P3 is a comprehensive Peritoneal Dialysis programme specifically designed to improve your patients’ quality of life while aiming to extend their time on PD.

P3 allows you to prescribe individual therapy programmes, monitor patient conditions and precisely adjust therapy when needed – in an efficient and optimised way.

P3 features three integrated categories:

- **Protect**: simple to use and easy-to-understand PD systems
- **Preserve**: ultra-low GDP fluids
- **Prolong**: individual therapies optimized for fluid balance control and guided prescription modelling

*PIN technology reduces the risk of contamination

1. Protect Preserve Prolong: Upgrade to Comprehensive PD, Fresenius Medical Care Deutschland GmbH, F00001009, 03.10.
2. Protect Preserve Prolong: Upgrade to Comprehensive PD, Fresenius Medical Care Deutschland GmbH, F00002664, 06.11.
8. Protect: Upgrade to Comprehensive PD, Fresenius Medical Care Deutschland GmbH, F00001011, 09.09.
10. Prolong: Upgrade to Comprehensive PD, Fresenius Medical Care Deutschland GmbH, F00001013, 05.10.

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<td>Pre-dialysis education, home guideline/policy and absence/minimal</td>
<td>Both authors are working for Baxter Healthcare Corporation, a manufacturer of home dialysis therapies</td>
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<td>provider-driven demand are significantly influencing the usage of</td>
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<td>O-5</td>
<td>Development of a nurse led PD service in South Africa: is it good</td>
<td>Brett Cullis has received speakers fees from Adcock Ingram Critical Care and Baxter Healthcare</td>
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<td>O-11</td>
<td>Randomised controlled open label study comparing mupirocin vs</td>
<td>The department has received grants from Baxter Healthcare and BBraun (supplier of Prontosan Wound Gel) to support this research</td>
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<td>O-13</td>
<td>Similar fibrogenic responses in two different models of peritoneal</td>
<td>This research is supported by Baxter Healthcare Corporation, USA. Dr. C. Hoff is an employee of Baxter</td>
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<td>O-14</td>
<td>Fibrogenic response to transforming growth factor B1 is mouse strain</td>
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<td>O-17</td>
<td>Inadequate cellular stress responses after exposure to peritoneal</td>
<td>Christoph Aufricht is a co-founder of Zytoprotec GmbH, a spin-off of the Medical University Vienna that holds the patent ’Carbohydrate-based peritoneal dialysis fluid comprising glutamine residue’ (International Publication Number: WO 2008/106702 A1).</td>
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<td>Two authors (BR and PV) are employees of Baxter Healthcare Corporation.</td>
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<td>mouse model atherosclerosis and vascular calcification</td>
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<td>Impact of polydispersity of glucose polymers on ultrafiltration and</td>
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<td>ultrafiltration efficiency</td>
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<td>different polyglucose formulations</td>
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<td>P-15</td>
<td>Effect of molecular weight on the ultrafiltration (UF) efficiency of</td>
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<td>glucose polymers with low polydispersity</td>
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<td>P-16</td>
<td>Optimization of molecular weight (MW) for monodisperse glucose</td>
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<td>polymers (GPS) providing improved ultrafiltration (UF) without</td>
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<td>additional caloric load: a theoretical comparison with icodextrin</td>
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<td>New developed double-cuffed self-locating catheter placement by</td>
<td>KUA, HIM and RRW has received a honorarium or consultancy fees from Fresenius.</td>
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<td>Patient views of a new system for CAPD - improved ease of use and</td>
<td>Authors are all employees of Baxter Healthcare.</td>
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<td>Lanthanum carbonate is effective in reducing serum phosphate levels</td>
<td>RW is a consultant to Shire pharmaceuticals. MG and JBC are both employees of Shire pharmaceuticals</td>
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<td>P-149</td>
<td>Peritoneal fluid transport, peritoneal equilibration test, and body composition</td>
<td>Bengt Lindholm is employed by Baxter Healthcare Corporation.</td>
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O-1

IMPROVED PD SURVIVAL RELATIVE TO HD 1990-2010

James Heaf1, Sonja Wehberg2, Henriette Engberg2

1Department of Nephrology, Copenhagen University Hospital at Herlev, Herlev, Denmark, 2Research Unit of Clinical Epidemiology, Centre for National Clinical Databases, University of Southern Denmark and Odense University Hospital, Odense, Denmark

Introduction

Many epidemiological studies comparing PD and HD survival have been published. They generally show a survival advantage for PD during the first 1-2 years of ESRD. Longterm outcomes (>3-4 years) are either similar or worse for PD. We investigated whether the relative survival of PD and HD patients had changed over time.

Methods

The survival of all 12095 patients starting treatment with dialysis in Denmark between 1.1.90 and 31.12.10 was investigated on an intention-to-treat (ITT) analysis, censored for transplantation. Survival was adjusted for age, sex, renal diagnosis and Charlson Comorbidity Index at start of therapy. These patients were divided into four 5-year cohorts.

Results

A fall in adjusted mortality for both groups was seen (HD -46%, PD -51%). An initial survival advantage for PD lasting up to 2 years was found in all cohorts and subgroups. PD outcomes after 4 years were poorer than HD. Overall, PD prognosis was better than HD and a relative improvement during the period was seen (relative ITT risk for PD 94% in 1990-94 falling to 81% in 2005-10). This improvement was greatest in the medium term (1-3 years), and was common for all subgroups (DM/Non-DM and </>65 years). The improvement in relative prognosis was particularly marked for patients >65 years, both diabetic and non-diabetic.

Conclusions

A major improvement in dialysis patient prognosis has occurred during the past 20 years. In addition, an improvement in the relative prognosis of PD compared to HD was seen.

O-2

PRE-DIALYSIS EDUCATION, HOME GUIDELINE/POLICY AND ABSENCE/MINIMAL PROVIDER-DRIVEN DEMAND ARE SIGNIFICANTLY INFLUENCING THE USAGE OF HOME DIALYSIS MODALITIES: AN ANALYSIS OF 14 EUROPEAN AND NORTH-AMERICAN COUNTRIES

Suzanne Laplante1, Peter Vanovertveld2

1Baxter Healthcare Corporation, Braine l’Alleud, Belgium, 2Baxter Healthcare Corporation, Zurich, Switzerland

Introduction

The use of home dialysis modalities (mostly peritoneal dialysis) varies across Europe and North America from today <5% in Germany to a high 28% in Denmark. Reimbursement and renal care organization have often been cited as responsible for the differences. However, the importance of the various factors has never been quantified.

Methods

The organization of renal care of 12 European countries, Canada and the USA were reviewed using a series of 8 factors (i.e., home target, reimbursement level, payment flow, pre-dialysis education, assisted dialysis, guideline/policy favouring dialysis at home, incentives for home, monitoring/planning tool). A semi-quantitative scoring algorithm was developed and used to rate country renal care organization based on publicly available information. A regression analysis was used to explore the relationship between the score and the use of home dialysis modalities as retrieved from the latest available ERA-EDTA, USRDS and Canada organ replacement registry reports, the German Medical Netcare report and published data for Switzerland. The most significant factors were identified by analysis of variance.

Results

A significant ($r^2=0.694; p<0.001$) correlation was found between the total score and home dialysis modalities usage. Three factors were especially significant: well funded and independent pre-dialysis education ($p<0.001$), clinical guideline/policy favouring home modalities ($p=0.002$) and (the absence of) provider-driven demand* ($p=0.035$). Nordic countries, Canada, and to a smaller extent the UK and the Netherlands performed better on these 3 factors than countries such as Germany or USA.

Discussion

Pre-dialysis education, home guideline/policy and absence of provider-driven demand significantly influence the usage of home dialysis modalities in the 14 countries analysed. This suggests that actions to implement and/or correct these 3 factors should be prioritized in countries intending to increase usage of home modalities.

*healthcare service demand driven by benefits (financial or other) to the provider rather than benefits to the patient.
O-3
IMPLEMENTATION OF A NATIONAL TRAINING COURSE FOR LOCAL ANAESTHETIC PD CATHETER INSERTIONS
Joble Joseph, Janet Wild, Peter Rutherford
Baxter Healthcare Sa, Zurich, Switzerland

Introduction
Local anaesthetic (LA) PD catheter insertion is a frequently practiced procedure with low complication rates has advantages in the efficient use of resources and avoids general anaesthesia. Additionally, a positive effect on PD uptake is reported when nephrologists insert LA catheters. In a UK survey, over 70% of renal units stated they rely on surgical resources to insert PD catheters, but two-thirds of respondents indicated they may attend a LA insertion course. This study describes the development of a LA PD course and its outcomes.

Methods
A faculty of 7 experts (surgical, medical and nursing) was created to agree structure and content of the course using the percutaneous Seldinger technique.

A 4-step course was devised.
- Pre-course preparation to set up the service, including gaining hospital management approval and the development of protocols
- Pre-course study using on-line education.
- Two-day course covering basic surgical skills, simulated catheter insertion, and review of each unit’s protocols.
- Supervised clinical practice at base unit with a trained mentor

Results
Between April 2008 and February 2011, 18 centres completed the course, 12 (66%) of whom have set up and are running a LA PD catheter insertion programme including one where a nurse performs the technique. 6 of 12 (50%) centres are able to offer PD catheter insertion to late presenting patients. Primary patency rate is high. Failure to set up the service included resistance from the surgical team and preference for surgical team to develop their own service.

Discussion
LA PD catheter insertion is a cost effective model of care that enables more patients to have the option of a home therapy. A faculty led approach to the development of the protocols, and procedures required to set up such a service has shown to be an effective strategy to increase the use of this technique.

O-4
EXPERIENCE OF SETTING UP A NATIONAL ASSISTED APD SERVICE
Joble Joseph, Janet Wild, Dawn Sarioglu, Peter Rutherford
Baxter Healthcare Sa, Zurich, Switzerland

Introduction
With an aging and increasing co-morbid dialysis population the challenges associated with enabling patients to have dialysis at home have become apparent. Thus a national assisted Automated Peritoneal Dialysis (aAPD) service was set up in July 2007. Here we describe the model and the outcomes to date.

Methods
A national network of Health Care Assistants (HCAs) were trained to deliver a high quality daily service in the patient’s home. HCAs are experienced in basic nursing care but not registered nurses. The HCAs are trained to a high standard using a robust 5 day classroom based programme followed by supervised community practice. Spot checks and annual reassessments are performed on all HCAs to ensure all competencies are met. They strip and setup the APD machine leaving the patient to connect/disconnect to/from the therapy. Patients are referred to the service from their parent renal unit and are either new to PD or existing patients requiring additional support.

Results
To date, 38 units, and 365 patients (55% male) have used the service. 135 of the 365 patients are currently on therapy. The median age is 72 years (range 8 to 95 years). The cohort falls into 2 distinct groups – permanent and temporary. Temporary patients used the therapy to gain self-confidence and become self-caring, averaging 71 days before becoming independent. 57 patients were able to wean off the assisted service as they gained confidence. Family members took over the assistance role when they had developed their confidence in 9 patients. In the permanent cohort, average time on Therapy Was 296 Days.

Discussion
This novel approach has allowed more patients to remain at home. This HCA network provides a reliable, effective and flexible mechanism to deliver aAPD nationally as they can cover a wide geographical area, rather than being limited to just one renal unit.
O-5
DEVELOPMENT OF A NURSE LED PD SERVICE IN SOUTH AFRICA. IS IT GOOD ENOUGH?
Barbara Crisp1, Neil Collinge1, Brett Cullis2
1Greys Hospital, Pietermaritzburg, Kwa-Zulu Natal, South Africa, 2Royal Devon and Exeter NHS Trust, Exeter, Devon, United Kingdom

Introduction
Greys Hospital serves a population of 3.5 million and is served by only one nephrologist. Patients travel significant distances to dialyse, but due to resource limitations this is restricted to twice a week. For these reasons a peritoneal dialysis (PD) service has been developed, but in order to be viable it needed to be nurse led due to the extreme pressures on the local nephrologist.

A PD nurse specialist (PDNS) was trained over six months in all aspects of PD management, on ward rounds, in clinic and at a formal PD education workshop.

Method
After 5 months a service evaluation was performed to assess the ability of the PDNS to manage patients independently in clinic. Patients were seen separately by the PDNS and the nephrologist, Assessments were made of fluid balance, exit site, dialysis adequacy, anaemia and bone disease and nutrition as well as identifying any non PD problems. A management plan was formulated.

The PDNS's assessments were scored as: Comparable, minor difference (unlikely to alter management plan) or major difference (likely to alter management plan). Any non PD medical issues identified by the nephrologist were correlated with those of the PDNS. Management plans were scored as above.

Results
Nine patients were seen in two clinics. No cases of exit site infection were missed. Other assessment parameters are presented below

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Fluid Adequacy</th>
<th>Nutrition</th>
<th>Anaemia</th>
<th>Bone</th>
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<tr>
<td>Comparable</td>
<td>8</td>
<td>9</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Minor</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Major</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
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The nephrologist identified eight medical issues, all of which were identified by the PDNS. Management plans were comparable in six patients. Three had minor differences relating to dialysate strength none of which were deemed clinically relevant.

Conclusion
This demonstrates in our institution a PDNS can independently run a PD service aided by locally developed management protocols.

O-6
DEVELOPMENT OF A PERITONEAL DIALYSIS PROGRAM: IMPACT OF A PRÉ-DIALYSIS EDUCATION PROGRAM
Carla Santos-Araújo, Manuel Pestana
Nephrology Research and Development Unit - Hospital S. João, Porto, Portugal

The current status of peritoneal dialysis (PD) for the treatment of end-stage renal disease (ESRD) varies markedly worldwide and is being reexamined from a global perspective. The number of incident and prevalent ESRD patients in Portugal is highest among other European countries. Despite comparable survival of hemodialysis (HD) and PD and improved PD technique survival over the last few years, PD utilization in Portugal remains as low as 5.6% according to the most recent report (2009). The increased numbers of in-center HD units, physician comfort with the modality, perceived superiority of HD, reimbursement incentives as well as lack of adequate chronic kidney disease (CKD) education programs all contribute to underutilization of PD in Portugal. It has been suggested that if patients are provided with CKD education, then between 30 to 40% of patients will opt for PD. From 2007 onwards, an effort was made in our nephrology department to develop a pre-dialysis education program (PDEP); the objectives were to decrease the mystique surrounding dialysis, provide patients with objective and neutral information about ESRD treatment alternatives, help them make a proper treatment choice and promote self-care.

From 2007 to 2010, the number of incident patients on renal replacement therapy (RRT) that went through our PDEP did differ significantly (38% to 40%, respectively). However, the percentage of ESRD patients that went through our PDEP and choose PD as first option more than doubled throughout the same period. This was accompanied by a huge increased in the number of prevalent PD patients (see table).

<table>
<thead>
<tr>
<th>Incident pts on RRT</th>
<th>Incident pts choosing PD</th>
<th>Incident PD pts</th>
<th>Prevalent PD pts</th>
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<tr>
<td>2007 268</td>
<td>5.2%</td>
<td>14</td>
<td>44</td>
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<tr>
<td>2008 330</td>
<td>10.3%</td>
<td>34</td>
<td>59</td>
</tr>
<tr>
<td>2009 312</td>
<td>17.0%</td>
<td>53</td>
<td>87</td>
</tr>
<tr>
<td>2010 416</td>
<td>11.5%</td>
<td>48</td>
<td>112</td>
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</table>

In an era where an increasing number of patients have to be treated with more and more restricted resources, ESRD patients should be informed on the various RRT modalities, to choose and participate in their medical management. Our experience further suggests that the number of ESRD patients who choose PD as first option critically depends on the timely access to a well structured CKD education program.
O-7
PERCUTANEOUS VERSUS SURGICAL INSERTION OF PERITONEAL DIALYSIS CATHETERS - COMPARING OUTCOMES: A SINGLE CENTRE EXPERIENCE

Samar Medani, Mohamed Shantier, Wael Hussein, Catherine Wall, George Mellotte
Adelaide & Meath Hospital, Dublin, Ireland

Background
Peritoneal dialysis (PD) is the preferred available option of renal replacement therapy for a growing number of end stage kidney disease patients. A major limiting factor to the successful continuation of PD is long-term viability of the PD catheter (PDC). Percutaneous placement of PDCs is not commonly practiced despite recent published data encouraging use of this technique. Its advantages include faster recovery and avoidance of general anaesthesia.

Methods
We carried out a retrospective analysis of the outcomes of 313 PDC insertions in our centre comparing percutaneous PDC insertions between July 1998 and April 2010 (group P) with surgical PDC insertions from January 2003 to April 2010 (group S).

Results
151 group P and 162 group S catheter insertions were analysed. Significantly more patients in group S had previously undergone abdominal surgery or PDC insertion compared with group P (41.8 % versus 9.3 % and 33.3 % versus 3.3% respectively; P=0.00). There were more exit site leaks in group P than in group S (20.5 % versus 6.8%; P= 0.002) but no significant differences in peritonitis rates (1 episode per 16.5 catheter months versus 1 episode per 12.5 catheter months; P= 0.36), poor initial drainage (9.9 % versus 11.7 %; P= 0.1) or secondary drainage failure (7.9% versus 12.3 %; P= 0.38). Technical survival at 3 months was significantly better for group P than for group S (86.5 % versus 77 %; p= 0.047%) and at 12 months was 76 % versus 67.7 % respectively (P= 0.189). 

Conclusion
We have demonstrated further encouraging outcomes of percutaneous PDC placement in comparison with the open surgical technique. The percutaneous insertion group were primarily a selected subset of patients without prior abdominal surgery or PDC insertion, therefore limiting this comparability. Further studies eliminating these confounding factors are required although local expertise may affect generalisability of the results.

O-8
A MULTICENTRE COMPARATIVE STUDY OF THE TECHNIQUE OF PERCUTANEOUS PLACEMENT OF CAPD CATHETERS

Johann Nicholas1, Mark Thomas2, Roger Adkins2, Kanwal Sandhu1, Jonathan Odum1, Indranil Dasgupta2
1Newcross Hospital, Wolverhampton, United Kingdom, 2Heart of England NHS Trust, Birmingham, United Kingdom

CAPD catheters can be percutaneously inserted (PI) under local anaesthesia and is a well tolerated, rapidly performed, day case procedure which enables timely initiation of peritoneal dialysis. This is a retrospective study, comparing technique survival of PI with the conventional surgical inserted catheters (SI) from two centres (Nx and BHH) spanning a decade. 613 consecutive patients receiving peritoneal dialysis and undergoing primary PD catheter placement in two centres have been selected and observed. 369 catheters were inserted percutaneously (PI) and 244 required a mini-laparotomy (SI). SI were performed in patients who had prior laparotomies or in patients who had decline a PI.

200 catheters were removed following infective episodes (31% Nx and 34.7% BHH, p= ns), (53% PI); 105 were removed due to mechanical dysfunction (10.5% Nx, 27.3% BHH, p<0.05), (56% PI),
Catheter survival was calculated from insertion to the point of catheter removal or discontinuation of PD. Survival censor events included episodes when a catheter was removed following an infection or after mechanical dysfunction. Although there was a larger proportion of catheter removals following mechanical complications in one centre, there was no significant difference between PI and SI.

Catheter removal following infections alone was more common with SI than PI following correction for age, gender and centres (HR – 1.39, 95% CI 1.05 to 1.84, p<0.05).

Overall, catheter survival following PI and SI when censored for infections and mechanical failure were similar using Log-Rank tests (p=ns). The median catheter survival time was 279 days.

This is a unique study, evaluating a large number of patients undergoing PI/SI across two centres over a decade. It has noted PI is an effective and safe method of PD catheter placement and it can be performed as a day case procedure, providing a reliable form of access for peritoneal dialysis and could support the growth of home therapies in most centres.
O-9
EMBEDDED CATHETERS DELAY INITIATION OF PERITONEAL DIALYSIS – A UK SINGLE CENTRE EXPERIENCE
Alexander Hamilton, Helen Burns, Duncan Whitehead, Naomi Maxwell, Coralie Bingham, Brett Cullis
Royal Devon and Exeter NHS Foundation Trust, Exeter, United Kingdom

Introduction
In October 2009 our unit began using embedded catheters (EC) in patients who had opted for peritoneal dialysis (PD). We compared data regarding EC with non-embedded catheters (NEC).

Aims
To assess whether exposure to PD is delayed with EC compared to NEC and whether they reduce the need for temporary haemodialysis access.

Method
Service evaluation of EC externalised from October 2009 (n=17) compared with patients who had NEC inserted from April 2008 (n=20)[1]. Median estimated glomerular filtration rates (eGFR) at time of PD initiation were calculated. The number of days free of PD in the EC group was calculated as time from median GFR of the NEC group to the time of initiation onto PD.

The numbers of patients who had chosen PD but had to start with a temporary haemodialysis (HD) catheter were recorded.

Results
In the NEC group 11/20 (55%) patients started PD with a GFR ≥10. In the EC group 6/17 (35%) started PD with a GFR ≥10.

Of the EC patients starting PD with a GFR <10, the mean number of days between eGFR 10 and initiation was 261 days (range 26-904).

<table>
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<tr>
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<th>EC (n=17)</th>
<th>NEC (n=20)</th>
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<tbody>
<tr>
<td>Mean eGFR</td>
<td>8.38</td>
<td>9.75</td>
</tr>
<tr>
<td>Median eGFR</td>
<td>8 (range 5-15)</td>
<td>10 (range 6-14)</td>
</tr>
<tr>
<td>Number requiring bridging HD to PD</td>
<td>0</td>
<td>4 (2 ‘crashlanders’)</td>
</tr>
</tbody>
</table>

Discussion
Embedded catheters provide pre-emptive access to dialysis, similar to arterio-venous fistulae. This gives clinicians confidence to delay dialysis initiation until patients are symptomatic. In our patient group, this appears to reduce lifetime exposure of the peritoneal membrane to glucose containing products. These results need to be confirmed in a larger study.


O-10
C-REACTIVE PROTEIN AND PULSE PRESSURE AS PREDICTORS OF MORBIDITY AND MORTALITY IN PATIENTS STARTING PERITONEAL DIALYSIS
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Introduction
Cardiovascular and infectious complications are the main causes of morbidity and mortality in peritoneal dialysis (PD) patients. C-Reactive Protein (CRP), a marker of inflammation and pulse pressure (PP), a measure of arterial stiffness, are associated with poor outcomes in dialysis patients. However, few studies showed these associations in PD patients. The aim of our study was to evaluate the role of CRP and PP at the start of peritoneal dialysis on the morbidity and mortality in PD patients.

Methods
We prospectively followed 105 incident PD patients for a period ≥3 months from 2000. Baseline clinical and biochemical data and PP, calculated by subtracting diastolic blood pressure (BP) from systolic BP, were collected. Data regarding cardiovascular events (CVE), hospitalizations and mortality was recorded throughout the follow-up period. In the statistical analysis we used the receiver operating characteristic (ROC) curve analysis.

Results
From the 105 incident patients, 43% were female with a mean age 53 ± 16.3 years. The mean duration of follow-up was 31 (range 3–99) months. The mean baseline values of CRP and PP were 14.3mg/L and 59.6 mmHg, respectively. A CVE was observed in 38 patients. 75.2% were hospitalized and 36.2% died. Peritonitis was the major cause both for hospitalization (36.1%) and death (22.4%).

ROC curve analysis showed that CRP (AUC=0.684; p=0.003) and PP (AUC 0.692; p=0.002) are predictors of mortality. CRP was also a predictor of peritonitis (AUC=0.652; p=0.014).

Discussion
In our study, CRP and PP evaluated at baseline showed to be valuable predictors of mortality and CRP was also predictive of the occurrence of peritonitis. In our opinion, they should be measured at the start of PD to help predict outcomes.
O-11

RANDOMISED CONTROLLED OPEN LABEL STUDY COMPARING MUPIROCIN VS ANTISPETIC POLYHEXANIDE FOR EXIT SITE CARE

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Introduction
Mupirocin application to Peritoneal Dialysis catheter exit sites is recommended by ISPD. However, the fear of Mupirocin resistance has hindered its introduction. We have compared Mupirocin ointment (Bactroban) against an antiseptic, Polyhexanide (Prontosan Wound Gel) in an open label randomised study.

Methods
106 prevalent patients were randomised to apply either Mupirocin or Polyhexanide to exit sites. There were no differences in demographic parameters including age, dialysis vintage, use of biocompatible solutions or APDvsCAPD.

Results
Mupirocin was used for a total of 697 patient-months (mean follow-up of 13.1 months/patient). There were 23 peritonitis episodes and 4 exit site infections (ESI). Polyhexanide was applied for 647 patient-months (mean 12.2 months/patient) with 25 peritonitis and 14 ESI.

Peritonitis-free survival was not statistically inferior in the Polyhexanide group (HR: 0.67, 95%CI: 0.34-1.32). However, ESI rate was significantly greater in the Polyhexanide Group (OR 0.26, 95% CI: 0.09-0.80). All episodes of pseudomonas (6) and staph aureus (4) ESI occurred in the Polyhexanide Group (p<0.001 by Chi Square). The difference was particularly marked in the non-diabetic patients.

Conclusion
We have shown in a randomised trial that prophylactic use of a Mupirocin ointment (Bactroban) is superior to a formulation of Polyhexanide (Prontosan Wound Gel) in preventing ESI particularly from pseudomonas and staph aureus. Although the trend to increased peritonitis with Prontosan did not reach statistical significance, safety concerns led to the termination of the study.

Reducing pseudomonas infections by Mupirocin is not without theoretical basis; mupirocin inhibits flagella formation and motility of pseudomonas - known virulence factors. Its antibiotic effectiveness against Gram positive organisms is well documented.

Prontosan Wound Gel is licenced for use on exit-site of central venous catheters. But our study showed it is inferior to Bactroban in preventing serious ESI. Thus, despite the theoretical risk of developing Mupirocin-resistant organisms, we recommend prophylactic use of Mupirocin ointment (Bactroban).

O-12

A PROSPECTIVE NATIONAL COHORT STUDY OF PERITONEAL DIALYSIS RELATED PERITONITIS: 2010 UPDATE

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Introduction
This study reports the peritonitis rates in all of the adult PD population in Scotland in the post-millennium period, with an update on the data from 2010.

Methods
The 6 monthly prospective audit data (episodes of peritonitis and causes of technique failure) reported to the Scottish Renal Registry (SRR) from all 10 adult renal units in Scotland has been analysed for this study from 01/01/2000 - 31/12/2010.

Results
1) Peritonitis rates in each adult renal unit 2000-2010: Peritonitis rates in Scotland were 19.9 months* (2000-2007), 18.5 months** (2008), 18.7 months*** (2009) and 18.9 months (2010). This varied from 12.7- 40.3 months in various individual units over these years.

* Data reported at the ISPD meeting, Vancouver, 2009
** Data reported in the Scottish Renal Registry 2009 Report
*** Data reported at the ISPD meeting, Vancouver, 2009

2) Causative organisms: The causative organisms of the 176 peritonitis episodes during 2010 were coagulase negative Staphylococcus (n=55, 31.3%), Staphylococcus aureus (n=23, 13.0%), Gram-negative bacilli (n=23, 13.0%), other organisms e.g. Streptococci (n=43, 24.4%), fungal (n=5, 3%) and culture negative (n=27, 15.3%). This spectrum of causative organisms was similar to earlier reports.

3) Technique failure: Peritonitis accounted for 35/93 (38%) of all PD technique failure during 2010.

Discussion
National peritonitis rates remain unchanged over more than a decade and each year meet the standards set by the UK Renal Association. However, wide variation among various units warrants review of preventative strategies across the country to identify best practice in the units with the lowest rates of peritonitis.
O-13
SIMILAR FIBROGENIC RESPONSES IN TWO DIFFERENT MODELS OF PERITONEAL INJURY
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Introduction
There are many animal models of peritoneal injury – these include exposure to peritoneal dialysis solutions, chemical irritation, and virus-mediated expression of fibrogenic molecules. Whether the peritoneum responds similarly in these models has not been assessed.

Methods
We evaluated the differential peritoneal response in 4 different mouse strains to 2 peritoneal injury models; an adenovirus expressing active transforming growth factor (TGF) ß and daily peritoneal fluid infusion via a tunneled peritoneal catheter. We used genetically distinct C57Bl/6J (B6), DBA/2J (DBA), C3H/HeJ (C3H) and SJL/J (SJL) mice. Adenovirus was administered with a single intraperitoneal injection. Mice were sacrificed 10 days after infection. A null adenovirus was used for control. In the chronic infusion model, a subcutaneously tunneled silicone catheter was placed. Mice were allowed to recover for 1 week then daily infusion of 2.5% glucose (0.08 ml/g) was initiated and continued for 6 weeks. Animals with no catheter were used as control.

Results
After correction for baseline differences in control animals, B6 animals demonstrated similarly increased collagen content in both daily infusion and adenovirus models. Gene expression of type 1 collagen, fibronectin, Snai1, and Snai2 was measured by quantitative PCR. The pattern of gene expression was similar between animals exposed to chronic dialysis fluid exposure and AdTGFß1.

Discussion
We were able to assess the response in 4 different mouse strains to 2 fibrogenic stimuli; active TGFß1 and daily dialysis fluid exposure. Interestingly, the fibrogenic and gene expression response patterns among the 4 mouse strains were similar between the 2 models. This suggests that the mechanism of peritoneal injury is similar in these 2 experimental models.

O-14
FIBROGENIC RESPONSE TO TRANSFORMING GROWTH FACTOR BETA 1 IS MOUSE STRAIN DEPENDENT
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Introduction
The etiology of encapsulating peritoneal sclerosis is generally unknown but genetic factors are likely important. In an effort to identify genetic determinants, we exposed 4 genetically distinct mouse strains to a fibrogenic stimulus and measured the peritoneal response.

Methods
We used an intraperitoneal injection of an adenovirus expressing active transforming growth factor (TGF) ß in C57Bl/6J (B6), DBA/2J (DBA), C3H/HeJ (C3H) and SJL/J (SJL) mice. Animals were sacrificed 4 and 10 days after infection with either AdTGFß1 or a control (null) adenovirus.

Results
In all mouse strains, active and total TGFß protein expression in peritoneal effluents was increased after AdTGFß1 infection. By day 10, only SJL mice continued to demonstrate significant TGFß peritoneal expression. This was confirmed by western blot for phosphorylated Smad2 which was significantly elevated only in SJL mice. TGFß type 1 receptor expression was similar in all groups. SJL mice had minimal fibrogenic response despite the prolonged TGFß expression. There was a graded response in submesothelial thickening with B6 having the greatest response, followed by DBA, C3H and SJL mice. Type 1 collagen protein expression was significantly increased in B6 mice. Gene expression was measured using quantitative PCR of mRNA extracted from the parietal peritoneal surface. Type 1 collagen, fibronectin, TIMP-1, Snai1, and Snai2 were all significantly elevated in B6, DBA and C3H mice, but unchanged in SJL mice treated with AdTGFß1.

Conclusion
There was a differential response to a potent fibrogenic stimulus in genetically distinct mouse strains. The lack of a fibrogenic response despite TGF-ß expression in SJL mice is intriguing and further assessment of the genetic differences between the SJL strain and the other strains is needed. Identification of genetically determined mediators may shed light on human genetic susceptibility to encapsulating peritoneal sclerosis.
DO CHANGES IN THE MATRIX METALLOPROTEINASE (MMP) SYSTEM UNDERLIE THE DEVELOPMENT OF PERITONEAL SCLEROSIS (PS) OR ENCAPSULATING PERITONEAL SCLEROSIS (EPS) DURING PERITONEAL DIALYSIS (PD)?

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Background
Peritoneal sclerosis (PS) limits PD duration. EPS is a rare, but serious complication of PD. EPS may represent the severe end of PS or an independent pathology. In many fibrotic diseases reduced Extracellular-matrix breakdown due to lowered MMP activity occurs, often from over-expression of Tissue inhibitors of MMP (TIMPs).

Hypothesis
Changes in the MMP system in PD fluid underlie PS &/or the switch to EPS. These may have value as prognostic markers or diagnostic tools.

Methods
Two patient cohorts: 1) 32 Sheffield PD fluid samples (overnight dwells) from individual patients including 1 EPS patient, 2) 209 samples from the Global Fluid Study (GFS) with sequential samples from 12 EPS & 42 matched non-EPS patients (4-hour dwell). Total MMP activity was assessed using the ENZchek system. TIMP and MMP were quantified by commercial ELISA (ng/ml).

Results
The Sheffield cohort had minimal MMP activity in PD fluid. MMP-1 & MMP-9 were almost undetectable. MMP-2 was present (46±6.5). In contrast all TIMPs had significant levels in peritoneal fluid from commencing PD (TIMP-1 109±15.5, TIMP-2 17±2.1, and TIMP-3 0.29±0.065) with all TIMPS raised in EPS. Subsequently TIMP-1 & 2 were measured in the GFS. Both EPS and non-EPS patients had similar TIMP-1 levels (66±3.7) throughout PD until the last 100 days of PD, where all developing EPS had >7 fold increase. TIMP-2 showed no changes between control and EPS (12±1). The TIMP-1/TIMP-2 ratio maintained >5 fold increase in late EPS samples while reducing variation.

Conclusions
Negligible MMP activity in PD effluent results from higher TIMP than MMP levels. This is consistent with a fibrotic phenotype which could underlie the development of simple PS. Elevated TIMP-1 in fluid may have value as a diagnostic tool or late biomarker of EPS. Using the TIMP-1/TIMP-2 ratio provides an internal reference lowering false positives.

THE PERITONEAL MEMBRANE, A FASCINATING TOOL FOR IN VIVO RESEARCH OF CARDIOVASCULAR DISEASE IN UREMIA

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The major cause of death in CKD-patients is cardiovascular disease. Accumulation of uremic toxins is partly involved in this condition. In vitro models showed that p-cresylsulfate (pCS) and indoxylsulfate (IS) have an effect on leukocyte activation and/or vascular integrity. These models however miss the complicated cross-talk between different cell systems as present in vivo. This study evaluated the effects induced by acute exposure to uremic toxins on the recruitment of circulating leukocytes in the rat peritoneal vascular bed, using intravital microscopy.

The peritoneum of rats was exposed to HBSS (physiologic solution) or HBSS containing a uremic toxin at a concentration relevant in uremia. Leukocyte-endothelial interactions, blood flow rate and vessel diameter were analyzed in postcapillary venules during 120 min.

No effect on rolling and adhering leukocytes was observed in the controls during the 120 min evaluation period. Exposure to pCS increased rolling after 2 min (p<0.05). Adhering significantly increased at 120 min (p=0.011). Extravasation was significantly increased from 20 min on (p<0.05), which became significantly higher compared to the controls after 30 and 60 min. Exposure to IS did not have a clear effect on rolling and adhesion, but caused a strong and fast extravasation after 10 min of exposure (p<0.05). This became significantly higher, compared to the controls after 30 min (p<0.05). In 5/7 rats, an ‘interruption’ of blood flow was observed after ± 30-60 min of exposure to IS. Vasoconstrictive properties of IS tested with a wire myograph, could not be demonstrated.

These results provide clear evidence that pCS and IS exert a proinflammatory effect that could contribute to the propensity for vascular disease in uremic patients. Tissue factor will be investigated to reveal a possible role of the coagulation-cascade in the interrupted blood flow, observed after IS-exposure. The effect of other toxins (SDMA,ADMA,para-cresylglucuronide) are currently under evaluation.
O-17

INADEQUATE CELLULAR STRESS RESPONSES AFTER EXPOSURE TO PERITONEAL DIALYSIS FLUIDS AND POTENTIAL TARGETS FOR CYTOPROTECTION

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Peritoneal dialysis (PD) helps patients with end stage renal disease to survive before kidney transplantation. However, the applied PD-fluid (PDF) leads to damage of peritoneal mesothelial cells (MC) used as dialysis membrane. In contrast to earlier studies, where heat shock proteins (HSP) were evaluated as standard biomarkers of PDF toxicity, recent results indicated depressed HSP levels, leading to further increased vulnerability of cells.

In a combined proteomics and bioinformatics approach, we used gel-based fluorescent detection of protein abundance and MALDI-TOF protein identification to gain candidate lists of proteins for bioinformatic exploration. Using a next neighbor approach based on protein-protein interactions we searched enriched biological processes and pathways.

We identified sterile inflammation as a mechanisms leading to this inadequate cellular stress response. Danger signals lead to an elevated cytokine level associated with sterile inflammation via interleukin-1 receptor (IL-1R) mediated pathways. The addition of an IL-1R antagonist resulted in significant cytoprotection of MC, with blockade of sterile inflammation and significantly altered expression of proteins involved in relevant processes.

Comparing the stress proteome between acute and extended PDF exposure, we found “dampening” of biological processes. Addition of alanyl-glutamine ameliorated this effect, associated with increased survival of MC. A significantly higher number of marker proteins regained their differential expression level upon PDF exposure, with the majority of proteins being involved in chaperoning processes.

By combining proteomics with well-established animal models of experimental PD, protein expression patterns of PD-effluent fractions of rats were generated by using sequential detergent extraction, depletion methods for plasma proteins and 2D-DIGE, to distinguish between cellular populations and characterize the involved cellular mechanisms.

This work describes the inadequate cellular stress response of MC following PDF exposure as a novel pathomechanism in PD. Depressed HSP expression increased the susceptibility of MC during experimental PD. Supplementation of PDF restored the cytoprotective stress proteome, resulting in improved cellular resistance.

O-18

INTERNATIONAL PERITONEAL BIOPSY STUDY IN CHILDREN: DATA FROM NON UREMIC CONTROLS

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Within few years the peritoneal membrane of adult peritoneal dialysis (PD) patients undergoes substantial morphological transformation. To date very limited data have been obtained in children on PD. We therefore initiated an international pediatric PD biopsy registry, including more than 50 centers. To allow for an age specific comparison to healthy controls, we performed peritoneal biopsies in non uremic children, who underwent elective surgery for diseases not affecting the peritoneum.

Thus far, peritoneal biopsies were obtained from 16 non-uremic children (0.2 - 16.6 years) from the parietal peritoneum and omentum at defined positions. Analyses included light microscopy and semiquantitative histomorphometry.

The mesothelial cell layer was intact in 13 out of 16 children. In infants and small children no to very little submesothelial fat could be detected. Thus, the submesothelial compact zone reaches to the muscle fascia with a mean thickness of 293±89 (150-400) µm, which is much more than observed in non uremic adults from our centre (36.3±20µm). Few anti-smooth muscle antibody positive, activated fibroblasts were detected in 35% of the children and no CD45 or CD68 positive, inflammatory cells. Omental vessel wall/lumen ratio appears to be higher as compared to adults. None of the children exhibited a biopsy related complication.

Conclusions

PD membrane biopsy sampling is feasible in infants and small children. Our preliminary findings in non uremic children suggest substantial differences in peritoneal morphology as compared to adults.
O-19

A NEW TEST FOR EVALUATION OF THREE-PORE MODEL PARAMETERS IN PERITONEAL DIALYSIS PATIENTS

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Introduction

The standard methods for evaluation of peritoneal transport (e.g. Peritoneal Equilibration Test, PET) cannot discriminate between different transport mechanisms, whereas more sophisticated methods require the application of labeled volume marker and advanced measurement techniques or a sophisticated clinical protocol. Therefore, there is need to combine clinical studies and mathematical modeling to get a new, feasible method of providing detailed information about fluid transport characteristics.

Methods

The test consists of PET (glucose 2.27%, 4h), miniPET (glucose 3.86%, 1h) and overnight exchange (personal prescription). Collected data include dwell times, infused and drained volumes, dialysate and blood solute concentrations (urea, creatinine, glucose, and sodium). Peritoneal transport parameters are estimated using three-pore model and clinical data, including hydraulic permeability, contribution of ultrasmall pores, osmotic conductance, and peritoneal absorption (for fluid transport), and diffusive mass transport parameter and sieving coefficient (for solute transport).

Results

The test was performed in 17 stable CAPD patients. Using a three-pore model with fitted parameters it was possible to obtain a good agreement of simulated and clinical data as regards final dialysate volume and sodium, urea and glucose concentrations in dialysate with percentage errors less than 10%. Hydraulic permeability was 0.0338 +/- 0.0368 (mean +/- SD) mL/min/mmHg, peritoneal absorption 1.10 +/- 0.90 mL/min, and contributions of ultrasmall pores 0.095 +/- 0.076, and diffusive mass transport coefficients were similar to that from three-pore theory.

Discussion

The fluid transport parameters were different than those applied in the standard three pore theory with higher share of ultrasmall pores and peritoneal absorption, and lower hydraulic permeability. However, osmotic conductance was of the same order as that applied in other studies.

O-20

THE HMB-PP PRODUCING CAPACITY OF THE CAUSATIVE PATHOGEN PREDICT OUTCOME IN PERITONEAL DIALYSIS ASSOCIATED PERITONITIS

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Introduction

Peritoneal infection and associated inflammation remain frequent complications in peritoneal dialysis (PD) patients. However, only little is known about host-pathogen relationships depending on the nature of the causative species, and whether and how this interaction has implications for local immune responses and clinical outcome. γδ T cells play a pivotal role in sensing ‘danger’ signals from invading pathogens through their ability to recognize the microbial metabolite (E)-4-hydroxy-3-methyl-but-2-enyl pyrophosphate (HMB-PP) produced by many Gram+ and Gram− bacteria.

Methods

In this study we characterized the local immune responses in episodes of PD associated peritonitis by multi-color flow cytometry and multiplex ELISA and validated the clinical relevance for patient and technique survival in two independent patient cohorts in Australia and the United Kingdom. Episodes were grouped according to the result of organism culture into HMB-PP+ (e.g. Corynebacterium, E. coli, Pseudomonas) and HMB-PP− (e.g. Enterococcus, Staphylococcus, Streptococcus) within culture-positive infections.

Findings

Within the culture-positive group, the capacity of the causative pathogen to produce HMB-PP together with peritoneal infiltrates of activated γδ T cells and increased peritoneal levels of TNF-α during bacterial infection were indicative of detrimental inflammatory responses. In vitro experiments demonstrated that γδ T cells from peripheral blood, omental tissue and peritoneal cavity of non-infected individuals readily respond to HMB-PP.

Conclusions

Our results implicate HMB-PP responsive γδ T cells in the nature and severity of the peritoneal immune response to bacterial infection, which may be of diagnostic, predictive and therapeutic value for PD associated peritonitis patients.
O-21
DAILY TREATMENT WITH SODIUM PYROPHOSPHATE IN A PERITONEAL DIALYSIS SOLUTION (PPI-PD) TOTALLY PREVENTS AORTIC CALCIFICATION IN A UREMIC MOUSE MODEL ATHEROSCLEROSIS AND VASCULAR CALCIFICATION

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Background
Cardiovascular mortality is extremely high in CKD and in dialysis patients severely limits life expectancy. Strongly implicated is the development and rapid worsening of vascular calcification (VC). Pyrophosphate (PPi) is thought to be a major natural inhibitor of soft tissue calcification, but appears reduced in CKD. The short, approximately 10 min half-life of PPi in circulation with IV delivery stimulated past work creating bisphosphonates as stable analogs of PPi. However these drugs are contraindicated in ESRD patients as they may induce bone loss when not cleared, especially in patients with low turnover bone disease. We reasoned that daily delivery of PPi by peritoneal dialysis (PPI-PD) might allow for more favorable pharmacokinetics (PK) and the prevention of VC.

Methods
First, PK studies were performed in uremic rats, comparing IV and PD delivery. Second, efficacy studies were carried out in apolipoprotein E gene knockout mice overlaid with severe reduction in renal mass. Treatment was administered daily over 8 weeks following confirmation of uremia. Calcification at the aortic root was measured using von Kossa’s staining followed by semi-quantitative morphological image processing, and separation of inside (intimal) and outside (presumed medial) lesions. PD was accomplished following the placement of permanent peritoneal catheters. The drug was delivered in a dialysis solution approximating the volume used in human PD; however the solution was not withdrawn, but allowed to be absorbed overnight.

Results
PPi-PD produced a reduced plasma peak owing to an extended (by approximately 4 hours) delivery compared to an IV bolus of PPi. The efficacy studies showed that daily PPi-PD produced a dose-dependent inhibition of aortic root calcification blocking both intimal and medial-like lesions. The highest dose of PPI-PD also produced a complete inhibition of total aortic calcification, which was reduced at a lower PPi concentration. Limited peritoneal inflammation was observed in control groups, and was not altered by PPI-PD, nor did it alter blood chemistry values.

Conclusions
Our study indicates a potential for PPI-PD to prevent the further development of VC. Although the mechanisms behind these effects remain to be defined, this study suggests a potentially effective dose range for consideration in future human studies.

O-22
SYSTEMIC ENDOTHELIAL ALBUMIN LEAK IS ASSOCIATED WITH MARKERS OF PLATELET ACTIVATION INDEPENDENT OF SYSTEMIC INFLAMMATION IN PREVALENT PERITONEAL DIALYSIS PATIENTS

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Background
Our purpose was to explore associations between endothelial barrier function, measured atranscapillary escape rate of albumin (TERalb), and soluble markers of systemic inflammation and endothelial injury.

Methods
This was a cross-sectional study of 41 prevalent PD patients (M/F 22/19, mean age 61 ± 17, Diabetes 29%). A panel of 17 plasma biomarkers including pro-inflammatory cytokines, endothelial biomarkers and MMPs, were measured. Hierarchical clustering (HCA) was used to identify patient groups according to the similarity of biomarker patterns. Principal component analysis (PCA) was used to reduce the large number of biomarkers to a smaller set of independent factors remaining as much of the variance as possible.

Results
The mean TERalb was 13.7 ± 8.9(%/h), higher than in normal populations (typically 5%). Three clusters and one outlier were defined from the HCA. Cluster 1 was characterized by inflammation, as indicated by higher CRP and lower albumin, and with intermediate TERalb. Cluster 2 was non-inflamed according to the lowest CRP levels and was with lower TERalb. Cluster 3 was higher in TERalb with moderate CRP levels. 2 principal components (PCs) were identified from the biomarker matrix. The first PC (PC1, platelet activation) was composed mainly of MMP-1, P-selectin, CD40L and VEGF. The second PC (PC2, pro-inflammation) featured an inverse relationship between MMP-3, and positively relate to IFN-gamma, TNF-α and VCAM-1, positively related to CRP. TERalb was positively related to PC1 but not PC2. Diabetes had higher PC1 and PC2 was higher in ischemic heart disease (IHD).

Conclusions
Endothelial barrier function is decreased in PD patients. Platelet activation is another marker of endothelial dysfunction (especially in diabetics) whereas inflammation markers are more associated with PD patients who have IHD.
IMPACT OF POLYDISPERSIY OF GLUCOSE POLYMERS ON ULTRAFILTRATION AND ULTRAFILTRATION EFFICIENCY

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Introduction
The glucose polymer icodextrin is known to enhance ultrafiltration during the long dwell and improve the fluid status of peritoneal dialysis patients. It is not yet possible to produce polymer solutions with a single molecular mass (monodisperse polymer), but only polydisperse polymers with a range of masses. Therefore it is important to understand the influence of polymer polydispersity on the performance of glucose polymers as osmotic agents.

Methods
Glucose polymer formulations were described theoretically using lognormal distributions with weight average molecular mass (MWw) of 6000, 11000, 15000, 20000 and 24000 daltons and polydispersity index (PDI) ranging from 1.0 to 3.5. Computer simulations of peritoneal dwells in patients with fast transport status were performed for dwell time 8-16 hours for: 1) osmolarity equivalent to that in Extraneal (icodextrin) PD solution (Baxter, USA) or 2) weight concentration of 7.5%.

Results
For fluids with equivalent osmolarity, significant decreases in ultrafiltration (UF) and ultrafiltration efficiency (UFE, defined as the net UF divided by the amount of carbohydrate absorbed) were observed with increasing PDI for all tested MWw. The highest ultrafiltration was obtained during dwells with the formulation of MWw = 24000 and PDI = 1 (requiring a concentration of 30.5%). For fluids with the same weight concentration, the highest ultrafiltration was obtained during dwells with glucose polymer formulations of low MWw and there were no substantial differences in UF and UFE for different PDI: slight increase or decrease was observed dependent on MWw and time of dialysis; the highest ultrafiltration was for MWw = 6000 and PDI = 1 or 3.5 depending on dwell time.

Discussion
Polydispersity index is important when comparing glucose polymer solutions with the same osmolarity, whereas for fluids with the same weight concentration impact of PDI is less vital.

DEVELOPING BIOIMPEDANCE (BIA) AS A TOOL FOR FLUID MANAGEMENT IN PERITONEAL DIALYSIS PATIENTS: A VALIDATION STUDY

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Introduction
Overhydration is a common finding among peritoneal dialysis patients. The combination of hypoalbuminaemia, a significant predictor of fluid status and the difference in the rate of change in fluid status, muscle mass and fat in PD make it difficult for the clinicians to determine fluid status with confidence. We hypothesize that regular monitoring of body composition using BIA adds value to the fluid management in PD patients.

Study Design
On-going multi-centre, prospective, randomized study of incident and prevalent PD patients stratified according to residual renal function >200ml vs <200ml at entry. To detect a between group difference in ECFv of 0.8 Kg requires 38 patients per group assuming type I error of 5% and 80% power. Patients in the active limb where BIA information is available the extracellular fluid volume (ECFv) remains unchanged over the observation period of 12 months. Following a 2-3 months run in period where fluid status is deemed optimal baseline BIA measurement is obtained in all patients. Measurements are taken in both groups 3 monthly and in addition at any time of clinical need in the active limb where BIA data is available. Interventions can be a combination of advice on dietary salt and fluid intake, increased use of diuretics, hypertonic solutions and icodextrin. Any interventions based on BIA data and their intended effects will be recorded prospectively.

Outcome Measures
The primary outcome is the maintenance of ECFv determined from BIA in the active limb. Other outcome measures are BP, residual urine volume, membrane function and cardiac function as determined from echocardiography and BNP.

Conclusion
Measurement of fluid status in PD is challenging and BIA can be a powerful clinical tool in the routine longitudinal management of fluid status. This study will give insight and valuable information as to the best application of this technique.
P-1

EVALUATION OF GLUCOSE AND ICODEXTRIN-BASED BIMODAL PERITONEAL DIALYSIS SOLUTIONS IN A RABBIT MODEL

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Introduction
Animal models have been used to evaluate the ultrafiltration (UF) performance of peritoneal dialysis (PD) solutions containing multiple crystalloid osmotic agents, but little data exist on solutions containing both crystalloid and icodextrin osmotic agents. We evaluated the UF performance of bimodal PD solutions containing both glucose and icodextrin in an experimental rabbit model and compared the results with those of human PD patients treated with the same solutions.

Methods
Bimodal solutions were administered to NZW female rabbits (3.0-3.3 kg) at 40 mL/kg BW (n=12/group). After a 4 or 8 hour dwell, blood and effluent were collected and net UF recorded. Bimodal solution formulations - 7.5% (w/v) icodextrin in combination with 0.35%, 1.36% and 2.6% glucose, and 6.8% (w/v) icodextrin in combination with 2.6% glucose – were based on published clinical studies. 7.5% icodextrin was used as a control. In some studies, radio-iodinated serum albumin (RISA) was used as a volume marker, allowing the evaluation of intraperitoneal volume profiles.

Results
Bimodal glucose/icodextrin solutions produced an increase in net UF vs. icodextrin alone. While the net UF produced by the 7.5% icodextrin/0.35% glucose solution was not statistically different from 7.5% icodextrin (38.3±24.7 vs. 42.6±19.9 mL, mean±SD), the 7.5% icodextrin/1.36% glucose and 7.5% icodextrin/2.6% glucose solutions produced increases of 50% and 60%, respectively (83.0±10.0 & 88.1±18.3 mL vs. 56.0±14.8 mL) (p<0.01). The 6.8% icodextrin/2.6% glucose solution, a low sodium formulation, produced a 2-fold increase over 6.8% icodextrin (92.9±15.3 vs. 46.8±23.2 mL) (p<0.001). Intraperitoneal volume profiles indicated that the increase in net UF with bimodal solutions vs. icodextrin alone occurred in the first 120 minutes of the dwell.

Discussion
The relative increase in UF produced by bimodal solutions in the rabbit is similar to that reported for PD patients. Our results suggest that rabbits may be useful in evaluating crystalloid- and icodextrin-based bimodal solutions.

P-2

A NOVEL VITAMIN D DEFICIENT RAT MODEL

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Peritoneal dialysis (PD) is associated with alterations of the peritoneal membrane. Vitamin-D-receptor activation plays an important role in inflammation, angiogenesis and fibrosis. Vitamin-D activation occurs mainly in the kidney, regulated by parathyroid hormone. This process is impaired in PD patients, which can lead to hyperparathyroidism and hypocalcemia.

To study the effects of different treatment regimes in PD, animal models are extremely useful. We use a rat PD exposure model to examine therapeutic interventions. To better mimic the human situation we previously performed parathyroidectomy to induce vitamin D deficiency. However, a lot of side effects by the direct effect of PTH affect the study parameters. Therefore, we developed another method to induce vitamin D deficiency.

Before starting a vitamin D deficient diet blood samples were drawn, under isoflurane anesthesia, from ten Wistar rats to determine 25-hydroxyvitamin D₃, 1,25- dihyroxyvitamin D₃, PTH, phosphate and calcium serum levels. The animals were used as their own control. They received a calcium enriched vitamin D deficient during the whole experiment. Moreover, three injections with 32 ng 19-nor 1,25-dihydroxyvitamin D₃ were given intraperitoneally in the first and second week to deplete the endogenous pool of 25-hydroxyvitamin D₃. After 21 days blood samples were collected for analyses.

Comparing the median 25-hydroxyvitamin D₃ and 1,25- dihydroxyvitamin D₃ serum levels before the start and at the end of experiment, we observe large significantly decreased levels from 61.45 nmol/L to 13.1 nmol/L and 475.5 pmol/L to below detection level (30 pg/ml), respectively. Calcium levels increased (2.252 mmol/L to 2.67 mmol/L) and phosphate levels decreased (2.285 to 2.01 mmol/L) which might explain some fluctuation in PTH levels.

The protocol allows successful generation of vitamin D deficient rat and is not only a useful animal model in PD research but also for studying bone or heart abnormalities observed in vitamin D deficiency.
P-3

AN EXPERIMENTAL, NON-UREMIC RABBIT MODEL OF PERITONEAL DIALYSIS

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Introduction
Standard peritoneal dialysis (PD) solutions are not biocompatible with peritoneal membrane.

Aim of the Study
The aim of the study was developing a new experimental non-uremic rabbit model of PD to investigate the long-term effect of dialysis fluids.

Methods
The study was performed on 17 healthy Chinchilla during a five-weeks follow up. Animals were anesthetized with Thiopental injection. Catheter placement was a modified version of the procedure described in the literature. We used double-lumen central venous catheter or part of infusion system as peritoneal catheter. The exit site of the catheter was made at the dorsal part of the neck and the catheter was placed in the abdomen throught a subcutaneous tunnel. Immediately after opening the peritoneal cavity, biopsies of peritoneal tissue were taken from diagonal edges and the catheter was placed at the floor of peritoneal cavity. The tissue was, then routinely processed to be analyzed by light microscopy and for transmission electron microscopy examination. Infection was prevented with daily injections of cefuroxime. The rabbits’ peritoneal cavity was instilled with 3.86% glucose concentration conventional dialysis solution, preheated at 37°C, at an initial dose of 60 ml., increased by 10 ml. daily to reach the dose of 40 ml/kg body mass. Daily heparinisation was performed. The catheter was removed throgh a new incision.

Results
An overall 64,5% animal concluded the 5 weeks follow up, with 89% survival rate. No wound infection nor catheter obstruction was recorded during the follow up. One episode of peritonitis was suspected. One rabbit developed diarrhea and one other opstipation. In one rabbit we noticed subcutaneous dialysate leak in the abdominal region.

Conclusion
The presented non-uremic rabbit model of peritoneal dialysis is relatively inexpensive, reproducible, does not require sophisticated technology and it was well tolerated by the animals. Complications were negligible.

P-4

PULSE PRESSURE IN PD PATIENTS

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Fourteen patients on PD (4 on CAPD and 10 on APD), from almost six months, aged between 15-85 years were investigated for changes in pulse pressure (PP).

Systolic arterial pressure (SAP), diastolic arterial pressure (DAP), weight, total body water (TBW), body weight (BW), diuresis and residual renal function (RRF) were calculated and researched correlations with PP.

Our results showed that SAP was 133.5 ± 17.05 mmHg, DAP 74.2±10.3 mmHg, PP 59.2±11.6 mmHg, BW 74.3±16.3 Kg, TBW 36.4± 4.8 liters, RRF 7.7±3.8 ml/min and diuresis 1672.1± 430.6 ml/24h. No cardiovascular events were observed in these patients in three months.

SAP was significantly correlated con PP (p<0.0001); RRF was significantly correlated with PP (R=0.66; P<0.01). No correlations between TBW, diuresis, DAP, BW and PP were demonstrated

Our data confirmed that SAP is the first determinant of PP in PD patients, as reported in literature. A linear, positive relationship exists between PP and RRF and it could suggest that PP’s values and renal function are strictly related in PD patients with a good control of blood pressure and no clinical signs of overhydration
P-5

VASCULAR OR PERITONEAL ACCESS READY TO START DIALYSIS: INFLUENCE ON MORBI-MORTALITY

Inés Castellano, Sandra Gallego, Jesús Pedro Marín, Maite Mora, Gema Rangel, Juan Ramón Gómez-Martino, Javier Deira, Vanesa García-Bernalt, Ricardo Novillo, Angelínes Domínguez, Isabel Martín
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Late reference to nephrologist is related to high percentage of starting renal replacement therapy (RRT) without vascular/peritoneal access (VA/PA) available, high morbimortality, high cost and it does not allow the choice of the dialysis technique.

The aim of this study was to evaluate the influence of a VA/PA ready to start dialysis over 6 month and 5 year-morbidity and mortality.

Patients and Methods
Retrospective study of all patients commencing RRT in our department over three years (2003-2005). We analysed age, sex, diabetes condition, modified Charlson’s index (ICh), first mode of RRT, hospitalization and 6-month and 5-year-mortality. Patients were classified into two groups: A (patients with VA/PA available) and B (patients without it).

Results
160 patients (73 female) started dialysis; medium age 65 ± 14.9y; ICh median 7; 43.1% are diabetics. At the moment of starting dialysis 68 patients (42.5%) (group A) have a VA or PA ready and 92 lack them (57.5%) (group B).

Clinical characteristics are similar between two groups concerning age and sex. Group A had lower comorbidity (ICh 7 vs 8), less % of diabetics (30.9% vs 52.2%). All patients on group B iniciated RRT on HD opposite 72.1% on group A.

6-month-mortality was higher on group B (14.1% vs 2.9%), but 5-year-mortality was similar (48.5% group A vs 53.2% group B). The total days of hospitalization/patient in risk was lower on group A (23.7 vs 36.8). Admissions to start dialysis was higher on group B (26.3% of total admissions vs 7.4%).

Conclusions
Patients without VA/PA available at the moment of starting dialysis have higher early mortality rate than patients without it, but there are not differences en late mortality rate. Admissions to the hospital are more frequent in patients who lack of VA/PA, specially concerning to start dialysis, which derives in a higher cost.

P-6

5-YEAR SURVIVAL IN INCIDENT DIALYSIS PATIENTS

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Overall mortality of patients in renal replacement therapy (RRT) is very high. In the last report of dialysis and transplantation registry of the Spanish Society of Nephrology in 2009 the annual mortality reaches 14.8% in haemodialysis and 8.4% in dialysis peritoneal.

The aim of our study was to review factors related to long-term mortality of incident patients during a 5-years period after the onset of RRT. This is a retrospective study of all patients who started RRT in our Spanish province between 1/1/2003 and 31/12/2005. We analysed age, sex, diabetes condition, modified Charlson’s index, vascular or peritoneal access, first dialysis planned, initial modality of RRT and 5-year mortality.

Results
A total of 160 patients started dialysis between 1/1/2003 and 31/12/2005, with average age of 65 ± 13.9 years, 73 female (45.6%) and 87 male (54.4%), 69 were diabetics (43.1%) and modified Charlson’s index median 7.

During the first 5 years in dialysis 88 patients died (55%). The survival was 85.4% at 12 months, 66.6% at 24 months and 37.4% at 60 months. We did not find differences in survival at 5 years in relation to sex.

Mortality at 5 years was related of statistically significant form with age of patients, unplanned beginning of RRT and presence of diabetes mellitus (p<0.01), but not with absence of access or the initial modality of RRT.

Conclusions
Mortality at 5 years of starting dialysis is very high and is related to age of patients, presence of diabetes mellitus and unplanned beginning of RRT.
P-7

PATIENT AND TECHNIQUE SURVIVAL OF AN INCREASING POPULATION OF DP IN GIRONA (SPAIN)

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Introduction
Since 2007 our Peritoneal Dialysis (PD) program has been growing each year. This increasing amount of patients is based on a solid educational program for all patients who suffered from chronic kidney disease (CKD). During 2007, 43 patients were prevalent, in 2008 were 48 and in 2010 64. We have studied patient and technique survival during last four years. Each year, we have studied different parameters to assess the quality of ours treatments.

Material
All patients who were incident on PD during the time period between the First January 2007 and the First January 2011 were studied (n=80). 71% were men. Mean age was 56 years. The principal cause of CKD were Glomerulonephritis (33%). The majority (70%) suffer from hypertension. TH 36.7% was diabetic and the 23% suffer from heart disease. In this group, 62 patients started PD as the first option. The rest have started Hemodialysis and changed to PD as a personal option of the patient. The 80% of patients were on APD.

Results
The total technical survival rates during these four years is 76.26 %. The principal cause of abandoning DP was transplantation (16%) and death (9.5%). Only 6% of cases were due to technical failure. During these years, we have reported 8 deaths. All of them were due to cardiovascular disease, specially heart stroke. In relation to patient survival our data are that 68% are alive during these period of time. The principal factors determining an increasing risk of mortality are Diabetes (50% of survival at 4 years) and having a previous history of cardiac disease (33% survive).

We include a table of some quality parameters based on the Spanish Quality Guides of PD.

<table>
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</table>

Conclusions
- We would like to emphasize the importance of having a good educational program for patients in order to provide ambulatory dialysis treatments.
- Our results show good results on technical and patient survival.

P-8

MORTALITY BECAUSE OF CARDIOVASCULAR COMPLICATIONS IN PERITONEAL DIALYZED PATIENTS WITH CORONARY ARTERY AND VASCULAR CALCIFICATION

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Introduction
Cardiovascular diseases are among main causes of death in dialyzed patients. Coronary artery calcification (CAC) and valvular calcification (VC) are significant risk factors of cardiovascular complications.

Purpose
The study was performed to analyze risk factors of CAC and VC in peritoneal dialyzed patients (PDpts), as well as to analyze frequency of mortal cardiovascular complications.

Methods
In 105 PD pts (59 female and 46 males; mean time of dialysis 52.1±31.5 months) analysis of CAC and VC was performed by means of computed tomography (8-row GE Light Speed Ultra scanner, Cardio software). Semiautomatic analysis of CAC was performed with calculation of Agatson and volumetric scores. Patients were divided into 3 groups with CAC only (CAC group); CAC and VC (CAC+VC group), and without calcification (control group). Following factors of calcification were analyzed: age, gender, time of peritoneal dialysis, levels of calcium, phosphorus, CaxP, CRP, fibrinogen, fetuin-A, echocardiography.

Results
CAC was present in 66% of patients, of which in 58% it was accompanied by VC. A positive correlation was found between CAC and VC expressed by Agatson and volumetric scores, and serum levels of CRP (r=0.27, p<0.05) and fibrinogen (r=0.35, p<0.01) and patients age (r=0.36, p<0.01). Fetuin-A level was decreased in groups with calcification, as compared to control. It was significantly lower (p<0.05) in CAC+VC group then in CAC group only. In patients with calcification, especially in CAC+VC group, very advanced changes in echocardiography were found. Cardiovascular complications as cause of mortality were significant more frequent in CAC+VC group. As a result of cardiovascular complications during the course of the study died 25% of patients from control, 52% of patients from CAC and 65% of patients from CAC+VC group.

Conclusions
CAC accompanied by VC is a high risk factor of mortality resulting from cardiovascular complications in peritoneal dialyzed patients.
P-9

MINERAL METABOLISM, INFLAMMATION AND MALNUTRITION ARE RISK FACTORS OF MORTALITY IN PERITONEAL DIALYSIS PATIENTS

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Mineral metabolism disturbances are common in CKD patients and recently several studies have pointed out its relationship with increased morbidity and mortality. Other non-traditional risk factors have been also associated with increased death rate in peritoneal dialysis (PD) patients.

The aim of this study was to evaluate the risk factors of mortality in a population of patients undergoing peritoneal dialysis.

We included in this study 48 PD patients (f = 22 m = 26, mean age = 54 years, mean follow-up = 35 months) from our renal unit. In 21 patients the etiology of CKD was unknown (43.5 %); diabetic nephropathy (25 %), chronic glomerulonephritis (12.5 %), nephroangiosclerosis (10.4 %) and chronic interstitial nephritis (8.3 %) were the other causes of renal insufficiency. The population was evaluated regarding several biological and laboratorial parameters. We performed descriptive statistics and to analyze the risk factors of mortality we used the Cox proportional hazard model.

Our population were dialyzed with a mean KT/V = 2.7 ± 1.3 and the mean values of the evaluated parameters were: hemoglobin = 11.7 g/dl, Ca = 9.2 mg/dl, P = 47.6 mg/dl, PTH = 700 pg/ml, albumin = 3.5 g/dl and C-reactive protein = 14.9 mg/L. Using the Cox model we found that age (β=0.148, p=0.04), male sex (β=3.647, p= 0.026), Ca x P (β=0.091, p= 0.011), C-reactive protein (β=0.06, p= 0.04), PTH (β= - 0.006, p= 0.002) and albumin (β= - 2,996, p= 0,005) independently influenced the mortality of our population.

In our population inflammation, malnutrition and mineral metabolism (lower PTH and higher Ca x P) were associated with higher mortality.

P-10

(OH) VERSUS INDEX OF RELATIVE OVERHYDRATION (OH / ECW) IN HYPERTENSIVE PATIENTS ON PERITONEAL DIALYSIS: WHICH ONE TO USE TO IDENTIFY THE STATES OF HIPERVOLEMIA?

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Introduction

The hydration is a phenomenon common in patients on peritoneal dialysis (PD) associated with increased cardiovascular morbidity and mortality with hypertension, left ventricular hypertrophy and possibly through mechanisms directly associated endothelial dysfunction. Utensils are arranged by bioelectrical impedance can learn easily and quickly the patients' body composition and thereby the state of hydration, as the BCM® from Fresenius. Recent studies indicate that the ratio of overhydration (OH) and extracellular water (ECW) is better than the OH to identify hypervolemia.

Objectives

Rate OH vs OH / ECW as a marker of overhydration in a group of PD patients on hypertension.

Material and Methods

We studied 39 patients .20 women, 19 men mean age: 51.84 ± 16.2 years. Average time on dialysis: 22.1 ± 9.6 months. CAPD: 15, DPS: 24 Etiology ERC: 16% DM, 36% NAE, PQR 8%, 24% uncertain etiology, 5% glomerular, interstitial 8%, 4% urological. Residual renal function (> 200 ml / day) 86% 5% 1500-2000 ml / day, 75% 1000-1500 ml / day, 20% 500 - 1000 ml / day. D / P creat: 80% medium-high, 20% medium low only or medium concentration of glucose, icodextrin: 7 patients. All low PDG. Measures were taken to monitor BCM, PA, MAP always measure the same team of nurses and the same apparatus.

Results

Of the total were hypervolemia as OH 74% vs 28% according OH / ECW and 53% patients with hypertension. Of hypertensive patients: 90% hypervolemia as OH vs 57% according OH / ECW. ABPM in 14 patients showed non-dipper pattern under all hyperhydrate according OH / ECW only 40%. After raising the osmolarity for 1 month from differing patterns of patients (9) between the valuation OH vs OH / ECW in order to achieve optimal hydration status was achieved normalization of BP in 8 patients, but with a fall of 30% RRF.

Conclusions

The prevalence of hypertension is high and appears to correlate with hydration status

OH is better than OH / ECW for identification excess volume as a cause of hypertension

OH better identify patients with impaired circadian BP

There is a tendency to associate high blood pressure, hydration and RRF
P-11

PRESCRIPTION OF THREE DIFFERENT MODELS WITH BIOCOMPATIBLE SOLUTIONS: ARE THERE CLINICAL DIFFERENCES?

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Objective
Assess medium-term (18 months) clinical differences exist in three groups of 10 CAPD patients (4 exchanges of 2 liters) with similar demographic characteristics: 15 men and 15 women, mean age 50.43 ± 14.53, no differences in percentage three schemes when used in diabetic dialysis using biocompatible solutions or glucose-free.

Materials and Methods
Prospective data were collected on CRP, glycated hemoglobin, bicarbonate levels, hemoglobin, triglycerides, residual renal function (FRR), peritoneal ultrafiltration (UFF), total ultrafiltration (UFT), dry weight, peritonitis in three groups dialysis regimens: Group 1: 2 bags of glucosa1 Physioneal ®, 36% Nutrineal ® 1 bag, 1 bag Icodextrina ®, Group 2: 3 bags Bicavera ® 1.5%, 1 bag Bicavera ® 2.3%, Group 3: 1 bag GambrosolTrio ® 2.5%, 3 bags Gambrosol Trio ® 1.5.

Results (see table)

Conclusions
Only significant differences in bicarbonate levels (lower in group 3 on 1 and 2) between the baseline period and 18 months.

Table

<table>
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<th>G3</th>
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<td>Bicarbonate (mEq/l)</td>
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<td>HbA1c (%)</td>
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<td>FRR (ml/1.73m²)</td>
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P-12

CROSS-OMICS COMPARISON OF STRESS RESPONSES IN MESOTHELIAL CELLS EXPOSED TO HEAT- VERSUS FILTER-STERILIZED PERITONEAL DIALYSIS FLUIDS

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Introduction
Exposure of mesothelial cells (MC) to peritoneal dialysis fluids (PDF) not only causes toxic injury, but also induces heat shock proteins (HSP) during recovery. Recent research suggests that these cytoprotective responses might be inadequately induced by heat-sterilized PDF. This study compares transcriptome data and multiple protein expression profiles in experimental PD in order to provide new insight into regulatory mechanisms.

Methods
Human peritoneal mesothelial cells (HPMC) underwent exposure to heat- or filter-sterilized PDF for 24 hours in a 1:1 mixture of PDF and culture medium. In parallelized experiments, we used two-dimensional difference gel electrophoresis (2D-DIGE) based proteomics and topic defined gene expression microarray-based transcriptomics techniques to evaluate mesothelial stress responses in response to PDF on a global level.

Results
The comparison of proteomics and transcriptomics data allowed the discrimination of differentially regulated protein expression into groups depending on correlating or non-correlating transcripts. The inadequate expression of several HSP on the protein level, following extended exposure to heat-sterilized PDF, is not reflected on the transcriptional level indicating potential interference in translational activity and regulation.

Discussion
Our data show that under stressful conditions the correlation between mRNA and protein cannot be regarded as linear for several HSP. For the first time, we describe evidence for translational suppression of adequate cellular stress responses by heat-sterilized PDF as a novel cytotoxic property. These findings might introduce a novel way of improving PDF biocompatibility by searching for tools and interventions to re-establish adequate cytoprotective responses.
P-13
THE RELATION BETWEEN THE OSMOTIC EFFECT AND THE REABSORPTION INHIBITION EFFECT OF SODIUM CITRATE IN PD SOLUTIONS
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University of Gothenburg, Göteborg, Sweden

Introduction
Sodium citrate at 5 – 10 millimolar concentrations in PD fluid has been shown to improve net ultrafiltration in humans and rats respectively. Since citrate forms complexes with cations like sodium and calcium, the direct osmotic effects of sodium citrate in a PD dwell are hard to predict. In order to understand the mechanisms of action of citrate it is however important to quantify these effects.

Methods
Single 20 mL dwells were performed in rats with pre-implanted PD catheters. A filter sterilized standard 2.5% glucose PD fluid with 40 mM/L lactate was supplemented with either 10 mM/L sodium citrate or 16 mM/L sodium chloride or 12 mM/L sodium lactate. PD fluid without supplementation was included as control. The osmolality of samples drawn after 0, 30, 60 and 120 minutes was determined from freezing point depression and compared between the different solutions. Osmotic ultrafiltration (OUF) was measured from the dilution of $^{125}$I labelled albumin and net ultrafiltration (net UF) from drained volume. The osmolality was averaged over time for each fluid and the increment caused by the three different additives was calculated and related to OUF and net UF.

Results
The osmolality increments from the three additives were in close agreement. Assuming linear relationships between molar concentrations and osmolalities, calculations showed that the time averaged osmolality of 10 mM/L sodium citrate corresponded to 15 mM/L sodium chloride and 13 mM sodium lactate respectively. In terms of osmotic ultrafiltration sodium citrate provided a higher OUF per mOsm, probably due to its higher reflection coefficient compared with lactate and chloride. In agreement with earlier studies in humans and rats citrate supplementation reduced the reabsorption of fluid into the peritoneal tissue space, thereby significantly contributing to the net UF increase.

Discussion
Citrate effects on OUF can be directly attributed to the osmotic effects of the citrate molecule and the associated sodium ions. The inhibitory effect on reabsorption reflects an unknown pharmacological mechanism that significantly adds to the osmotic effect. Reabsorption inhibition accounted for most of the net UF increase seen in the earlier study in humans (Nephrol Dial Transplant 24: 286, 2009).

P-14
A MATHEMATICAL METHOD FOR PREDICTION OF ULTRAFILTRATION WITH DIFFERENT POLYGLUCOSE FORMULATIONS
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Introduction
Mathematical modeling of the osmotic effect of polymers with a distribution of molecular weights applied in PD fluids needs a definition of their fractions. The purpose of this study was to provide a description of polymer distribution sufficient to predict ultrafiltration (UF) and ultrafiltration efficiency (UFE) for polyglucose-based fluids with formulations alternative to that in Extraneal (icodextrin) PD solution (Baxter, USA).

Methods
The description of the distribution density of polymer fractions, assuming its log-normal molecular weight distribution (Vonesh et al, 2006), was applied to simulate new formulations defined by their weight average molecular weight, $\bar{M}_w$, and polydispersity index, PDI.

Computer simulations of dialysate volume during PD dwells were based on the method applied in PD Adequest v2.0 and performed for patients with fast transport status. UF and UFE (net UF divided by absorbed carbohydrate mass) were analyzed for polyglucose formulations with different MWw (range 1000 to 24000), PDI = 2, and the same weight concentration (7.5%) or the osmolarity equivalent to that in Extraneal.

Results
For fluids with the same weight concentration the highest UF was obtained using formulation of low MWw. For dwells lasting 16 h, the formulations with MWw from 3000 to 4000 gave the highest UF; for shorter dwells, lower MWw were better. The maximum of UFE was obtained for MWw not higher than 10000; again for shorter dwells lower MWw was better. For fluids with equivalent osmolarity, UF and UFE increased with the increase in MWw.

Discussion
The proposed mathematical and computer method allows for the predictions of UF and UFE induced by new polyglucose formulations with different MWw and mass distribution. The choice of the best formulation strongly depends on the applied concentrations (and the method of their comparison among formulations) and dwell time.
P-15

EFFECT OF MOLECULAR WEIGHT ON THE ULTRAFILTRATION (UF) EFFICIENCY OF GLUCOSE POLYMERS WITH LOW POLYDISPERSITY

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Introduction
Icodextrin, a glucose polymer with a polydispersity (ratio of weight-average to number-average molecular weight or Mw/Mn) of approximately 2.6, has been shown to provide superior UF efficiency (ratio of UF to carbohydrate (CHO) absorbed) compared with glucose when used as an osmotic agent during long dwell peritoneal dialysis exchanges. It has been suggested that glucose polymers with Mw/Mn less than that of icodextrin may improve UF and UF efficiency. We evaluated the effect of weight-average molecular weight (Mw) on UF and UF efficiency of glucose polymers with low Mw/Mn in an experimental rabbit model.

Methods
A crossover trial was performed in female New Zealand White rabbits (2.20-2.65 kg) with surgically implanted peritoneal catheters. Two glucose polymer preparations at nominal concentrations of 7.5 g/dl were evaluated: a 6K polymer (Mw= 6.4 kilodalton, Mw/Mn=2.3) and a 19K polymer (Mw=18.8 kilodalton, Mw/Mn=2.0). Rabbits were randomized to receive either the 6K (N=11) or 19K (N=12) solution during the first exchange (40 ml/kg body weight); the alternative solution was evaluated in a second exchange 3 days later. UF and total CHO absorbed were determined during each 4-hour dwell.

Results
UF for the 6K polymer was higher (P<0.0001) than for the 19K (mean±SD, 73.6±30.8 ml vs. 43.0±20.2 ml), as was the percentage CHO absorbed (42.5±9.8% vs 35.7±11.0%, P=0.021). In spite of higher CHO absorption, the 6K polymer had an approximately 50% higher (P = 0.029) UF efficiency than the 19K polymer (28.3±18.8 ml/g vs. 19.0±11.3 ml/g). The results were independent of the order of the experimental exchanges.

Discussion
Glucose polymers with low Mw/Mn are effective osmotic agents in a rabbit model. While the low Mw glucose polymer is more effective at generating UF and displays a higher UF efficiency, it is at the expense of it being more readily absorbed from the peritoneal cavity.

P-16

OPTIMIZATION OF MOLECULAR WEIGHT (MW) FOR MONODISPERSE GLUCOSE POLYMERS (GPS) PROVIDING IMPROVED ULTRAFILTRATION (UF) WITHOUT ADDITIONAL CALORIC LOAD: A THEORETICAL COMPARISON WITH ICODEXTRIN

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Introduction
Previous attempts to determine the optimal MW for an osmotic agent were limited to experimental studies in animals and theoretical evaluations that considered only optimization of UF (Yokota et al, Adv Perit Dial 1998; Rippe et al, PDI 1996). In this study, we have predicted the optimal MW for monodisperse GPS in comparison with icodextrin, by maximizing UF without additional carbohydrate (CHO) absorption.

Methods
Peritoneal transport parameters were obtained based on UF measurements in 10 patients undergoing an 8-hour exchange with icodextrin (Douma et al, KI 1998). PD Adequest 2.0 was used to fit 3-pore model parameters to the measured UF data (Vonesh et al, PDI 2006). The set of parameters obtained by averaging those from all 10 patients was then used to predict UF, CHO absorbed, and UF efficiency (defined as ml of UF per g of CHO absorbed) at the end of a 12-hour exchange with icodextrin and a set of hypothetical solutions containing monodisperse GPS with MW ranging from 500 to 20000 Da and concentrations from 5.5 to 8.5 g/dL.

Results
The relative maximum in UF efficiency was MW dependent and ranged between 24% (5.5 g/dL, 1500 Da) and 136% (8.5 g/dL, 3000 Da), corresponding to a 53% - 204% higher UF at the expense of 19% - 27% higher CHO absorption. When limited to no additional CHO absorption, however, the optimal range of MW was between 3500 and 7500 Da, resulting in 32% – 97% higher UF and UF efficiency.

Discussion
When the production of single macromolecule formulations becomes a viable alternative, monodisperse GPS with MW between 3500 and 7500 Da may provide substantial improvement in UF without additional caloric load. Both UF and CHO absorption, and not UF efficiency alone, need to be taken into account when determining the ideal size of GP osmotic agents.
DIFFERENCES IN PERITONEAL RESIDUAL VOLUME (VR) INDUCE VARIABILITY OF ULTRAFILTRATION (UF) WITH ICODEXTRIN

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Introduction
Icodextrin induces UF during long dwell exchanges by creating a difference in oncotic pressure between the peritoneal cavity and plasma; however, the mechanisms governing the intra- and interpatient variability in UF when using icodextrin (Jeloka et al, PDI 2006) remain largely unexplained. In the present study, we show that differences in VR have a more profound effect on UF when using icodextrin than glucose; this phenomenon is due to a differential effect of VR on oncotic, rather than osmotic, pressure differences between the peritoneal cavity and plasma.

Methods
The 3-pore model was used to calculate the effect of VR between 150 and 1200ml (Durand, Contrib Nephrol 2006) on UF using 7.5% icodextrin (ICO) and 3.86% glucose (G) solutions at the end of a 12-hr dwell in four patient transport groups (i.e. fast to slow). Average oncotic (ICO) and osmotic (G) pressure differences over the entire dwells were also calculated.

Results
As expected, at nominal VR of 300ml, UF with G differed substantially among the four patient transport groups (2 to 804ml) while UF with ICO did not (556 to 573ml). When VR was increased from 150 to 1200ml, with an infusion volume of 2L, the oncotic and osmotic agent concentrations at the start of the dwell decreased from 7.0 to 4.7% with ICO and from 3.6 to 2.4% with G. The decrease in UF on average was greater with ICO from 624 to 252ml (-372ml or -60%) than with G from 398 to 292ml (-106ml, -27%). These trends agreed with the calculated reductions in the oncotic (-13mmHg, -55%) with ICO and osmotic (-22mmHg, -30%) with G pressure differences.

Discussion
When using icodextrin, VR alters the oncotic pressure difference between the peritoneal cavity and plasma, and substantially alter UF. Differences in VR may explain the additional variability of UF sometimes seen with icodextrin.

FACTORS INFLUENCING SKIN AUTOFLUORESCENCE OF PATIENTS ON PERITONEAL DIALYSIS

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Conventional peritoneal dialysis solutions provide a high glucose load for patients due to their high glucose content. The continuously high glucose exposure triggers the accumulation of tissue advanced glycation end products (AGE) that can be measured by a new non-invasive approach called skin autofluorescence (SAF) measurements. AGE production is documentedly increased in patients with end-stage renal disease and in those on haemodialysis. Less is known about those treated with peritoneal dialysis (PD). In this study we tested if SAF is influenced by clinical and treatment characteristics in PD patients.

This cross-sectional study included 198 PD adult patients (128 were on traditional dextrose-based solutions and 70 patients were previously switched to icodextrin-based PD). SAF measurements were done between March and May in 2010 with an AGE Reader device. Patients with any malignancy, skin disorders and jaundice were excluded. The impact of patients’ age, gender, current diabetes, duration of PD, cumulative dextrose exposure, body mass index, smoking habits and use of icodextrin on SAF values were tested with multiple regression analysis. Mann-Whitney U test was used to compare the two groups’ clinical parameters.

Our analysis revealed that patients’ age, current diabetes and icodextrin use significantly increase patients’ SAF values (p = 0.015, 0.012, 0.005, respectively). Patients on icodextrin regime had significantly lower total and residual weekly Kt/V results (p<0.0001 both) and less residual daily diuresis with more peritoneal ultrafiltration volume (p< 0.0001 and p< 0.0001) because of frequent application of high glucose content solutions. Tissue AGE accumulation of PD patients with diabetes and on icodextrin solutions is increased. Further investigation is required whether the latter finding is due to a still unidentified clinical characteristics of PD population treated with icodextrin or a direct effect of icodextrin on skin SAF. Improvement in systemic biocompatibility is even more important in case of diabetes.

Keywords: skin autofluorescence - peritoneal dialysis - icodextrin
P-19

PD THERAPY – CLINICAL RISK BASED APPROACH TO MAINTAIN PD FLUID SUPPLY

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Introduction
Therapy requirements to maintain patients on PD include:
- adequate fluid volumes to ensure solute clearance matched to body size
- solutions providing adequate ultrafiltration
- solutions and systems suited to the PD modality to avoid changes in basic PD technique.

To address a major PD fluid supply issue across Europe, it was important to define critical medical needs with a risk-based approach to ensure adequate supplies, thereby allowing patients to be safely maintained on PD therapy.

Methods
In December 2010, a critical PD solution supply issue affected approximately 24,000 patients in Europe, Middle East and Africa. Clinical risk-based criteria were developed to ensure that the limited supply of PD fluids from manufacturing plants outside the region were available for approximately 12,000 CAPD and 12,000 APD patients.

Results
After reviewing clinical evidence and PD practice patterns with PD experts, a risk assessment was performed and key criteria for PD fluid supply from other manufacturing sites were established to meet critical medical needs: (1) basic PD technique to remain unchanged with need for only minimal additional training that could be provided by simple information leaflets, (2) needs of both CAPD and APD patients must be met, (3) EXTRANEOUS supply prioritised to patients with fluid balance problems, co-existent cardiac insufficiency or difficult diabetes, (4) physiological [Ca] prioritised over high [Ca] (5) short dwell PD therapy regimes simplified for CAPD (2 L bags) and APD (2 and 5 L bags). PD solutions were imported against these criteria to meet short dwell and long dwell requirements in simplified PD therapy regimes.

Discussion
The PD supply issue caused significant challenges for patients, nurses and physicians. A clinical risk-based approach was developed which focused on maintaining identical PD technique (reduce risk of touch contamination) while using simplified PD therapy regimes and ensuring adequate ultrafiltration.

P-20

INCREASING USE OF PHYSIOLOGICAL [CALCIUM] PERITONEAL DIALYSIS FLUID IN EUROPE

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Introduction
There is increasing awareness of the need for careful management of calcium, phosphate and PTH in PD patients. Over recent years, guideline targets have changed and additional oral drugs are available with a general trend to aim for better phosphate control whilst not increasing the risk of vascular calcification and managing metabolic bone disease. This study aimed to examine the patterns of PD prescribing in terms of PD fluid [Ca] in relation to recent KDIGO guidance.

Methods
Total patient use (million litres) of glucose based fluid in APD and CAPD patients was analysed in 16 European countries. Use of physiological [Ca] (1.25 mmol/l) and high [Ca] (1.75 mmol/l) conventional and biocompatible PD fluid was examined.

Results
Annual use in 2010 of physiological [Ca] PD fluid was greater than high [Ca] (40.3 million L vs 14.3) PD fluid. The difference existed for conventional PD fluid (17.4 vs 7.7) and was more marked for physiological fluid (22.9 vs 6.6). Trend analysis shows that the use of physiological [Ca] glucose based fluid is growing in W Europe.

Discussion
There is a high and increasing use of physiological [Ca] compared to high [Ca] PD fluids in W Europe. This clinical practice is consistent with therapeutic targets and the KDIGO recommendation to prefer the use of PD fluid [Ca] of 1.25 mmol/l.
P-21

ASEPTIC PERITONITIS IN EUROPE RELATING TO POTENTIAL ENDOTOXIN PRESENCE IN PD SOLUTIONS

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Introduction

At the end of 2010 it was found that a small number of bags of peritoneal dialysis (PD) solutions Extraneal, Dianeal and Nutrineal could potentially contain endotoxin levels above the manufacturing limit. It was very important to assess associated clinical problems and to reduce the risk of patient harm. The most likely clinical problem associated with increased endotoxin levels in PD solutions is the observation of cloudy PD fluid and the diagnosis of sterile/aseptic peritonitis. The clinical picture of reported aseptic peritonitis episodes will be described.

Methods

After reporting to authorities and physicians, potentially affected PD bags were replaced by PD fluid imported from other manufacturing plants. Over this period, physicians were encouraged to report details of aseptic peritonitis episodes for (1) detailed analysis of clinical features, (2) linkage to use of potentially affected PD solutions and (3) identification of safety signals associated with specific batches of fluids which would prompt rapid recall. Reports were analysed by a medical team including pharmacovigilance and nephrology experts.

Results

Reports of aseptic peritonitis cases were received from many countries in association with potentially affected PD solutions. Clinical features were typical of aseptic peritonitis as previously reported in the literature in terms of clinical symptoms and laboratory findings. Over this time, 3 particular batches of PD fluid were identified as potential safety signals and recalled. Other important findings included - some reports that were more likely to be culture negative bacterial peritonitis rather than aseptic peritonitis, and usage of a wide variety of empiric antibiotic regimes across different centres.

Discussion

Reports of aseptic peritonitis potentially related to endotoxin in PD solutions were received, analysed and used to identify trends and possible safety signals for batch recall. Useful information relating to the investigation and management of PD peritonitis has been obtained.

P-22

ACUTE EFFECTS OF DIFFERENT BIOCOMPATIBLE PD FLUIDS IN RATS

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Purpose

Biocompatible PD fluids (PDF) differ with regard to buffer composition, the clinical impact is unknown. We recently demonstrated PD buffer dependent regulation of AQP-1 expression and function in mesothelial cells in vitro.

Methods

We now dialysed male SD rats with 8ml/100g BW low GDP, pH neutral PDF containing either bicarbonate (Bica Vera®, BPDF) or lactate buffer (Balance®, LPDF) and with acidic, high GDP PDF (CAPD®, CPDF). The first group of animals underwent a PET, the second group underwent 36h of PD (9 exchanges, 2.3% glucose) followed by a PET (4.3% glucose). IP fluid was collected at 10,20,30,60 and 120min of PET, blood at 0 and 120min, and animals sacrificed for tissue sampling.

Results

Single PET sodium sieving at 10min was lower in rats treated with BPDF compared to LPDF and CPDF (94.0±1.1 vs. 92.4±0.4 and 92.5±0.9, p<0.01/0.05) and still lower with BPDF compared to LPDF after 20 and 30 min (92.1±1.1 and 91.1±1.88 vs. 90.3±0.6 and 89.1±0.87, p<0.01/0.05). Ultrafiltration and solute transport was similar in all 3 groups. Following PD pretreatment serum sodium concentrations differed between groups at time of PET (p=0.06), relative sodium sieving and water absorption, however, were similar in all 3 groups. D/Pcrea was higher and glucose absorption faster with BPDF within the first 20min. Peritoneal urea transport was higher with BPDF than with LPDF and CPDF (0.48±0.19 vs. 0.27±0.08 and 0.30±0.07, p<0.05) at 10min. VEGF mRNA expression was higher in mesentery of rats treated with BPDF and AQP-1 abundance higher in animals treated with LPDF for 36h. CAPD treatment reduced angiopoietin 1 and FGF 2 expression, HIF1 expression remained unaltered.

Conclusions

PDF buffer compound has acute effects on peritoneal membrane solute and water transport characteristics. Whether the buffer also has an impact on long term peritoneal membrane morphology and function deserves further studies.
P-23
SHORT AND LONG TERM OUTCOMES OF STERILE PERITONITIS ASSOCIATED WITH ENDOTOXIN: CLINICAL STUDY DESIGN
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Introduction
Beginning in September 2010, there were increased numbers of sterile peritonitis cases reported in Europe associated with endotoxin levels exceeding manufacturing specification limits in PD fluid. Current knowledge of sterile peritonitis is limited to descriptions of small case series with short term clinical follow up. Unlike bacterial peritonitis (BP), sterile peritonitis (SP) is thought to be a time limited inflammatory response, and typically presents with milder clinical symptoms which resolve with the removal of stimulating factor(s). However, the short- and long-term clinical outcomes of patients with SP and BP have not been rigorously compared. This abstract presents the outline of a clinical study to assess these outcomes.

Methods
A non-interventional, retrospective, cohort study has been designed to evaluate outcomes in approximately 90 patients who were exposed to specific lots of NUTRINEAL (amino acid) or DIANEAL (glucose) PD solutions associated with a cluster of endotoxin-associated sterile peritonitis (e-SP) events. Patients will be enrolled into 3 subgroups (~30 patients/group): e-SP, BP and no peritonitis. Data collection will include clinical data prior to the presentations of peritonitis, at the peritonitis event, and 6 and 12 months post-peritonitis. Data analysis will include change in membrane function and clinical outcomes between the groups, as well as assessment of the differences in acute presentation of e-SP and BP.

Results
Enrolment is anticipated from approximately 15 PD centres across 7 European countries. The 12-month follow-up visits will be completed by January 2012 and study results are expected by June 2012. Patient baseline characteristics and description of the peritonitis events in the 3 groups will be presented.

Discussion
e-SP may have a different clinical presentation and clinical outcomes when compared to BP. This study may elucidate differences which could assist the clinician in appropriate identification and clinical management of sterile peritonitis.

P-24
LONGITUDINAL GROWTH IN CHILDREN ON PERITONEAL DIALYSIS IN SPAIN. A MULTICENTER STUDY.
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Objective
To assess growth at the initiation of elective peritoneal dialysis (PD), and throughout the duration of this dialysis modality, in order to implement appropriate therapeutic approaches within the pediatric population on renal replacement therapy in Spain.

Population & methods: In the last 8 years, 208 children (60% males) started PD in 10 hospitals in Spain. We analyzed the standard deviation score (SDS) for Height at the beginning (SDSi), and at the end (SDSf) of PD treatment, and data related to growth hormone (GH) treatment.

Results
Height (SDSi and SDSf) for the whole group was 0.99 and -1.08, respectively. A quarter of patients (n=52) received GH therapy. In children treated with GH, Height SDSi was -1.7, and an increase in growth rate was observed, to Height SDSf -1.4 (+0.26). However, the group without GH treatment showed an overall decrease in the growth rate, from Height SDSi -0.68 to SDSf -0.94 (-0.26). Statistical association (p<0.05) between GH treatment and better growth rate was observed. Fifty-nine patients showed a height SDSi below -1.8. Only 41% of them (24 children) received GH treatment, while 59% (35 children) did not.

Conclusions
As a whole, children starting PD in Spain did not show severe growth failure. Those treated with GH improved their growth rate, while the group not treated exhibited worsening growth failure. Only 40% of children on PD who fulfilled indication criteria for GH treatment, actually received it.
P-25
WITHDRAWAL OF PERITONEAL DIALYSIS (PD) DUE TECHNIQUE FAILURE IN SPANISH CHILDREN. A MULTICENTER STUDY
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Aim
To evaluate the causes of PD technique failure in Spanish children to achieve prevention.

Population and Methods
In the last 8 years, 208 children (60% males) started PD in 10 hospitals in Spain. Patients’ mortality rate was very low (3%), but 26 patients (12.5%) abandoned that renal replacement therapy modality due technique failure. We evaluated those factors directly and indirectly associated with PD failure, and compared their distribution between the subgroup of patients who did suffer (n=26) or not (n=182) PD failure.

Results
PD Failure was due to ultrafiltration capacity loss (35%), peritonitis (35%) and other causes such as dialysate leaks and hernias (30%). The median age of the group of patients with and without PD failure was 5.9 versus 7.4 years, respectively. Dialysate glucose concentration average was 1.8 versus 1.36%. Further, initial Height SDS was -1.6 versus -1, whereas mean plasma albumin level was 3 versus 3.6 g/dL in both subgroups. Eighty-five percent of the group with failed PD had high blood pressure, while only 51% of those who continued PD were hypertensive. Up to 36% of children with PD failure were anuric at the beginning of PD, compared to 16% of the non-failure group. Regarding to infections, 70% of children in the PD failure group had suffered peritonitis, and one third of them catheter exit site infections as well. All the variables described above were statistically significant. No association between failure of the technique and type of PD catheter, PD modality, dialysate prescription or PD adequacy parameters (Kt/V) was found.

Conclusions
Younger age, hypertonic dialysate use, infections, short stature, hypertension, hypoalbuminemia and anuria at the initiation of PD were statistically associated with technique failure. Therefore, optimal nutrition and infection avoidance will preserve the functionality of peritoneal membrane from ultrafiltration failure.

P-26
OUR EXPERIENCE WITH NON-INFECTION COMPLICATIONS IN PEDIATRIC PERITONEAL DIALYSIS IN R.MACEDONIA
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Introduction
Peritoneal dialysis (PD) is known to be associated with infectious and non-infectious complications. Non-infectious complications are usually less common as compared with infectious

Methods
In this retrospective study we examined the incidence of various non-infectious complications in pediatric patients who underwent PD treatment.

Results
We analyzed 25 children (10 girls and 15 boys, mean age 10.25±4.20 years) on PD in the period between January 1996 and May 2011. The cause of ESRD was uropathy in 11 children (44%), chronic glomerular disease in 6 children (24%) and others in 8 children (32%). The mean duration of PD was 36.2±27.16 months (range 4-115 months). 16 children received CAPD and nine received automated PD. The incidence of non-infectious complications was as follows: hernias in 20%, catheter dysfunction in 36%, dialysate leak in 8%, cardiovascular problem in 20%, cuff erosion in 12% and ileus in 4%. Catheter block and hernias were more prevalent then other complications and were diagnosed with a median duration after catheter insertion of 28.89±25.36 and 22.67±15.14 days, respectively. More than half of hernias were inquinal and all were bilateral. Surgical intervention and catheter replacement were required in 16 episodes to resolve technique failures. During follow-up period 4 patients (16%) died because cardiovascular problems, and dialysate leak in 2 children (8%) was the main cause for transferred to HD.

Conclusion
Prevention, early recognition, and appropriate management of these complications are important because of associated patient morbidity and technique failure.
P-27

AN ALTERNATIVE TREATMENT OPTION FOR EXIT SITE AND TUNNEL INFECTIONS IN PEDIATRIC PD PATIENTS

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Introduction
Chronic peritoneal dialysis (PD) is, in most cases, the first choice dialysis modality for end-stage renal disease in children. Exit site and tunnel infections (ESI/TI), which occur in approximately one third of pediatric patients after one year of PD, are a clear risk factor for the development of peritonitis and impose a 2-fold risk of access revision and an almost 3-fold risk of hospitalization for peritoneal access complications. International guidelines for management of ESI/TI recommend a 2-4 weeks course of systemic (oral or intraperitoneal) antibiotic therapy in addition to local treatment with non-alcoholic disinfectants, with the potential drawback of increasing antibiotic resistance.

Methods
According to an ad-hoc protocol for the management of ESI/TI, since 2008 children on PD diagnosed for ESI with a low-medium score (according to Twardowski’s classification), who did not respond to topic treatment with antibiotic ointment, and those diagnosed for TI or ESI with a high score were addressed to a course of local injections of antibiotic solution into the tunnel by means of a flexible 22 Gauge cannula inserted between the peritoneal catheter and the tunnel wall.
We administered 80 mg of gentamycin diluted in 10 mL of saline once a day for a 1-2 weeks course, depending on the therapeutic response.

Results
In the period 1st January 2008 - 31st December 2010 (corresponding to 516 treatment months) we observed 39 infections, 33 of the ES and 6 of the tunnel (1 episode/13.2 treatment months – 0.07 ep/mos pts); the ES culture was positive in 22 cases (staphylococcus species 65%). Thirteen out of 39 infections had to be treated with the above mentioned protocol. The median duration of the treatment was 7 days (range 7-10 days): a full recovery was obtained in 100% of the ESI/TI and no relapses occurred. No local complications related to the procedure were observed.

Conclusions
Notwithstanding the limits of the cohort study design, local intra-tunnel antibiotic injection represented in our experience a valid therapeutic option for ESI/TI management, with the advantage, compared to the international recommendations, of decreasing potential antibiotic resistance.

P-28

PREVALENCE OF VITAMIN D DEFICIENCY IN PERITONEAL DIALYSIS PATIENTS

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Background
Chronic Kidney disease affects nearly every system of the body. Especially, the effect on bone and mineral metabolism is responsible for significant morbidity in long standing kidney patients. These include progressive hyperparathyroidism, hyperphosphatemia, and decreased calcitriol levels, all leading Vitamin D deficiency (1, 2).

Introduction
Peritoneal dialysis patients have a particularly high risk of developing Vitamin D deficiency, as 25(OH) Vitamin D, the precursor of active Vitamin D is lost through the peritoneal membrane(3,4).

Methods
We included 27 patients in the Peritoneal dialysis center at King Khalid University Hospital-King Saud University, Riyadh, Saud Arabia. The mean age was 46 (15 - 78 ± 21) months, 11 patients were male and 16 females. 5 Patients were on CAPD, and 22 patients were using APD. Average time on PD was 27.5( 5 – 84 ± 18.5) months.

Results
The mean serum Calcium was 2.2 (1.7 – 2.6 ± 0.2) mmol/L. The mean serum Phosphorous was 1.48 (0.64 -2.22 ± 0.37) mmol/L. 15 patients (55.5%) had hyperparathyroidism (serum PTH levels above 30 pmol/L). The mean serum Vitamin D 25 (OH) level was 16.1 (4.9 – 41.5 ± 8.23) nmol/L. 16 (59.2 %) of the patients had levels below 15 nmol/L, while another 8 patients (29.6 %) had Vitamin D levels between 15 – 25 nmol/L indicating a marked deficiency in nearly 90 % of the patients.21 (77.8%) patients were using Calcitriol, while 5 patients (18.56%) were on Cinacalcet therapy.

Conclusion
Majority of peritoneal dialysis patients in our center are suffering from Vitamin D deficiency. The reason for these extremely levels include chronic Renal failure, Dietary restrictions, loss of Vitamin D through peritoneal dialysis and decreased exposure to sunlight (5). Clinical guidelines are needed for optimal management of these patients including oral vitamin D receptor agonists.
P-29

PLACEMENT THE PERITONEAL CATHETER WITH HELP OF PERITONEOSCOPE

Karmela Altabas, Krešimir Cala, Mario Zovak, Miladen Siranovic, Drasko Pavlovic, Svjetlana Cala
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In our country dialysis peritoneal catheters are mostly implanted via the laparoscopic technique by surgeons. In December 2009 after education we started placing peritoneal catheters with help of peritoneoscops. Because of death of one nephrologist the program was stopped for 8 months, but it started again. Procedures were performed on nephrology ward in a dedicated room, by nephrologists assisted by nephrology nurses. During procedures patients were anesthetized with propofol by anesthesiologists. We used prophylaxis with 1g of cefazolin.

During that period we had 14 procedures, and 13 double-cuff catheters were placed. In one patient with BMI 38.6 kg/m² we failed to place the catheter, we simple could not reach the abdominal cavity. Catheters were implanteted in 6 female and 7 male patients, aged from 42-74 years. They had lot of comorbidities: heart failure, diabetes mellitus, anemia, plasmocytooma with platelet aggregability, active hepatitis B and C, systemic lupus, myocardial infarction, stroke, epilepsy, addiction to narcotics, significant stenosis of carotid arteries. Propofol anesthesia went without any complications or need for intubation. We did not have any case of bowel perforation or bleeding. During 14 days after procedure we did not have any case of peritonitis (0/13), infection of tunnel (0/13) or exit site (0/13). Only 3 patients asked for analgesia after the procedure (up to 50mg of tramadol). In two patients we had functional catheter problems. In one case it needed some manipulation of catheter and in the other catheter replacement, because of inadequate length. We did not have any patient with dialysate fluid leaks (0/13), although we started early APD in 4 patients.

Although a small number of patients, our results are within results of other centers around the world yet.

P-30

PRACTICALITIES OF SETTING UP A PD ACCESS SERVICE

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1UHC “Sestre milosrdnice”, Zagreb, Croatia, 2Leicester General Hospital, Leicester, United Kingdom

PD catheters in our center were usually placed laparoscopically by surgeons in operating room. In this part of Europe no one was performing that technique.

After PD academy we heard about a technique of implantation of PD catheters with help of peritoneoscope done by nephrologist I talked about the idea to start that program in our center with chiefs of Department of Nephrology and Internal clinic. We found the sponsors for essential equipment. Room for peritoneal dialysis was renovated.

We got in touch with a nephrologist in UK who was performing that procedure. Two nephrologists went to UK to see how and were the procedure was done, they got a list of necessary equipment and protocols. After the sponsor bought a peritoneoscope, source of light, and implantation sets nephrologists and nurses practiced on a model the whole procedure. Parallel to that process two nurses and two nephrologist practiced parts of the procedure on Surgery clinic in theatre. In consultation with chief of Anaesthesiology clinic we decided that patients will be anaesthetized with propofol by anesthesiologists. Clinical pharmacologist recommended preoperative prophylaxis with cefazolin.

Finally a nephrologist and his nurse form UK came to our hospital, and we performed 4 procedures, 2 by each nephrologist in two days. A surgeon from our hospital was also there. After that we continued with placing catheters in dedicated rooms by nephrologists and our nurses. Now we are able to perform that procedure when we necessary, which is more convenient for patients and less expensive for the health care system.
P-31
APPLICATION OF PERITONEAL DIALYSIS AFTER RENAL TRANSPLANT - EXPERIENCES
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Kidney transplant is the best choice for kidney failure and for replacement of renal function. After cessation of transplant function, the patients mostly restart the chronic hemodialysis program. Peritoneal dialysis (PD) is rarely method of choice in such situations.

We presented a 29-year old patient who was in childhood diagnosed with Sy Alport. During 2000, due to development of terminal stage of chronic renal insufficiency (CRI), distal arteriovenous (AV) fistula in the left arm was created and hemodialysis program was initiated. During next year (2001), the patient underwent transplant surgery and the donor was his father. Chronic insufficiency of the transplant gradually developed after nine years. Considering poor vascular access for hemodialysis, application of PD was indicated. After appropriate preparation procedure, peritoneal catheter was placed using laparoscopic technique. During surgery, colon adhesions attached to anterior abdominal wall were removed. Peritoneal catheter was properly positioned and its adequate functioning was provided from the beginning. The PD was initiated according to CAPD protocol, with a gradual increase of influent volume up to 2000 ml.

The mean ultrafiltration volume was 1200 ml, and diuresis 1500 ml. Laboratory finding before initiation of dialysis treatment and one-month later: urea 28.0 – 21.0 mmol/l; creatinin 670 – 540 umol/l; K 4.6 - 4.3 mmol/l; Ca 1.79 – 2.20 mmol/l; P 2.40 – 1.90 mmol/l. Bacterial culture of the dialysate was negative, as well as throat and nasal swabs and the swab of catheter exit site. Immunosuppressive therapy was reduced during following six months.

This is the first case of application of PD after renal transplant at our Centre and the course and outcome of the treatment are satisfactory.

P-32
DIALYSIS ADEQUACY INDICES, BODY COMPOSITION, AND GENDER
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1Nalecz Institute of Biocybernetics and Biomedical Engineering PAS, Warsaw, Poland, 2Unidad de Investigacion Medica en Enfermedades Nefrologicas, Hospital de Especialidades, Centro Medico Nacional Siglo XXI, Mexico City, Mexico, 3Divisions of Baxter Novum and Renal Medicine, Department of Clinical Sciences, Intervention and Technology, Karolinska Institutet, Stockholm, Sweden

Introduction
Relationships between indices of dialysis adequacy (scaled to body size: total urea and creatinine KT/V, and non-scaled: KT; removed solute mass) and body size (body surface area, BSA, total body water, TBW, body mass index, BMI, fat mass, FM, and fat-free mass, FFM) in male and female patients on continuous ambulatory peritoneal dialysis (CAPD) are of interest for the optimization of peritoneal dialysis.

Methods
Daily collections of dialysate and urine were carried out in 99 patients (56 males) on CAPD. TBW, FM and FFM were determined by bioimpedance.

Results
BSA, TBW and weight of the females were lower than the respective male characteristics. No difference in BMI between genders was found. The females had higher FM and lower FFM than men. Urea and creatinine M, were lower in females than in males, but KT was not different between the genders. In contrast, KT/V was considerably higher in females than in males.

M, correlated positively with patient body size (TBW, BSA, BMI, weight, FFM) for each gender separately. Body size scaled index KT/V correlated negatively with body size characteristics (including TBW and FFM). In contrast, KT correlated positively with TBW (except for urea KT in males), but no correlation was observed with BSA, BMI and weight (except for urea KT in females).

Urea KT correlated positively with FM in females (r=0.18, p=0.02) and negatively in males (r=-0.25, p<0.001); however, no correlation was found for the data for all patients together. Creatinine KT correlated negatively with FM in males (r=-0.25, p<0.001), but no correlation was found in females.

Conclusions
KT/V is influenced strongly by body size and therefore differs between men and women, whereas KT is in general less influenced by body size. The association of body fat with the efficiency of dialysis (KT) depends on gender.
PERITONEAL DIALYSIS: THE EXPERIENCE OF SAHLOUL PERITONEAL DIALYSIS UNIT

Yosra Guedri, Awatef Azzabi, Anis Belaarbia, Dorsaf Zellama, Sinda Mrabet, Wissal Sahtout, Ferdaoues Sabri, Manel Chouchene, Karim Hajfradj, Abdellatif Achour

Department of Nephrology, Dialysis and Transplantation, CHU Sahlool, Sousse, Tunisia

Introduction
Peritoneal dialysis (PD) is a widely accepted ambulatory form of renal replacement therapy that also offers improved quality of life compared to hospital-based conventional hemodialysis. Our objectives are to evaluate the characteristics of patients undergoing peritoneal dialysis (PD), the complications and the survival of patients and technique.

Methods
We performed a retrospective cohort study of patients who underwent PD at the PD unit in Sahlool Hospital from January 2007 to June 2010. Underlying renal disorders, comorbidity, type of peritoneal permeability, episodes of peritonitis, survival of patient and technique were noted. Laboratory values at baseline and after 1 year of PD were also retrieved.

Results
We included 73 patients. They were 46 men and 27 women. Mean age at the start of PD was 46.88 ± 17.03 years. Diabetic nephropathy was the main cause of end-stage renal disease (37% of cases). The majority of patients had hypertension (74%). The modality of PD was CAPD in 48 patients and APD in 25 cases. The PET test was performed in 56 patients; it has shown high transport in 6 cases, high average in 25 cases, low average in 23 cases and low average in 2 cases.

We identified 82 episodes of peritonitis in 42 patients. Of the 82 episodes, 49 (60%) episodes were culture-positive.

Gram-negative peritonitis was more frequent than gram-positive peritonitis in our PD. The incidence of peritonitis during this period was 1 episode every 15.2 months. In our study 34 patients had to stop PD technique, 24 was switched to hemodialysis, 9 died and 3 had transplantation.

Mean technique survival was 39 ± 4.3 months.

Discussion
PD is an established treatment modality in patients with end-stage renal disease. Failure of PD is an important problem, with peritonitis being the major cause, either directly, or indirectly.

BODY COMPOSITION AND NUTRITIONAL STATUS IN PERITONEAL DIALYSIS PATIENTS

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Introduction
Peritoneal dialysis (PD) is characterized by gain in fat mass. Visceral fat mass is associated with metabolic syndrome and atherosclerosis rather than subcutaneous fat mass.

In this study, we have to examine the body composition and nutritional status of patients undergoing PD.

Methods
Body Composition Monitoring was performed in 22 patients on PD. PD patients were measured with a full abdomen. Patients’ demographic data and laboratory values: protein equivalent of nitrogen appearance (nPNA), serum albumin, prealbumin, transferrin, C-reactive protein (CRP), and lipid profile were also retrieved. Furthermore, we have to determine basal metabolism for each patient.

Results
They were 14 men and 6 women. Mean age was at 46.65 ± 18.53 years. Diabetic nephropathy was present in 30% of cases. The average percentage of fat mass was 27.75 ± 7.6, of muscle mass was 72.25 ± 7.65 and lean mass was 36.89 ± 7.47.

The mean Body mass index (BMI) was 24.6 ± 3.83 kg/m2 (17.86 to 31.4), and the average value of basal metabolism was 1644 ± 332.13. Total body water, extracellular water, and intracellular water were respectively 53, 15 ± 6, 01% of total body weight 41, 65 ± 2.14% of total water and 58.19 ± 2.28% of total water.

Discussion
Body composition analysis provides vital clinical information in the PD patient. Several techniques, including DEXA, anthropometry, and BIA are readily applicable to clinical use. A central issue is the effect of hydration on nutritional and body composition assessment and the importance of distinguishing changes in fluid and nutrition status. The complexity of body composition in renal disease and the effects of abnormalities on analysis techniques mean that a clear understanding of the methodology and of the limitations of these measurements is essential to ensure maximal use of the information obtained.
**P-35**

**CHRONIC PERITONEAL DIALYSIS IN SZOMBATHELY BETWEEN 1978-2010**

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**Introduction**

The aim is the study to present how the peritoneal dialysis program changed in the past 32 years in our center.

**Methods**

- In the first (1978-1983) and the second period (1984-1994) in-center intermittent peritoneal dialysis (IPD) were carried out in our dialysis center. In the first time IPD was only the renal replacement therapy modality. In the second period the majority of patients were moved into the hemodialysis (HD) programme. IPD was provided using dialysis solution in 1 L bottles, 10 to 14 liters in one 8 to 12 hours session, three times a week. The CAPD and APD programme was launched in 2000.

**Results**

- In the first period 3228 IPD days were carried out on 29 patients, whose average age was 42. 14 of them died, 5 were switched to HD and 4 moved to TX. Between 1984 and 1994 99 patients were treated (8329 PD days). 46 of them switched to HD, 13 moved to other centres, 38 died and only 2 of them moved to TX. In the third term (2000-2010) we carried out 99896 CAPD or APD treatment days on 137 patients. 28 of them died, 18 moved to TX and 33 switched to HD. Our peritoneal rate was 25.5 patientmonth in the last 11 years.

**Conclusions**

We treated 265 patients by PD in the last 32 years (111.453 PD days). Life prospects for patients much more better than 32 years before.

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**P-36**

**ORAL PARICALCITOL FOR THE TREATMENT OF SECONDARY HYPERPARATHYROIDISM IN PERITONEAL DIALYSIS**

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**Introduction**

The approval of a new oral form of paricalcitol, supposed an additional and more comfortable option for those patients on peritoneal dialysis (PD).

**Methodology**

A multicenter, retrospective, observational study was carried out in patients on PD with secondary hyperparathyroidism (SHPT) after treatment with oral capsules of paricalcitol.

**Results**

- 162 patients were included, 61.1% men and 38.9% women. Mean age: 62.07 ± 14.34 y. PD mean duration of 49.09 ± 24 months. Charlson Comorbidity Index: 5.81 ± 2.84. Parathyroidectomy was done in 4.32% patients. Ethiology: chronic glomerulonephritis (26%), diabetic nephropathy (20%), lupus (16%) and vascular nephropathy (15%).

**Conclusions**

Oral Paricalcitol was safe and effective to treat SHPT in PD patients. PTH levels were reduced 42.39% at 6 months after treatment with Paricalcitol but its levels remained within limits recommended by guidelines. Phosphorus and alkaline phosphatases remained stable after treatment with Paricalcitol. Dialysis doses had no influence in PTH control.

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**Table 1. Biochemical parameters evolution**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Basal</th>
<th>6 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium serum (mg/dl)</td>
<td>8.96 ± 0.61</td>
<td>9.1 (8.6-9.37)</td>
</tr>
<tr>
<td>Phosphorus serum (mg/dl)</td>
<td>4.36 ± 1.03</td>
<td>4.5 (3.8-5.06)</td>
</tr>
<tr>
<td>Calcium x phosphorus</td>
<td>39.13 ± 9.86</td>
<td>39.48 (34.85-45.39)</td>
</tr>
<tr>
<td>Haemoglobin (g/dl)</td>
<td>12.06 ± 1.40</td>
<td>12.1 (11.2-12.8)</td>
</tr>
<tr>
<td>Alkaline phosphatase (UL)*</td>
<td>107.37 ± 64.69</td>
<td>94 (69-126)</td>
</tr>
<tr>
<td>GGT (UL)*</td>
<td>32.97 ± 30.94</td>
<td>24 (15-41)</td>
</tr>
<tr>
<td>Albumin (g/dl)</td>
<td>3.67 ± 0.45</td>
<td>3.7 (3.4-3)</td>
</tr>
<tr>
<td>PCR (mg/ml)</td>
<td>4.24 ± 8.49</td>
<td>1.58 (0.4-3.3)</td>
</tr>
<tr>
<td>pH</td>
<td>7.3 ± 0.07</td>
<td>7.33 (7.29-7.36)</td>
</tr>
<tr>
<td>Bicarbonato (mEq/l)</td>
<td>24.91 ± 2.95</td>
<td>24.3 (23.26-29)</td>
</tr>
<tr>
<td>Proteinuria (mg/dl)</td>
<td>0.86 ± 0.64</td>
<td>0.67 (0.37-1.29)</td>
</tr>
</tbody>
</table>

**K: interquartile range**

*Non normal distribution*
P-37

METOXIPOLETILENGICOL-EPOETINA BETA (MIRCERA): AN EFFICIENT TREATMENT FOR ANAEMIA IN PERITONEAL DIALYSIS PATIENTS. FINAL RESULTS FROM CAPRI STUDY

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Introduction and Aims

Methoxypolietilengicol epoetina beta (MIRCERA) is a new eritrophoietic stimulating agent (ESA) with the longest half life of all ESAs. This could be a good condition to indicate Mircera for the treatment of anaemia in predialysis and peritoneal dialysis (PD) patients. The aim of our study (CAPRI) is to follow the evolution of haematological parameters in PD patients, in a multicenter study in our region of Catalonia. This is the first study on PD patients.

Methods

We included 113 PD patients that initiated MIRCERA as the first treatment of anaemia or as a change from previous treatment with other ESAs.

Results

83 patients have a completely follow-up at 12 months. The mean age was 57,8±16y. 59% were men and 41% were women. The most frequent aetologies of Chronic renal failure (CRF) were glomerulopathy 24,1%, unknown aetiology 22,9%, diabetic nephropathy 14,5% and vascular nephropathy 14,5%. 59 patients (71%) began PD as first treatment of CRF, 12(14,5%) were transferred from HD and 12(14,5 %) returns to PD after kidney transplant failure. A total of 93.9% of the patients were hypertensive, and 78.5% were treated with ACEis, 8.2 % ARB, 40.7% diuretics and 22.5% other antihypertensive drugs (antiHT). 10 (12%) patients were naïve, 52 (62%) previously treated with darbepoetin alpha,19 (22.9%) with Epo beta and 2 (2,4%) with Epo alpha. The mean dose of Mircera was 115,4±56,2 Hg/month at the beginning. 117,2±58,5 Hg/month at 6 months and 126,6±59,8 Hg/month at 12 months; p=0,127. Haemoglobin levels remained stable all through the measurements (11,9±1,4g/dl; 11,8±1,4g/dl; 11,8±1,5g/dl; p=0,780). We didn’t observe any relation between dose of dialysis administered (weekly Kt/V) and the Mircera dose or Hb levels. Haemoglobin at baseline and after 6 months in the patients treated with ACEis or ARB was 11.7 and 12.2 mg/dl versus 11.8 and 11.7 mg/dl in patients treated with other antiHT, respectively (no statistically significant differences were observed). At baseline, 36.7% of the patients showed good blood pressure control (SBP/DBP <140/90 mmHg). After 6 months this figure increased to 51.0%, being the differences statistically significant (p<0.05). During the follow-up we registered only 7 adverse events not directly related to Mircera.

Conclusions

Mircera® once a month is safe and effective in correcting and maintaining the haemoglobin levels. This pivotal study suggests that MIRCERA is an efficient treatment for PD patients.

P-38

TIME-DEPENDENT CHANGES IN PERITONEAL EQUILIBRIUM TEST RESULTS IN PATIENTS UNDER LONG-TERM PERITONEAL DIALYSIS

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Introduction

In Japan, peritoneal dialysis as renal replacement therapy is often continued for a long period, and whether peritoneal dialysis can be continued or not depends largely on the extent of peritoneal deterioration. One cross-sectional study has reported that peritoneal equilibrium test results/ peritoneal mesothelial cell area based on the duration of peritoneal dialysis may be useful indicators of peritoneal deterioration and of the need for peritoneal dialysis withdrawal. However, the time-dependent changes in peritoneal equilibrium test results/peritoneal mesothelial cell areas have not yet been reported. In the present study, we examined the time-dependent changes in the peritoneal equilibrium test results in each patient against indicators of peritoneal deterioration/need for peritoneal dialysis withdrawal, in order to determine the appropriateness of direct application of the indicators.

Subjects

Twenty-three patients undergoing peritoneal equilibrium tests at least 4 times.

Methods

Time-dependent changes in the 4-hour D/D0 glucose, creatinine D/P, Kt/V, and weekly CCr values in a standard peritoneal equilibrium test.

Results

The mean duration of peritoneal dialysis was 8.9 years (range, 4.2-17.2); and the mean follow-up duration, 5.5 years (range, 3.0-7.0). The mean D/D0 glucose and D/P creatinine values at the start of follow-up were 0.953 (range, 0.199-0.594) and 0.667 (range, 0.404-0.905), respectively, showing variations of absolute values. The glucose and creatinine values changed over time in each patient, but showed no obvious monotonic increase over time.

Discussion

We examined the time-dependent changes in the peritoneal equilibrium test results as indicators of peritoneal deterioration; however, the results were found to be unreliable as indicators of peritoneal deterioration. Evidently, it is difficult to evaluate peritoneal deterioration by one-time measurements. Therefore, various factors may need to be considered to evaluate peritoneal deterioration in each patient.
P-39

**CONSTRUCTION OF INTERACTIVE CKD NETWORK FOR ENHANCING PD: IMPACT OF PRE/POST DIALYSIS EDUCATION BASED ON CONTINUOUS QUALITY IMPROVEMENT**

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**Background**

In Japan, penetration rate for PD has been still low less than 4%. In addition, increasing aged and diabetic patients with high incidence of cardiovascular diseases (CVD) affected mortality of the dialysis subjects.

**Purpose and Methods**

In 2005 early referral including pre-dialysis program (PEP) was undergone for chronic kidney disease (CKD) stage 3-5 patients by 4 days hospitalization. The patients have been followed every 1-6 month. PD first and planned PD catheter insertion policies were introduced. To simplify technical support, single PD system with limited types of PD prescription was applied. Two different programs were introduced for staffs in the hospital and for those in cooperative institutions, based on continuous quality improvement (CQI) partly by inter-net.

**Results**

918 patients were educated with PEP. 233 patients (M/F:166/67, 66 years old, diabetes: 48%, hypertension: 18%) underwent insertion of PD catheter. PD penetration rate was increased from 3.4% (3 out of 87 ESRD patients in 2006) up to 51 % (85 out of 167 in 2010). In 2011, 134 out of 155 (86%) PD patients were managed at our division and rests of them (14%) were prescribed at regional institution (21 hospitals or clinics with/without HD faculty). The cooperating institutions distribute 3 prefectures. In our hospital, every 2 weeks PD meeting has been held by PD team, including social workers, dieticians and pharmacologists. We provide CQI meeting every 6 months including home doctors and nurses, sharing information of PD treatment and CVD status about all patients. When they revisit our institution to change titanium. PD staffs retrain patients and key supporting family members and evaluate CVD by non-invasive methods.

**Conclusion**

Developing PD network with CQI program help increase in PD penetration rate over 50 %. Development of regional medical network for PD succeeds to increase in PD patients.

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P-40

**MAGNESIUM CARBONATE AS A CAPTOR OF PHOSPHORUS IN PERITONEAL DIALYSIS (DP): A SAFE AND EFFECTIVE TREATMENT**

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**Introduction**

The control of phosphorus levels is a key objective in monitoring patients with chronic renal failure. Advice on diet and renal replacement therapy alone is insufficient and often require the use of phosphorus captors. The combination of magnesium carbonate (235 mg) + calcium acetate (435mg) Osven ® may be useful for the management of P in PD patients, drawing on the lowest calcium intake and the potential effect of Mg in the regulation of of iPTH sintesi. In addition, in the case of PD patients, can take one of the potential side effects of Mg (laxative effect) to reduce the need for laxative treatment to ensure catheter position and prevent its dysfunction.

**Objectives**

Safety assessment (Mg levels in the blood), Ca, P, iPTH, need for other captors and laxative therapy in a group of peritoneal dialysis patients who entered the combination of magnesium carbonate + calcium acetate.

**Material and Methods**

Monitoring of 25 patients (age: 51.84 ± 14:56) for 6 months in peritoneal dialysis (APD: 68%, CAPD: 32%), all with biocompatible solutions, Ca 1.25 mmol / L who has changed the calcium acetate (Royen ®) ® Osvaren initially with a 1:1 ratio.

**Results**

See table

At 6 months follow-up is a significant drop in the baseline levels of Ca, P, iPTH blood and the amount of calcium provided. The elevation of Mg is significant but in no case exceeded the reference value in our laboratory. At follow-up none of the patients required other captors (initially sevelamer 25%) and laxatives (80% initially).

**Conclusions**

The combination of magnesium carbonate (235 mg) + cálcio acetate (435mg) in PD patients is safe and effective by providing a lower burden of calcium.

<table>
<thead>
<tr>
<th></th>
<th>basal</th>
<th>2 months</th>
<th>4 months</th>
<th>6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ca</td>
<td>9.43±0.24</td>
<td>9.06±0.27</td>
<td>8.96±0.234</td>
<td>8.88±0.23</td>
</tr>
<tr>
<td>P</td>
<td>5.01±0.32</td>
<td>4.6080±0.35</td>
<td>4.2520±0.29</td>
<td>4.0760±0.27</td>
</tr>
<tr>
<td>Mg</td>
<td>1.77 ±0.13</td>
<td>1.94 ±0.96</td>
<td>1.97 ±0.83</td>
<td>2.07 ±0.13</td>
</tr>
<tr>
<td>iPTH</td>
<td>305±56.63</td>
<td>223.32±52.79</td>
<td>294.80 ±52.79</td>
<td></td>
</tr>
<tr>
<td>Ca supplied</td>
<td>447±164.44</td>
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P-41
IMPACT OF GLUCOSE-SPARING PERITONEAL DIALYSIS SOLUTIONS ON METABOLIC CONTROL IN DIABETIC PATIENTS – DESCRIPTION OF A RANDOMIZED, CONTROLLED, CLINICAL TRIAL PROGRAM: THE IMPENDIA AND EDEN CLINICAL TRIALS

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Introduction
The use of glucose-containing peritoneal dialysis (PD) solutions may exacerbate metabolic abnormalities in diabetic PD patients. A glucose-sparing PD regimen such as P-E-N or D-E-N (Physioneal or Dianeal + Extraneal + Nutrineal) can provide a significant decrease in daily glucose exposure compared to regimens using only glucose-based solutions. We hypothesized that a glucose-sparing PD regimen would lead to improvement in metabolic control as measured by change in HbA1c from baseline to 6 months.

Methods
IMPENDIA [Improved Metabolic Control of Physioneal, Extraneal, Nutrineal (P-E-N) vs. Dianeal Only in DIAbetic CAPD and APD Patients] and EDEN [Evaluation of Dianeal, Extraneal, and Nutrineal (D-E-N) versus Dianeal only in Diabetic CAPD Patients] are multi-center, prospective, randomized, controlled, clinical trials that compare the impact of glucose-sparing PD prescriptions (Intervention group: P-E-N or D-E-N) vs. a glucose-only prescription (Control group: Dianeal only) on metabolic control in diabetic PD patients. Eligible patients were randomized 1:1 to either the treatment or control group and followed for 6 months. The primary efficacy endpoint was improved metabolic control as measured by the magnitude of change from baseline in HbA1c. Secondary outcome measures included change in glycemic control medication requirements, lipid parameters, nutritional status, and quality of life. (Trial registration: ClinicalTrials.gov NCT00567398, NCT00567489, NCT01219959).

Results
Study enrollment was terminated in January, 2011, after 251 diabetic PD (95.5% CAPD) subjects were randomized (IMPENDIA, n=180; EDEN, n=71). Mean age was 58 years, 44.4 % were female. The average BMI was 27 kg/m², and baseline HbA1c was 7.4%. All subject visits will be complete in July 2011 and study results will be available in early 2012.

Discussion
The IMPENDIA/EDEN clinical trials will assess potential benefits associated with the use of glucose-sparing PD regimens in diabetic PD patients. Additional baseline demographic and clinical characteristics of the study population will be presented.

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NEW DEVELOPED DOUBLE-CUFFED SELF-LOCATING CATHETER PLACEMENT BY LAPAROSCOPIC ROTATION TUNNELLING

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Introduction
Peritoneal dialysis (PD)-catheter placement is the first step in peritoneal dialysis therapy. Therefore a safe and reliable implantation technique is important for further troublefree treatment. Catheter-associated complications like leakage, infection and misplacement are limiting factors for PD. We describe a new implantation technique by laparoscopic rotation tunneling that reduces the typical complications and improves outcome for PD-Patients.

Methods
PD catheter implantation was performed by a laparoscopic triple hole technique. After installing a 15 mmHg pneumoperitoneum of intraabdominal pressure a 11mm trocar (Covidien Versaport V2) was seated in a caudal direction. Then a 5 mm trocar (non-cutting, WISAP HI-FLO) was placed in the right lower abdominal quadrant, a second 5 mm trocar was placed in the left lower quadrant 2-3 cm beneath the umbilicus which marks a visual fixpoint for the following rotation of 180° from the left to the right abdominal wall. Skin, subcutis, muscles and fascies are penetrated step by step creating a long intraabdominal tunnel. A self-locating catheter with a tungsten-weighted tip (B.Braun, Care-Cath®) was placed through the rotated 5 mm trocar. The first cuff was placed in the cuts, the second cuff at the level of the peritoneum. After removal of the 5mm trocar we performed a leakage control by instillation of 500 ml sodium solution.

Results
We implanted N=14 Self-locating catheters between March 2006 and May 2010. All catheters were correctly placed as documented by abdominal x-ray. One post-operative catheter leakage was observed due to patients non-compliance. During 194 treatment months 4 episodes of peritonitis in 3 patients were observed (1 peritonitis in 48,5 months) and 1 exit-site infection. There were no perioperative complications.

Discussion
Self-locating catheter placement by newly developed laparoscopic rotation tunnelling is a safe implantation technique with a very low complication rate.
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APPLYING THE STANDARDS. THE PRACTICALITIES OF USING THE PERITONEAL ACCESS GUIDELINES

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Introduction

We describe our experience of applying audit standards derived from the recently published clinical practice guidelines for peritoneal access1, 2. Several of the regional audit group were authors of these guidelines and participated in the extensive consultation process that preceded publication.

Methods

An audit tool was developed from the ISPD access guidelines. The 6 renal units within the region collected data for first PD catheters inserted between January 2008 - January 2010 with 1 year follow up. Data was censored for patients that stopped using their catheter for a non-catheter related reason, including death, transplant, transfer to HD.

Results

1 year mean catheter failure (mechanical and infective causes) for the 6 units was 31.1% (range 20.8%-36%).

Early (within 2 weeks) Post operative complications for PD catheter insertion

<table>
<thead>
<tr>
<th>centre</th>
<th>Bleeding (%)</th>
<th>Peritonitis (%)</th>
<th>Exit site infection (%)</th>
<th>Function (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6.1</td>
<td>0</td>
<td>9.1</td>
<td>12.1</td>
</tr>
<tr>
<td>B</td>
<td>0</td>
<td>9</td>
<td>2.8</td>
<td>4.7</td>
</tr>
<tr>
<td>C</td>
<td>10.5</td>
<td>5.3</td>
<td>15.8</td>
<td>33.3</td>
</tr>
<tr>
<td>D</td>
<td>0</td>
<td>2</td>
<td>6</td>
<td>88</td>
</tr>
<tr>
<td>E</td>
<td>0</td>
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<td>3.4</td>
<td>3.4</td>
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<tr>
<td>F</td>
<td>0</td>
<td>2.7</td>
<td>5.5</td>
<td>36.1</td>
</tr>
<tr>
<td>Total</td>
<td>2.8</td>
<td>3.2</td>
<td>7.1</td>
<td>29.6</td>
</tr>
</tbody>
</table>

Discussion

Wide variation between units was identified. There were significant discrepancies in interpretation of the qualitative audit standards. A large number of guidelines are published. For audit to be valuable the correct questions must be asked. Standards must avoid qualitative terminology.

The regional group have reduced the number and complexity of the audit standards for PD catheters. We plan to pilot a reproducible, strengthened audit tool across several regions. Our intention is to use this tool nationally to facilitate registry PD Data collection.

**P-44**

**EMBEDDED PERITONEAL DIALYSIS CATHETERS – ONE YEAR’S EXPERIENCE**

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**Introduction**

In October 2009 our unit began using embedded catheters (EC) in patients opting for peritoneal dialysis (PD).

**Aims**

To assessing EC efficacy with respect to patency rates, peritonitis episodes, malfunction, dislocation and dialysis adequacy.

**Method**

Retrospective review of EC inserted from October 2009. Events were cumulative for the data period. Adequacy data were taken as the first catheter assessment performed.

**Results**

33 EC inserted, 17 externalised, 15 remained functional. Mean time to externalisation 174.5 days; median 141 days (range 25-466). Peritonitis episodes (ISPD criteria) happened on average 292 days after insertion and 93 days after externalisation. 4 catheters required radiology manipulations and 3 required surgical repositioning. One line was damaged during externalisation requiring replacement. Adequacy data were present for 9 EC. The duration from catheter insertion to first assessment was 26 to 173 days.

<table>
<thead>
<tr>
<th>eGFR at externalisation (mls/min)</th>
<th>mean 8.2, median 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary patency</td>
<td>16/17</td>
</tr>
<tr>
<td>Mean KvV</td>
<td>2.36</td>
</tr>
<tr>
<td>Mean Creatinine clearance (1/wk/1.72m²)</td>
<td>93.3</td>
</tr>
<tr>
<td>Automated peritoneal dialysis</td>
<td>5/9</td>
</tr>
<tr>
<td>Continuous ambulatory peritoneal dialysis</td>
<td>4/9</td>
</tr>
</tbody>
</table>

**Conclusions**

Our experience has comparable outcome and adequacy data to a prior UK-based study[1], and we encountered a similar complication of a line damaged during externalisation. The majority of peritonitis episodes occurred >100 days after insertion; timescales varied following externalisation. The median eGFR at externalisation suggests patients are starting dialysis when symptomatic, and as catheters can be used immediately, clinicians are reassured delaying dialysis initiation.


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**P-45**

**REMOVAL OF PERITONEAL CATHETERS: CAN WE AVOID IT BY CHANGING ITS TYPE OR LOCATION?**

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**Introduction**

The key for a successful, chronic peritoneal dialysis (PD) is a safe and permanent peritoneal access. Catheter-related complications cause significant morbidity and often force the removal of the catheter, leading to a permanent or temporal transfer to hemodialysis. The main causes of removal of the catheter include infections and malfunction.

The aim of our study was to assess the main causes of catheter removal in our centre, and the relationship between these causes and the characteristics of each catheter.

**Material and Methods**

We performed a retrospective study on 180 peritoneal catheters placed in 156 patients at our center from December 1991 to April 2011. The type of catheter, the anatomical location, the practitioner (Nephrologist or Surgeon), the implantation technique, the reasons for withdrawal (infectious or non-infectious faults) and the relationship between these variables were evaluated.

**Results**

Out of 180 catheters, 139 (77.2%) have been implanted by the nephrologist. 56.9% of catheters had no fault. The most common reason for withdrawal was peritonitis (27.2%), followed by malfunction (24.7%). We found a different failure rate depending on the type of catheter. 70 out of 168 (41.7%) Tenckoff 2 versus 9 out of 12 (75%) Tenckoff 1 (p = 0.026) and on the anatomical location (left lower quadrant –54.4%– vs median line -34.2%-, p = 0.01), leading to a longer catheter survival. No statistically significant differences were found in the other items studied.

**Conclusion**

According to our data, and in order to achieve an improvement in the technique of peritoneal dialysis, we recommend using Tenckoff type 2 catheters, and implanting them in the left lower quadrant.

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[1]
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OUR EXPERIENCE WITH THE SELF-LOCATING CATHETER

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Objective

We started using the self-locating catheter, designed by DiPaolo, in 1997. Since then, we have implanted more than 400 self-locating catheters in two centres. The aim of this study is to study the evolution of both peritoneal catheter and patients in peritoneal dialysis (PD) until dec/2010, and to analyse possible improvements in the last years.

Patients and Methods

Retrospective survey. We included peritoneal catheters implanted since feb/1996 until dec/2010. We excluded those catheters that were not used to do PD. We analyse catheter withdrawal causes, exit site infections, peritoneal infections and the cause of finish on PD. We study catheter survival differences between different forms of catheters (straight, coiled, self-locating). We also compare two periods (before 2000 and after 2005). Statistics: Descriptive statistic and comparative analysis between groups by t student test. Survival analysis was made by Kaplan-Meier method.

Results

We included 522 catheters in 462 patients (60% male) with a mean age of 53.2±15.7 years (12-89).The bulk of patients had only one catheter (n=422). The main catheter implanted was the self-locating one (n=449), followed by straight one (n=58) and coiled catheter (n=15). The mean duration of the catheter was 790 ± 661 days (2-4315). Catheter withdrawal: Tip displacement occurred in 19 catheters, omental wrapping in 11 cases and obstruction in 5. There was a better survival with the self-locating catheter than with other designs (log-rank, p<0.001). Peritonitis was the main cause of catheter withdrawal (n=94). In the second period of time there were less ESI, less catheter withdrawal due to malposition (18 vs 1). Besides, there were less exitus (34 vs 11 patients) and less change to HD due to peritonitis.

Conclusion

The self-locating catheter is associated with a few mechanical complications. In the last years there is a reduction in ESI and less death rate.

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SURGICAL EXPERIENCE AND COMPLICATIONS CATHETER IMPLANTATION FOR PERITONEAL DIALYSIS AT OUR CENTER

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The aim of this paper is to present our results in the placement of catheters for PD during the past two years. Between 01.01.2008.-31.12.2010.g. We had 49 surgical procedures in 43 patients / 28 males and 15 females / treatment program for CAPD. Of this number of operations, 32 were a PD catheter placement / Tenckhoffovi catheters with swan neck /, 8 were extraction of PD catheters, 6 repositioning, and three times we were doing simultaneous PD catheter replacement. We used standard surgical technique -35 procedures/ 81.40% / et laparoscopic technique - 8 reposition the PD catheter (18.60). In all patients was followed protocol antibiotic prophylaxis. Extracted from 8 PD catheter, in 2 / 25% / patient reason was because of refractory CAPD peritonitis, fungal peritonitis in 1 / 12.5% / patient, exhaustion of the peritoneal membrane with the inability to achieve adequacy of CAPD in 2 patient / 25% /, mechanical complications in 1 / 12.5% / patient and kidney transplant was performed in 2 patients / 25% /. Eight laparoscopic repositioning were done because of malposition - in 6 cases /75% / and omentisation PD catheter - 2 cases /25% /. Of perioperative complications, the most common was the bleeding-in 4 / 8.16% / patient which were treated by revision of the weld. Two / 4.08% / patient had a wound infection-output places. Total one-year survival of PD catheter was 89.86%.

Conclusion

The standard surgical techniques is leading the way placement of PD catheters in our center. Refractory CAPD peritonitis are the leading reason for the extraction of PD catheters.
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EXPERIENCE WITH CATHETER INSERTION, INDEPENDENT OF WHO IS THE OPERATOR, IS ASSOCIATED WITH LOWER EARLIER CATHETER COMPLICATIONS – DATA FROM THE BRAZPD

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A good catheter implantation technique is important to allow good peritoneal access function and long term technique survival. The effect of center size on technique failure is already known. However, data about the impact of experience of PD centers with catheter implants on early catheter complications is lacking, independent if the operator is a nephrologist or a surgeon. Thus, the objective of this study was to explore the impact of the experience with catheter insertion on early mechanical and infectious complications in a large Brazilian multicentric cohort.

Methods

All first catheter implantations performed in adult patients recruited in the BRAZPD, a multicentric national cohort study, from May, 2004 to December 2008 were included in the analysis. The aim of the study was to compare catheter complications related to its insertion according to the center experience in this procedure. We analyzed mechanical and infectious complication rates as time to the first event, for each of them separately, occurring up to 3 months after catheter insertion. Analyzes were adjusted for age, body mass index (BMI), diabetes, catheter type and operator (nephrologist versus surgeon).

Results

Catheter implantations in 736 patients from 93 Brazilian centers (mean age of 59 ± 16 years-old, 52% women, 61% white) were analyzed. Among these centers 55 of them contributed with the insertion of up to five catheters, 18 with six to ten catheters and 20 with more than ten catheters. Cox regression analyses were adjusted in both models, mechanical and infectious complications, for age, BMI, diabetes, catheter type and operator group. Centers who performed more than 10 catheters insertions during the follow-up period presented the lower mechanical and complications rates as shown in Figure 1A and 1B. No other covariate was statistical associated with early catheter complications.

Conclusion

The results of this national multicentric cohort study point to similar results obtained by nephrologists and surgeons in terms of catheter complications and technique survival, supporting the role of interventional nephrology in the placement of peritoneal dialysis catheters. Number of catheter inserted per center, as a measure of center expertise, was the only factor associated with better outcomes.

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THE MONCRIEF-POPOVICH TECHNIQUE FOR PD CATHETER IMPLANTATION: ACTUALISATION OF A MONOCENTRIC EXPERIENCE

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The Moncrief-Popovich technique of subcutaneously burying the external segment of the implanted peritoneal catheter until starting PD has been used in our center since 1995 for all patients who are judged able to wait ≥ 4 weeks before actually starting PD.

Purpose

We want to report our most recent experience with this technique during the last 5 years (01/01/06 – 01/01/11).

Methods

Retrospective files review in terms of infectious risk, catheter survival and patient follow-up.

Results

Sixty-three catheters (Swan-Neck coils) were implanted in 63 patients (35 M, 28 F) with a mean age of 57 years (from 20 to 89) on PD for a total of 1200 patient-months (median 17). The median time elapsed between implantation and start of PD was 62 days (13 – 483). During this time period, mean eGFR decreased from 10 to 8.7 ml/min/1.73 m². All catheters allowed immediate PD after exteriorization of their proximal segment independently of burial duration. Out of the 63 patients, 25 are still on PD, 5 left our center, 7 were transplanted, 15 died and 11 transferred to HD (6 because of relapsing peritonitis). The catheter 2-year survival probability was 85.4%. Peritonitis incidence was 1/32 patient-months and 6 catheters (7.6%) were removed because of refractory peritonitis. Mean interval between 1st PD exchange and 1st episode of peritonitis or ISE was 184 and 132 days, respectively. Ten patients developed an exit site infection (ESI) with no need of catheter removal (incidence of 1/120 patient-months) and 2 patients simultaneously suffered an ESI and a peritonitis.

Conclusions

Considering “good” but not excellent (according to the last ISPD Guidelines) rates of infections (both ES and peritoneal) and KT survival achieved, the main advantage of the Moncrief-Popovich technique seems to be the reinforcement of the “always ready” and “planned start” approach serving as the “PD functioning arterio-venous fistula”.
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PREPRITONEAL TUNNELING; A NOVEL TECHNIQUE IN PERITONEAL DIALYSIS CATHETER INSERTION: INTRODUCTION OF THE TECHNIQUE AND RESULTS OF LONG-TERM FOLLOW UP
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Purpose
This study describes the preperitoneal tunneling method for inserting a peritoneal dialysis catheter; thereby lessening surgical complications and increasing the catheter's survival, and following up its long term results.

Methods
This clinical trial was approved and funded by the Regional Ethical and Research Committees. All 23 cases included in this preliminary report was operated on during the first two years of the study (December 2005 to January 2007) and followed up till March 2011 (63 months). The procedure of the operation and its possible consequences were explained to the candidate patients. The procedure was performed laparoscopically under local (16 cases) or general (7 cases) anesthesia by one surgeon. Those factors which might have impacts on the results of this study were predicted and gathered from the patients. Cases were all routinely examined and evaluated monthly.

Results
The catheters were mechanically obstructed in 2/23 cases (8.7%); and were withdrawn due to a peritonitis resistance to antibiotic therapy (2 cases), kidney transplant (10 cases), inadequacy of peritoneal dialysis (1 case). Six patients died before completing this following up period; still the patients got the benefits of the peritoneal catheter until receiving a kidney transplant or death. The 5-year survival rate of the catheter was 90%. No incidence of catheter migration, omental wrapping, herniation or leakage was noticed. Peritonitis and infection of the exit-site were occurred at the rate of 0.68 and 0.1 episode/patients/year, respectively. Infection of the tunnel pathway did not occur in any of the patients.

Conclusion
Preperitoneal tunneling is a simple and safe method for insertion of peritoneal dialysis catheters. Using this technique, mechanical dysfunction of catheter and the side effects of the operation can be reduced down to about 0%. Therefore, this method is recommended to be used as a routine procedure.

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PERITONEAL DIALYSIS CATHETER INSERTION BY NEPHROLOGISTS: 3 YEARS OF EXPERIENCE AT A SINGLE CENTER
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Introduction
Traditionally peritoneal dialysis catheter (PDC) has been inserted into abdominal cavity by surgeons, urologists, or nephrologists in Japan. However, the impact of surgery by nephrologists has ever not been reported.

Objectives
To evaluate our clinical experience of PDC insertion by nephrologists, we examined the incidence of PDC-related complications and PDC survival in our center.

Design
Retrospective chart review study, not controlled.

Patients
28 patients (mean age 59.1 ± 14.9 years, 57% male, 32% diabetic) who were performed PDC insertion by nephrologists between April 2008 and May 2010.

Methods
Our clinical experiences were compared with the audit criteria of clinical practice guideline for peritoneal access (Perit Dial Int 2010; 30:424).

Results
Operations for PDC insertion were performed under general anesthesia in three cases, spinal anesthesia in 25 cases. 19 cases (68%) were performed by methods of embedded catheter (Perit Dial Int 1994; 14:556). The mean operative time was 87.6 ± 15.3 minutes. The mean hospitalization days were 33.3 ± 16.5. Incidence of PDC-related complications was as follows: bowel perforation (bowel injury in one case): 0%, significant hemorrhage: 0%, exit-site infection within 2 weeks of catheter insertion: 2.4%, peritonitis within 2 weeks of catheter insertion: 0%, functional catheter problem requiring manipulation or replacement or leading to technique failure: 0%, dialysate fluid leak: 0%. PDC survival at 1 year in 2008, 2009 and 2010 was 100%, 92% and 100%, respectively.

Conclusions
PDC insertion by nephrologists was safely performed and led to good PDC survival.
MINI-LAPAROTOMY IMPLANTATION OF TENCKHOFF CATHETERS BY NEPHROLOGISTS: EXPERIENCE OF A SINGLE CENTER

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Introduction
Complications related with peritoneal dialysis (PD) catheters have a major impact in long-term technique survival. Of those many could be avoided by good implantation procedures. The practise of Tenckhoff catheter insertion by nephrologists remains uncommon in most centers.

Methods
Retrospective analysis of all DP catheters inserted by nephrologists in our unit by mini-laparotomy with subcutaneous embedding by Moncrief-Popovich technique. Implantation related complications are defined as those that occurred within 1 month after first use. Survival rate were estimated by the Kaplan-Maier method.

Results
Since 2000, 88 catheters were inserted in 84 patients, 58% male gender, mean age of 45,4±13,1 years, 28% diabetics. Mean time to first use ("embedding time") was 88,1±88,3 days and time at risk was 213 patient-years, with a mean follow up of 29,0±21,8 months [3 – 82]. Only one intra-operative complication was registered (bladder puncture), but didn’t lead to catheter failure. Incisional hernias did not occur. Within 1 month of catheter use, 5 patients developed infectious complications: 3 (3,4%) peritonitis and 2 (2,3%) exit-site infections; none of these led to catheter removal. Also in the first month of use, 11 (12,5%) catheters developed mechanical complications: 7 (8,0%) catheter migration or omental wrap, 3 (3,4%) intraluminal catheter obstruction and 1 (1,1%) leak. All of these complications were solved by laparoscopic rescue procedure and/or temporary hemodialysis transfer. Catheter survival rates were 89,7%, 88,1% and 85,4% at 12, 24 and 36 months respectively.

Discussion
Good outcomes could be achieved with well trained staff supporting the role of the nephrologist in the placement of PD catheters.

PERITONEOSCOPIC PD CATHETER INSERTION: FIVE YEARS’ EXPERIENCE

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Although PD is patient friendly and cost effective, advancing age and comorbidities pose high anaesthetic and surgical risk. Peritoneoscopic technique of PD catheter insertion by nephrologist, its complications and outcomes are not widely discussed. This single centre retrospective observational study looks at these issues.

Data was collected between 2004 and 2009 (n=129). Of these 39% (n=50) procedures were performed using peritoneoscopic technique by single operator using fluid insufflation rather than air. We looked into patient factors (demographics, occupation, and co-morbidity) and factors associated with catheter insertion (pre-medication, surgical technique complications and outcome).

Aseptic procedural room attached to dialysis unit was used. Male to female ratio was 1.6:1 with median age being 49 yr. (SD=19). 66% were Caucasian’s & 26% were Asian. Majority of these patients had glomerulonephritis (42%) followed by diabetes mellitus (16%) as a cause of end stage renal failure.74% received dialysis education through pre-dialysis team. Mean eGFR at the time of catheter insertion was 9 ml/min (SD=2).

All patients were operated under local anaesthesia. 52% patients needed sedation with Midazolam, mean dose of 3.6 mg (range 1 – 10 mg). 70% had left sided insertion. Peritoneoscopic view was clear in 82% with obscured view in 10%. In 6% cases procedure failed mainly due to patient factors. 4% had minor bleeding as complication, requiring no surgical intervention.10% had post-op drainage issues. Average length of inpatient stay was 1.9 days. In 62% cases catheter survived > 12 months.

Nephrologist led peritoneoscopic technique of Tenckhoff catheter insertion under local anaesthesia is relatively straight forward and safe procedure with minimal complications. It is cost effective as theatre time is not required. Publishing similar data on catheter insertion by other operators and centres will help in improving success rate. This may result in increase in PD cohort.
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LOSS OF RESIDUAL RENAL FUNCTION IN PD - WHO IS IN GREATER RISK?

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Introduction and Aims
Residual renal function (RRF) in peritoneal dialysis (PD) has beneficial effects on blood pressure control, left ventricular hypertrophy, nutritional status and sodium and fluid removal. Accordingly, therapeutic strategies that preserve RRF in these patients are associated with more favourable outcomes. More than baseline RRF itself, the rate of decline of RRF has been shown to be a powerful prognostic factor in patients on long term PD. Despite this, the factors associated with a stronger risk of RRF loss remain to be clarified. The aim of our study was to retrospectively evaluate the factors associated with a faster decline in RRF in a patient population followed on PD for 1 year.

Methods
The study reviewed all patients that started PD during 2009 at our centre. Patient-specific data as demographics, renal disease etiology, comorbidities (diabetes mellitus, hypertension, cardiovascular disease -CVD), glomerular filtration rate (GFR), urine volume, PD modality, use of icodextrin, PD adequacy and RRF were collected retrospectively. After a year of treatment PD adequacy, RRF, laboratory parameters, peritoneal transport, urine volume, ultrafiltration volume, episodes of peritonitis, use of antihypertensive drugs and CVD were documented. Anuric patients defined as daily urine <100 mL and those with incomplete data were excluded. The study population was stratified by the decline of RRF into a fast, intermediate and slow decline group. Group differences were assessed by Newman- Cole and paired sample t test.

Results
During 2009 50 patients started PD at our centre. Fourteen patients were excluded: 7 were anuric and 7 had incomplete data. Our population had a mean age of 54±16 years old, a mean body mass index (BMI) of 26 ±3.5 Kg/m2, with a higher prevalence of men (61%). Diabetic nephropathy (31%) and chronic glomerulonephritis (17%) were the most common causes of renal disease. Their mean GFR was 10 ml/min. At start 31% were diabetic, 83% were hypertensive and 33% had CVD. The majority of patients was on continuous ambulatory PD (75%) and used icodextrin (56%). Their initial KT/V was 2.4±0.8 and it decreased to 6.9±4.6 ml/min at the end of the study. No statistical differences were found between groups according to sex, age, BMI, diabetes, hypertension, initial CVD, modality of DP, use of icodextrin, initial and one year KT/V, haemoglobin, bone natriuretic peptide, calcium, phosphorus, parathyroid hormone, albumin, diuresis, ultrafiltration, presence of peritonitis, number of antihypertensive drugs or CVD during the first year of treatment. However in the paired sample t test male gender and ultrafiltration volume higher than 750 mL after one year of treatment were associated with a higher decline in residual renal function.

Conclusions
Male gender and an ultrafiltration volume higher than 750 mL after one year of treatment seem to be associated with a higher decline in RRF. We didn’t found a higher decline with the use of icodextrin. This raises the question if the use of dialysate of higher concentration of glucose and glucose degradation products may be responsible for this decline.

P-56

INFLAMMATORY FACTORS AS MORTALITY PREDICTORS IN PATIENTS ON PERITONEAL DIALYSIS

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Besides peritonitis the most common complication in patients treated by peritoneal dialysis, chronic inflammation indicators associated with cardiovascular comorbidity are present as well. The aim of this study was to find out the significance of specific inflammatory parameters for mortality of the analyzed patients on peritoneal dialysis.

In a prospective cohort study, 87 patients (57 males), aged from 30 to 85 years (62.92±10.61) who had been treated by chronic program of peritoneal dialysis from 3 to 111 months were analyzed. Basal period lasted 3 months and follow-up period was 18 months. The patients were determined for clinical parameters (cardiovascular morbidity, blood pressure, and residual diuresis), dialysis adequacy (KT/V and Ccr) and laboratory parameters including the inflammatory factors: serum amyloid A (SAA), C-reactive protein (CRP), fibrinogen and erythrocyte sedimentation rate (ESR). The Cox regression analysis selected the parameters of univariate and multivariate survival analysis.

During the follow-up period, out of the tested patients 24 cases died (27.6%). Univariate analysis selected the following potential mortality predictors (p<0.10): age (years), present cerebrovascular insult (CVI), congestive heart disease (CHD), KT/V, serum albumin and urea concentrations, SAA, CRP, fibrinogen and ESR. Four models were created according to inflammatory parameters. In any of these models, the inflammatory parameters, besides the age and CVI, were the most significant mortality predictors, except in ESR model where only the CVI and ESR were the most significant mortality predictors. When the inflammatory factors were analyzed all together, multivariate analysis established that the independent mortality predictors of this group of patients were: age (RR 1.06; p=0.014; IP 1.01-1.12), CVI (RR 4.91; p=0.001; IP 1.85-13.04) and SAA (RR 1.02; p=0.002; IP 1.01-1.03).

Accordingly, it may be concluded that all analyzed inflammatory parameters were independent mortality predictors except ESR. However, in this studied group treated by peritoneal dialysis SAA was the most significant independent mortality predictor among the analyzed inflammatory factors.
P-57

SEVERE COGNITIVE IMPAIRMENT IN PATIENTS ON PERITONEAL DIALYSIS
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Background
Moderate to severe cognitive impairment is common and under-diagnosed in patients with end stage renal disease (ESRD) on renal replacement therapy. This study describes severe cognitive impairment occurrence in a peritoneal dialysis patients compared with a group of subjects without chronic kidney disease.

Methods
We used cross-sectional study to compare the occurrence of severe cognitive impairment in 38 patients with ESRD on peritoneal dialysis with age-matched control group. Subjects were classified, based on the results of the three neuropsychological test accessing memory, executive function, and language. The severe cognitive impairment was defined if patients scored ≥ 2 SDs below the age-adjusted mean on each test.

Results
Mean peritoneal dialysis therapy duration was 16 ± 9.2 months. Almost 40% of patients on peritoneal dialysis had scored ≥ 2 SDs below the limits on the memory and executive function tests, while 35% did so on testing of the verbal domain. The duration of dialysis, serum level of ferritin, history of stroke or brain injury, and low level of education (> 8 years), were associated with severe cognitive impairment. Peritoneal dialysis patients had increased risk of severe cognitive impairment compared with control subjects (OR, 3, 1; 95% CI, 0.95-7.56).

Conclusion
More than third patients on peritoneal dialysis had severe cognitive impairment. Cognitive testing in these patients before peritoneal dialysis initiation and periodically after the therapy onset may be prudent.

P-58

METABOLIC SYNDROME AND SELF-REPORTED SEXUAL DYSFUNCTION IN PATIENTS ON PERITONEAL DIALYSIS: ONE CENTER EXPERIENCE
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Introduction
Chronic renal failure (CRF) and renal replacement treatments have a negative effect on sexual function and satisfaction. The literature on impact of metabolic syndrome (MSy) on sexual function is scarce. The aim of this study was to evaluate the sexual function in patients on peritoneal dialysis (CAPD) with MSy.

Materials and Methods
A total of 85 CAPD patients (51 women, mean age: 59.7±11.6; dialysis vintage: 47.6±34.0 months, were enrolled in the study. Standard biochemistry testing and adequacy indices were obtained and anthropometric measurements done. The parameters of the metabolic syndrome were evaluated according to the American Heart Association/Updated NCEP. The 21 patient with metabolic syndrome was identified. The patients' experience in sexual dysfunction was self-reported by using the Arizona Sexual Experience Scale (ASEX) with 5-item rating scale that quantifies sex drive, arousal, vaginal lubrication/penile erection, ability to reach orgasm, and satisfaction from orgasm. Possible total scores range from 5 to 30, with the higher scores indicating more sexual dysfunction.

Results
There wasn’t found a difference between groups with or without MSy related to the age, dialysis vintage, residual renal function and dialysis adequacy results. Patients with MSy had statistically significant higher blood pressure (p<0.05), cholesterol levels (p<0.001), glycemia (p<0.001), BMI (p<0.001) and comorbidity (Davies) score (p=0.015). The whole CAPD group self-reported sexual disfunction was very high (20.78±5.8) and even worse in the group with MSy (22.14±5.0; p>0.05). All the categories of self-reported sexual disfunction did not differ between groups. The worst results (the highest scores) were reported for the erectile disfunction and arousal.

Conclusion
This one-center study documented that sexual disfunction is very pronounced in patients on CAPD treatment. Metabolic syndrome worsens the problem even more probably because of the comorbidity burden in patients with metabolic syndrome on peritoneal dialysis.
P-59
FACTORS INFLUENCING THE SURVIVAL IN ELDERLY PATIENTS TREATED WITH PERITONEAL DIALYSIS
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Introduction
Kidney chronic disease is mainly an adult disorder with a prevalence of 25% in stages 3-5 among patients older than 70 and 30% in older than 80, in comparision with the 11% in the general population. Forty percent of patients on dialysis are older than 75 years. In elderly people, peritoneal dialysis has theoretical advantages over haemodialysis, such as the absence of vascular access requirement, better preservation of residual renal function and hemodynamic tolerance.

Objectives
To determine the morbi-mortality of patients older than 60 years on PD, and to analyse the main factors related to their survival.

Patients and Methods
Observational and retrospective study among 207 PD patients older than 60 years, with a mean follow up of 28±23 months. We divided patients according to the age in three groups: Group 1 (60-65 years, n=65), Group 2 (65-70 years, n=69) and Group 3 (>70 years, n=73). We compared the survival between the three groups at 1, 2 and 5 years, and we analysed the associated comorbidities (number of hospitalizations, cardiovascular events, number of peritonitis), residual renal function, modality of PD, serum albumin, gender, and Kt/V.

Results
The 1, 2 and 5 year survival was 89.9%, 78%, and 35.5% respectively for the group 1; 83.4%, 58.7% and 23.1% for the group 2, and 83.2%, 67.2% and 25.7% for the group 3 (p= 0.15). We recorded 31 deaths in group 1, 40 in group 2 and 34 in group 3 (p=0.15). Charlson comorbidity index (p<0.05), body mass index (p<0.05) and the total number of peritonitis (p<0.05) were significantly associated with lower survival in all groups. In the multivariate analysis (regression Cox model) the number of peritonitis was independently related to a lower survival. The remaining parameters analysed had no impact in survival in none group. We found no differences between groups in the peritonitis rate, hospital admissions and cardiovascular events.

Conclusion
In PD patients older than 60, comorbidity and survival is similar in all age established groups. A greater number of peritonitis, higher BMI and Charlson index are associated with a lower survival in these patients.

P-60
EVALUATION OF PHYSICAL SYMPTOMS IN PATIENTS ON PERITONEAL DIALYSIS: A PROSPECTIVE LONGITUDINAL STUDY
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Introduction
Little is known about physical and emotional symptoms in peritoneal dialysis (PD) patients. This study evaluates the prevalence of general and abdominal symptoms in PD patients.

Methods
A cross sectional study with subsequent follow-up, using an author-designed 21 symptoms questionnaire (15 non-abdominal and 6 abdominal). Each symptom was assessed on a scale 0-3 for severity (none -severe) and frequency (never - every day); We also collected PET, total weekly creatinine clearance and routine dialysis parameters.

Results
We studied 60 patients, mean age 63 ± 14 years, 62% male, 32% diabetics, 59% on APD. Mean baseline PD time was 913 ± 655 days. Mean number of symptoms was 9.4 ± 3.8, total symptoms score was 29.3 ± 14 with abdominal scores of 5.9 ± 4.6. Total weekly creatinine clearance was 83.8 ± 28.2 L/week. Haemoglobin, phosphate and calcium were 11.5 ± 1.4 g/dl, 1.6 ± 0.4 mmol/l and 2.3 ±0.2mmol/L, respectively. Most frequent symptoms were lack of energy, cramps, itching, poor sleep, cold hands, shortness of breath and loss of appetite. A second evaluation 238 ±117 days after the first in 30 patients disclosed no statistical difference between the first and second assessment, or between subgroups: diabetics vs. non- diabetics, age above or below 65 years, male vs female, modality of PD, dialysis vintage > and < 1 year. Cramps were the only symptoms which decreased over time (p=0.034). Lack of energy did not correlate with haemoglobin; neither did itching with phosphate level. There was a week correlation r=0.285 (p=0.027) between total creatinine clearance and itching scores.

Conclusions
Physical symptoms are frequent and troublesome; they relate to advanced kidney disease and not specifically to PD. Symptoms remains stable over time and do not appear to relate to dialysis parameters markers.
P-61

A QUALITATIVE STUDY TO EXAMINE THE PATIENT EXPERIENCE OF ENCAPSULATING PERITONEAL SCLEROSIS (EPS) - A FIGHT FOR SURVIVAL

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Introduction
EPS although rare is still a major concern to the renal community. Surgery now offers better outcomes. Research into EPS continues to focus on imaging and early detection methods, genetics, biomarkers and preventative strategies.

No studies as yet have examined patient's quality of life or experiences of EPS. The subjective perspective of patients can enhance and contribute to our knowledge on how we manage patients by providing insights into their own unique experiences. The aim of this study was to explore the experience of patients who have undergone surgery for EPS in one centre in the north of England.

Methods
Interviews were conducted on nine participants on two occasions over a one year period (50% recruited out of a total of 18 eligible). Interpretative data analysis was conducted following the philosophical tradition of hermeneutics. Thematic analysis was used to organise the data and present the findings.

Results
EPS posed the biggest challenge these patients have had to face since developing CKD. Five major themes each with subcategories were described
1) Understanding EPS - abandonment, uncertainty, diagnosis shock and relief and death as a possibility.
2) EPS and embodied experience - self interpretation, bodily awareness from others and within and Struggles with eating
3) Losses - loss of independence, loss of control and loss of PD
4) Relationships - support, guilt, protecting the family and trust
5) Surviving - adjustments -context of chronic illness, personal attributes and feeling lucky.

Discussion
The findings of this study highlight many important issues relevant to clinical practice including lack of information and understanding of EPS particularly early symptoms, the enormity of the surgery and support required. Providing adequate information on risks and potential early signs when patients transfer from PD to HD will improve not only the patient experience but also may enhance early detection of EPS.

P-62

OFFERING PATIENTS THERAPY OPTIONS IN UNPLANNED STARTS (OPTIONS) REGISTRY

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Introduction
UnPlanned Start (UPS) to dialysis is still a common and important problem in units across Europe. Typically 30% of patients commence dialysis in this way. Such patients have increased morbidity and mortality, and are less likely to receive dialysis modality choice and choose a home therapy.

The UPS programme was developed to affect the patient pathway. It supports healthcare professionals (HCPs) to improve the care of UPS patients and to enable more a informed choice of dialysis modality. The programme consists of a training package and a set of tools which assist the unit. It comprises;
1. Examination of patient numbers in planned and unplanned pathways
2. HCP Training directed at educational approaches to UPS patients
3. Process mapping the patient pathway
4. An educational package and decision support tools

The OPTIONS Registry will examine the effectiveness of the UPS programme in allowing more patients to be informed about and potentially choose a home based therapy, peritoneal dialysis. In addition it will provide information on the impact of UPS in terms of clinical outcomes and resource utilisation.

Methods
This is a non-interventional, prospective, multi-centre, observational study of UPS subjects receiving chronic renal replacement therapy. Centres will be those that have implemented the Baxter UPS programme into their routine clinical practice.

Results
All clinical data will be collected from the patient records or from routine subject-HCP interactions and will include demographics, medical history, hospitalisation history, dialysis access procedures and details of infectious events. Data will be collected at baseline (presentation with need for UPS), 6 and 12 months.

Discussion
The OPTIONS Registry will enrol its first patients from May 2011 and recruit for 12 months. This study will give important demographic and outcome data for UPS patients and demonstrate the results of a novel educational approach for dialysis modality choices.
P-63

FATE OF THE PATIENTS PARTICIPATING IN THE PRE-DIALYSIS TRAINING

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Introduction
We check and training our EPO-treated patients with stage III-IV CKD monthly at our special clinic.

Goal of the Examination
The examination of the effect of the training on the selection of the dialysis modality.

Patients, Method
At the beginning of the training and in the two years past since then, we analysed the shaping of the fate of the patients.

Results
Of the 113 patients involved into the training in 2008, 86 patients (76.1%) attended the care also one year after, while 66 patients (58.4%) also two years after. In 2009, 40 patients got into the training, 29 patients of them attended still the care on the 31st of December 2010. In 2010, 39 patients got into the training, 38 patients of them attended the care on the 31st of December.

Of the trained patients in 2009 16 persons (PD:10, HD:6), in 2010 23 persons (PD: 6, HD:17) got into the dialysis programme; in 2009 all the patients, in 2010 91% of them were elective. 11 persons of the patients trained in 2009, 9 person of the patients trained in 2010 disappeared from the care or died. During the same two years, of the patients not received a special training from the nephrology care 26 persons (PD:4, HD:22), respectively 25 persons got into the dialysis programme (PD:5, HD:20), electively 30.8-76%.

Discussion
More than 50% of the trained patients attend to care also after two years.

Since the introduction of the pre-dialysis patient training the ratio of the patient got electively into the chronic dialysis programme has been increasing.

The education results that the rate of patients who choose the self-care dialysis modality(PD) much more higher, than before.

P-64

THE EXAMINATION OF THE CLINICAL FACTORS THAT INFLUENCE IN CHOOSING DIALYSIS MODALITIES AMONG THE PATIENTS WITH END STAGE RENAL DISEASE

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Introduction
Factors such as sufficient education on renal replacement therapy favor the PD utilization. However, other various clinical factors relating to the PD utilization is scarce. The purpose of the present study was to examine the clinical factors that influence in choosing dialysis modalities among the patients with end stage renal disease.

Methods
All the 329 patients who started dialysis in St Luke's International Hospital from April 2003 to April 2011 were included. The relation between dialysis modalities and the clinical factors; period of the pre-dialysis education, residual kidney function, blood pressure, anemia, nutrition, daily salt intake in each patient at the time of the dialysis start were retrospectively examined.

Findings and Conclusion
Sixty patients (18.2%) chose PD. The mean age of patients on PD and hemodialysis (HD) was 63.0 ± 14.3 years and 65.5 ± 13.5 years respectively. The prevalence of diabetes mellitus in PD and HD was 35.0% and 41.6% respectively. Out of the clinical parameters, the period of the pre-dialysis education and daily salt intake had a significant relation to the PD utilization. Peritoneal dialysis is still an underused modality of RRT at our hospital. The patients who chose PD at our hospital underwent longer RRT education compared to the patients who chose HD. Furthermore, the patients who took up for PD had better adherence than the patients for HD.
P-65

MONITORING PREDIALYSIS CARE DURING 7 YEARS IN A SPANISH MULTICENTRE STUDY SHOWS LIMITED IMPROVEMENT IN PLANNED DIALYSIS START, INFRASTRUCTURES AND FINAL RRT MODALITY

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Introduction

The quality of advanced chronic kidney disease care (ACKDC) may directly impact on morbi-mortality, lack of RRT modality choice, suboptimal dialysis start and higher costs. However, there are gaps in our knowledge of how ACKDC is actually being delivered that should be filled in order to design action plans for further improvement.

Objective

To evaluate main differences in ACKDC regarding timing of referral, type of predialysis care provided, RRT modality choice education offered, optimal care achieved, type of dialysis start and final RRT for incident patients in 2 periods.

Method

Retrospective multicenter comparative analysis of 2 cohorts of incident patients starting dialysis in Spain in the years 2002 (626 patients from 24 hospitals) and 2009 (603 patients from 14 hospitals). Chi square was used to assess statistical differences between the two periods.

Results

Late referral occurred in 23% in 2002 vs 21.8% (p=0.63). Renal follow up since early stages of CKD care was 75% in 2002 and 78% in 2009 (p=0.253). Planned dialysis start improved from 51% in 2002 to 57% (p=0.034). Education provided on RRT modalities improved from 37% in 2002 to 64% in 2009 (p=0.001). Optimal care, defined as follow since early stages of CKD, educated and with planned dialysis start, improved from 27% in 2002 to 66% % in 2009 (p=0.001). Specialized predialysis care was delivered to 50% of patients in 2002 and increased to 56% in 2009 (p=0.035). The final RRT modality remained stable at 81 and 83% for HD (p=0.415).

Conclusions

Monitoring quality indicators in ACKD referral and follow-up prior to dialysis initiation diagnoses deficiencies and proposes solutions. This study shows some improvements over a 7 year period but some improvements eg planned dialysis start, although statistically significant, remain modest. Multidisciplinary care is not widely available and RRT modality unbalances remain.

P-66

DOES IN-CENTER INTERMITTENT PERITONEAL DIALYSIS HAVE A RAISON D’ETRE? CASE STUDY

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Introduction

What can we do, if the patient underwent hemodialysis for a long time has no more vascular access and she/he is unsuitable for CAPD or APD?

Case description

Mrs. H. S. is a 53-year old woman. Original disease: 2nd type diabetes mellitus. Haemodialysis treatment was launched in March 2003 through a temporary jugular vein canule. The 2 attempts to create the AV fistula were unsuccessful. In September 2003 a permanent venous canule was inserted but it had to be replaced in 2004 as a result of an infection; then in 2005 another replacement took place because of thrombosis. Gradually, the jugular vein and the subclavian vein became thrombosed, so the permanent canule was moved to the right-side femoral vein. In the meantime, thrombolysis was carried out in the canules 3 times. In April 2005 another 2 attempts was made for a shunt operation, with A-Vgraft insertion. All attempts to created HD were fruitless. In 2006 and in 2008 the patient had acute myocardial infarcts. After HD treatment for 5 years and 3 months, the only option left was PD. (PD would have been preferred from the very beginning but the patient and the family were mentally unsuitable and also the social background ruled out this modality.) As in-home treatment was not an option, cycler-assisted in-center. IPD treatment was carried out 3 times a week. The patient lived for 6 more months. In December 2008 (3 months after the 2nd AMI) she died in an acute left ventricular failure.

Discussion

In our opinion, in these situations the only solution was to restore in-center intermittent peritoneal dialysis.
P-67

ASSISTED PERITONEAL DIALYSIS IN AN AGEING POPULATION

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Introduction

Life expectancy and chronic kidney disease (CKD) are becoming increasingly prevalent. Traditionally, both age and functional dependence were regarded as barriers to peritoneal dialysis (PD). In contrast to other countries, no funding for assisted PD is available in Ireland. This study aims to review assisted PD use in an ageing population over a ten-year period.

Methods

We retrospectively identified all adult patients, over the age of 50 years, who commenced PD as their first modality of renal replacement therapy (RRT) from 1998 to 2008. Primary outcome was patient survival; secondary outcomes included technique failure, peritonitis-free survival, transplantation and hospitalisation rates.

Results

22 patients underwent assisted PD; 22 age and gender matched independent PD patients were selected as controls. 63.6% (n=28) were male; mean age was 70±8 years. Continuous Ambulatory PD (CAPD) was used in 90.9% (n=20) of assisted patients and 72.7% (n=16) of independent (p=0.120). There were no differences between the groups in prevalence medical conditions or co-morbidity scores [Charlson Co-Morbidity (CCM) Index (p=0.821), modified CCM (p=0.671) or adjusted CCM (p=0.663)]. Mean survival was 815 days (58-2821 days), with no difference between the groups on Kaplan Meier analysis (log rank p=0.083), although death rate was higher in the assisted group (86.4% versus 59.1%, p=0.042). Technique failure, peritonitis free days and hospital admission rates were similar. Transplantation occurred only in the independent group (p=0.024).

Conclusion

Despite previous studies of assisted PD, this study fails to show any significant difference in overall survival, technique failure or hospitalization rates despite similar degrees of comorbidity. The majority of our cohort used CAPD, in stark contrast to international experience, where automated PD (APD) is more common. We suggest that assisted PD, including assisted CAPD, is a safe method of RRT in older patients.

P-68

AN INDEPENDENT PATIENT EDUCATION CENTRE’S RETRAINING MODEL FOR PERITONEAL DIALYSIS (PD).

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Background

This retraining model was set up by an independent patient education and training centre with four qualified renal nurses, who have a combined experience in both dialysis and teaching of 40 years, and provide all education for patients requiring Renal Replacement Therapy. Clinical responsibility for patients who attend the centre remains with their referring renal unit. Once training is complete, patients commence dialysis in their own home under the continuing care of their renal unit.

The centre instigated “Follow up Training” days for patients 6-8 weeks after starting therapy. This consisted of: review of dialysis procedure, hand positioning when connecting, hand washing, a fun interactive quiz which assesses their retention of knowledge related to their dialysis.

Between September 2009 and September 2010, the centre held 6 follow up training days. 55% of all patient trained for Unit A attended. The transfer to HD reduced by 8% to 38% at 12 months and none transferred from PD in the first 90 days. Patient numbers grew by 5. In Unit B transfer from PD in September 2009 was 61% and PD patient numbers were static. Having adopted this follow up training model within their unit, PD transfer to HD at 12 months decreased to 54% and patient numbers grew by 6. Seven patients transferred from PD to HD in the first 90 days in September 2009. This compares to none in September 2010 following implementation of the “follow up training”. They continue to use this model for all new patients that have been trained onto PD.

Conclusion

This is a simple, low cost and effective tool for keeping patients on PD. Further audit is required of those patients who did not return for follow up training and their relative success on therapy. Review of technique and knowledge is one key element to success on PD.
P-69
A PILOT STUDY OF THE IMPACT OF THE RESIDUAL PERITONEAL VOLUME ON THE PARAMETERS FROM THE PERITONEAL EQUILIBRATION TEST
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Background
The residual peritoneal volume (RPV) is a factor that varies widely among the peritoneal dialysis population. Animal studies have suggested that high RPV has an adverse impact on dialysis clearance and ultrafiltration capacity (UF). In this work we studied the impact of the RPV measured during PET on a range of parameters as well as the efficacy of dialysis in humans.

Methods
In 20 patients we measured the RPV following PET using the equation:

\[ \text{RPV} = \text{V injected} \times \left( \frac{[D3] - [D2]}{[D1] - [D3]} \right) \]

V= the volume of dialysate infused.
D1=the concentration of urea or creatinine in RPV, D2= the concentration of urea or creatinine in the fresh dialysate, D3= the concentration of urea or creatinine after mixing of infused dialysate. We calculated RPV using the urea and creatinine separately and took an average RPV. The average RPV was then correlated to the drain time, 4 hour D/P creatinine ratio, UF, 24 hour peritoneal creatinine clearance (CCl) and intra peritoneal pressure.

Results
The mean RPV (ml) measured with urea was 368 SD±150 and creatinine was 329 SD ±129. The average RPV (mean of the urea and creatinine methods) was 336 SD± 128 (range 143 – 590). Contrary to the results from the animal studies, there was no correlation between RPV and drain time, 4 hour D/P creatinine ratio, UF, 24 hour peritoneal creatinine clearance (CCl) and intra peritoneal pressure

Conclusion
The mean RPV in this study was higher than previously reported. However, we were reassured that it did not appear impact significantly on other PET parameters. Results from more studies will be available by the time of the meeting.


P-70
EFFECT OF GLYCEMIC CONTROL IN DIABETIC PATIENTS ON PERITONEAL DIALYSIS
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Introduction
Management of diabetic patients on peritoneal dialysis (PD) has been debated, because of problems in fluid management and glycemic control. Some studies have reported poorer outcome for diabetic PD patients.

Aim
To evaluate differences in biochemical parameters and complications in PD patients based on HbA1C levels.

Methods
28 PD patients in retrospective analysis, 2 groups based on mean HbA1C levels; Group A (HbA1C levels <7% - 13 patients) and Group B (HbA1C levels > 7% - 15 patients). We compared biochemical parameters and incidence of complications including peritonitis, Exit site infection (ESI), fluid imbalance, and non-dialysis problems.

Findings
The M:F ratio was 7:6 in Group A and 6:9 in Group B. In Group A, 2 patients using continuous ambulatory peritoneal dialysis (CAPD), 11 were on automated peritoneal dialysis (APD). In Group B, 3 patients used CAPD, 12 used APD. Mean age was 63.77(± 16) years (Group A), and 64.82(± 16.5) years (Group B). Average time on PD was 29.4(± 22.298) months In Group A, and 28.36(± 14.45) months in Group B. There were 3 episodes of peritonitis, in Group A, and 9 episodes in Group B (pValue=0.038). There were 2 cases of ESI in Group A, and 5 in Group B. 4 patients in group B developed diabetic foot, compared to 1 in group A. One patient in each group was admitted with fluid overload. One group B had myocardial infarction, and 1 group A patient developed CVA. Mortality rate was 7.6% (1 patient), in group A and 13.33% (2 patients) in group B. There was more of hypertriglycidemia in Group B patients, 2.14 mmol/L (± 1.17) compared to 1.67 mmol/L (± 1.23) in group A, (p value- 0.04).

Conclusion
We conclude that PD patients with poorly controlled Diabetes have more chances of PD related to Diabetic complications.
P-71

PERITONEAL DIALYSIS IN THE TREATMENT OF THE REFRACTORY CONGESTIVE HEART FAILURE

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Introduction

Congestive heart failure (CHF) is a disease with increased morbidity and mortality. Decreased cardiac output leads to decreased renal blood flow, which is often deteriorated by the administration of large doses of diuretics. Peritoneal dialysis (PD) has been proposed as a conservative rescue method in order to remove the excess of sodium and water.

Aim

The aim of our study was to present the experience of our unit as far as it concerns the efficacy of PD in patients with non-end stage renal disease and primary CHF resistant to diuretics.

Methods

Patients with refractory CHF and chronic kidney disease (CKD) strictly due to diminished renal blood flow were included. We gathered the demographic and laboratory data of the patients, we calculated the co-morbidity Davies index and monitored the functional status (NYHA criteria) at the initiation of PD and at the last follow-up. We also recorded the cardiologic ultrasound data before and after PD treatment.

Results

9 patients [mean age 69 years (66-83 years old)] were included. All patients had CHF (ejection fraction below 30%) and CKD [mean MDRD 16ml/min/1.73m² (10-35 ml/min/1.73m²)]. In the survival analysis, the mean time of survival was 26 months (95% CI 11.36-40.63 months). Seven out of 9 patients improved their NYHA status, while no changes in left ventricular ejection fraction appeared. A dramatic reduction in hospitalization days was observed (from 60±15 to 9±5days/patient/year) after treatment. At the initiation of PD, patients with the minor survival (<26 months) had higher co-morbidity index (50 vs 33%), lower NYHA status (83 vs 0%) and more serious pulmonary hypertension (66,7 vs 33%).

Conclusions

PD can be used successfully in the treatment of refractory CHF. Patients with better NYHA status, less co-morbidities and no serious pulmonary hypertension seem to benefit more from the method.

P-72

IMPACT OF HERNIAS ON PERITONEAL DIALYSIS TECHNIQUE SURVIVAL

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Introduction

Hernias are common in patients on peritoneal dialysis (PD) because of increased intraperitoneal pressure. There is little information about whether hernias and/or their repair affect future technique survival on PD.

Objective

The aim of this study was to describe types of hernias and impact of their repair on PD therapy.

Design

Retrospective case study.

Patients and Methods

We searched all computerized records of prevalent patients on PD from 2001 to 2010 for past history of hernias, hernia repair or conservatively managed hernias.

The information we collected included: age, sex, ethnicity, cause of renal disease, smoking, diabetes, past history of abdominal surgery, type of hernia, management of hernia, management post surgery, recurrence of hernia and subsequent dialysis therapy.

Results

73 hernias were recorded on 64 patients (40 males and 24 females, age range 21-88). The aetiology of kidney disease was Adult Polycystic Kidney Disease (13 patients), Renal Vascular Disease (10), Lupus and Glomerulonephritis (13), Diabetes (10), unknown (11) and 7 with other disorders.23% were diabetics and 31% current or intensive smokers when hernia developed. Types of hernias were umbilical (40%), followed by inguinal hernias (33%), incisional in relation to the peritoneal catheter (15%), incisional in relation to previous transplant (4%), epigastric (4%) and unknown (4%).

Most were treated with planned surgery (47), but 19 patients had conservative management. Two patients needed emergency surgery. Eight hernias recurred. Over 50% did not need dialysis for several days after surgery. Longterm outcomes showed 81% of patients started, continued or returned to PD, only 4% changed to hemodialysis, 3% died (not related to hernia repair) and 4% were transplanted.

Conclusion

Past history or development of hernias and their subsequent repair does not impact on survival of peritoneal dialysis therapy.
P-73
A PATHWAY FOR SURGICAL TREATMENT OF PATIENTS DIAGNOSED WITH ENCAPSULATING PERITONEAL SCLEROSIS (EPS)

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Introduction
EPS is a recognised complication of long term peritoneal dialysis which responds to surgery. As one of two NCG centres recognised in the UK for surgical intervention we have found that surgical outcomes are improved if there is timely referral for semi-elective surgery, rather than emergency intervention. The definitive diagnosis of EPS is still a challenge to many clinicians and the impact of delayed or wrong diagnosis can be catastrophic.

Methods
In order to streamline the referral process and to guide clinicians, we have devised a referral and management pathway.

Results
Initial contact from referring centre is to the EPS Co-ordinator who collates clinical data and arranges for mandatory CT images for review by the surgical team. A clinical diagnosis is made, along with a decision about severity and the need and timing for surgical intervention. Once enterolysis is decided upon, a plan is implemented for pre-transfer dietetic support. It is critical that a full medical, surgical and if possible psychological assessment is carried out along with completion of a pre-peritonectomy referral form, full septic screen, virology, HDX prescription, and echocardiogram. Locally the MDT is informed and before surgery patients are reviewed and counselled by different specialities including the stoma therapy, critical care and haemodialysis teams. Surgery is scheduled on an elective list with a mandatory critical care bed. Since the introduction of the NCG programme there have been 59 referrals and 43 patients have gone through this pathway. 37 patients underwent surgery with a mortality of 21%. In the last two years there has been a trend towards earlier referrals.

Conclusions
Given that the risks are high mortality in patients undergoing emergency surgery for EPS, the whole thrust of this pathway is aimed at early correct diagnosis and referral, with planned semi-elective surgery in a controlled situation.

P-74
PERIPHERAL ARTERY DISEASE AND PERITONEAL DIALYSIS

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Peripheral artery disease (PAD) is highly prevalent among patients in end-stage renal disease. PAD is associated with high cardiovascular risk and is often unrecognized in dialysis patients (pts). Ankle Brachial Index (ABI), a non-invasive method to diagnose PAD, shows a U-shaped association with mortality in this population. The ABI is believed to be highly correlated with the subclinical PAD of lower extremities but little is known about the associated risk factors and outcome for PAD and ABI in patients on peritoneal dialysis (PD).

We performed cohort analysis of 68 prevalent PD patients. These patients were screened for subclinical PAD using the ABI measurement. Measurements of ABI were performed in supine position. Blood pressure was measured in the left arm (brachial artery) and both ankles (posterior tibial arteries).

Highest ankle SBP/highest brachial SBP was used to calculate ABI.

An ABI value greater than 0.9 was defined as normal. Subclinical PAD was defined as an ABI value less than 0.90 in either extremity. The ABI was measured and a ratio of <0.9 was considered abnormal. ABI >1.3 is a false negative caused by noncompressible arteries.

The ABI value was correlated with laboratory data, functional parameters of peritoneum, Residual renal function (RRF), clinical cardiovascular disease and vascular calcifications. Biochemical parameters were time averaged for the 6 months preceding ABI evaluation.

68 patients_mean age of 54±18 (33-77) years_38.8% female and 19% diabetics. Mean follow-up time was 41±31 (3-136) months.

A normal ABI (An ABI > 0.9, an ABI <1.3) were found in 35 (51%). Vascular calcification were found in 27 (40%) patients. Advanced age, preexisting diabetes, preexisting cardio and cerebrovascular, (CVD), lower serum albumin levels, higher PCR serum levels, and higher peritoneal transport level were risk factors for PAD in our PD center.

Adjusting for age, diabetes, PD duration and cardiovascular disease at baseline, PCR (OR 5.7, 95% IC 2.6-8.9, p=0.016), High peritoneal transport (OR 4.2, 95% IC 2.12-12.46, p = 0.03) and vascular calcifications (OR 1.67, 95% IC 1.17-2.27, p = 0.021) was associated with ABI>1.3 or <0.9.
**P-75**

**A PRE-DIALYSIS EDUCATIONAL STRATEGY INFLUENCES MODE OF RENAL REPLACEMENT THERAPY**

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Chronic renal disease has individual clinical impact and significant social and economical weight to society. These costs rise exponentially when co-morbidities are considered in association to progression of renal disease. Patients are expected to get involved in self care, in order to improve therapy adherence. With that aim, a multidisciplinary pre-dialysis educational consultation was started, in order to provide information about renal disease and an informed choice of mode of renal replacement therapy (RRT). On the first consultation detailed information is given to the patients and his/her families, in a culturally adapted way. Patients are required to understand their clinical condition, evaluate their skills in including disease care in their daily routines and participate actively in their self-care. Patients, families and friends are informed of therapeutic needs and options, including RRT. An individual informed choice between equivalent options is encouraged. This programme involves active participation of a multidisciplinary team, including doctors, nurses, nutritionists and social workers. During 2010 we observed 62 patients in this programme. Estimated GFR was 14.2 ± 4.6 ml/min, 16 female e 46 male. Forty patients had diabetes mellitus. Fifty seven patients came to the hospital with family members and friends. Patients were referred by other doctors of ours hospital in 74.2% and from other hospitals, nephrologists or dialysis centers in 25.8%. Time of follow-up by nephrologists was XXX. Haemoglobin was 11.3 ± 2.8 g/dl, and albuminemia 3.2 ± 0.78 mg/dl. Of these 62 patients, 25 are still in pre- dialysis follow-up, 37 started RRT (16 (43.2%) preferred dialysis 20 (54.1%) peritoneal dialysis and one received pre-emptive renal transplantation. Of the 229 patients that started RRT in our hospital, 209 (91%) initiated hemodialysis and 20 (9%) peritoneal dialysis. Only 36 patients were referred to this pre-dialysis educational programme. Patients included in pre-dialysis educational strategy tend to chose more often home dialytic methods.

This presentation shows preliminary results of a patient-centred programme aimed to increase skills of patients in RRT, stimulating their autonomy. This changing strategy implies changes in work methodologies and medical-patients relationship paradigm.

**P-76**

**PERITONEAL DIALYSIS OUTCOMES DURING FIRST YEAR TREATMENT OF INCIDENT DIABETIC PATIENTS**

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Peritoneal dialysis (PD) technique failure is higher compared to haemodialysis. Whereas diabetes mellitus (DM) is not a consistent risk factor for peritoneal dialysis technical survival, other co-morbidities are common in DM patients (pts) and may predict technical survival.

**Aim**

Identify predictors of early technical and patient survival in incident PD patients, focusing on the impact of diabetes in outcomes.

**Methods**

Prospective multicentre, cohort study of every incident PD pts in a national public health care system, in a reference area of 10 million people. We registered baseline data, hospital admissions, peritonitis, transplants, CV events and deaths, PD prescription, dialysis efficacy and anaemia variables. Pts were followed for the first 12 months. Technique failure was defined as switching dialysis modality, censored for death.

**Results**

From 238 incident pts, aged 52±15 years, 56.7% male, 24.8% were diabetic; 42% did APD. Death and transfer to HD accounted for 5% each as causes of early drop-out. DM pts were older (52±16 vs. 57±12 years, p =0.013) and had higher prevalence of CVD (55% vs. 21% p<0.001). There were no differences in dialysis efficacy targets, peritoneal transport, and anaemia, and serum albumin, peritonitis rate between pts with and without early drop out, neither between diabetics and non diabetics. In multivariate analysis DM was positively (HR=10.1; p= 0.02) and daily fluid removal negatively (HR =0.9; p= 0.01) associated with mortality. After adjustment for age, assisted PD (HR 4.386, 95% CI 1.215 a 15.873, p= 0.022) and fluid removal (HR 0.99, 95% 0.89-1.0, p=0.03) but not DM were associated with early technique failure.

**Conclusion**

DM impacts on patient survival but is not predictor of early dialysis modality switch. Lack of autonomy in PD negatively affects the prognosis of these pts. Fluid removal is a modifiable variable to optimize both patient and technique survival.
P-77

INTESTINAL OBSTRUCTION RELATED TO ENCAPSULATED PERITONEAL SCLEROSIS – AN AVOIDABLE SURGICAL TRAGEDY?

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Introduction

Encapsulated Peritoneal Sclerosis (EPS) is a progressive inflammatory process resulting in the formation of new fibrous tissue, which covers and bind the intraperitoneal viscera enclosing them in a “cocoon” formation with severe impact on intestinal morphology and digestive function. EPS often leads to intestinal occlusion, intraperitoneal bleeding, small-bowel necrosis, enterocutaneous fistulas and malnutrition; is a very serious and potentially lethal complication of peritoneal dialysis. Medical treatment seems not to affect the formed sclerosis and the surgical management is a difficult task even for experienced teams.

Objective

Peritoneal dialysis (PD) is used as substitutive treatment of renal function in a large proportion of the end-stage kidney disease population in our country. Based on 15 years of active involvement in the national PD programme, the objective of our presentation is to point out the peculiar aspects of EPS in our cohort and discuss its surgical implications.

Conclusions

As known, the pathogenesis of EPS remains uncertain; in our cohort the predisposing factors are recurrent peritonitis and, probably, the composition of the dialysate. We did not find any relation between EPS and specific antiseptics used during bag exchanges. Most cases had a PD duration of more than 5 years and history of severe peritonitis.

Our experience has been pessimistic regarding the surgical outcome when EPS has caused complete intestinal obstruction. There is an important risk of visceral injury during the procedure and a high incidence of anastomotic failure when a resection and primary anastomosis is performed.

Although recent therapies have reported some encouraging results, an efficient diagnosis protocol to detect, at an early stage, patients at risk for EPS is mandatory. Our surgical department recommends an aggressive clinical, echografical and radiological screening having in mind the extreme menace and poor prognosis of the settled EPS.

P-78

LONG-TERM OUTCOME IN KIDNEY FAILURE PATIENTS ON PERITONEAL DIALYSIS

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The aims of the study were to establish the mortality and morbidities rates and causes in PD patients and the impact of morbidities to the patients, and the peritoneal dialysis survival.

Our preliminary data are referred to 68 patients (M/F=36/32, mean age at PD initiation=52.3 +/- 15.8yrs (18-83) on peritoneal dialysis. The mean follow-up of the PD patients was 31.09 +/- 17.22months (4-84). 88.23% (60/68) patients performed CAPD, and 11.76% APD. 16 patients (23.5%) deceased: stroke (n=4), myocardial infarction and sudden death (n=2), cardiac failure, digestive hemorrhage, sepsis and cardio-respiratory arrest (n=1) and hematological disease as cause of kidney failure (n=4; multiple mieloma). The most important morbidity factors is arterial hypertension presented in 93,4% patients, in 69,6% patients being associated with other cardiovascular pathology as arrhythmias, cardiac failure, valvular stenosis, angina and atherosclerosis. 33/68 patients (49.5%) presented at least one episode of peritonitis: 1 episode (n=16), 2 episodes (n=11), 3 episodes (n=2) and 4 episodes (n=4). In all patients, rate of peritonitis is 1 episode at every 36.6 months (0.32 episode/patient/year). In patients with peritonitis (n=33), rate of peritonitis is 1 episode at every 23.9 months (0.52 episode/patient/year).

Peritoneal dialysis survival rates at 1-year, 2-year, 3-year and 5-year are: 94.1, 77.9, 66.2, 51.5, and 45.6%. Conversion to HD was temporary in 21 patients (30.9%), related to surgical interventions on abdominal wall. Conversion rate to permanent HD is 16.2% (n=11) and to renal transplantation is 14.7% (n=10).

In our experience, PD survival rates at 1-year, 2-year, 3-year, 4-year and 5-year are similar or better than in literature. The most important cause of death is stroke, excluding hematological disease as multiple mieloma. The ‘PD first’ approach should be presented as the most logical choice, but starting with PD is not compulsory and the patient's preference should be taken into account as the primary factor.
P-79

PERITONEAL DIALYSIS IN PATIENTS WITH MULTIPLE MYELOMA

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Peritoneal dialysis is a treatment of proven efficiency for a variety of disorders. CAPD is being used only in limited number of patients with kidney failure due to multiple myeloma, despite having better preservation of hemoglobin, higher clearance of paraproteins, and higher chances to recover the renal function than hemodialysis.

We report 7 cases (M/F=3/4, mean age=62.6 +/- 17.6 years (45 - 81)) with multiple myeloma and kidney failure without recovery of renal function after aggressive therapy. CAPD schedule with standard glucose containing lactate-buffered peritoneal solutions (3-4 changes/day, 1500-2000ml) was performed. In 1/7 patients, 2 monthly cures of induction chemotherapy according to the protocol VAD allowed to achieve recovery of renal function and independence to CAPD program (creatinine Cl.=57.0ml/min). One year CAPD survival was 50% (3/6 patients). Median survival after start of PD was 14.0 months (4-28). Death appeared in all patients (6/6), without recovery of renal function and performing CAPD, due to evolution of multiple myeloma and was not related with peritoneal dialysis. There were no severe adverse events during CAPD initiation in multiple myeloma patients: peritoneal leak due to malignant obesity in one patient and catheter malfunction in another patient. 1/7 patients presented 2 episodes of peritonitis during 18 months of CAPD (1 episode at every 9 months or 1.33 episode/year). In all patients, rate of peritonitis is 1 episode at every 42 months (0.28 episode/patient/year). One patient developed hemoperitoneum secondary to posttraumatic spleen rupture, resolved by splenectomy and maintenance of peritoneal catheter and CAPD program.

CAPD allowed the recovery of renal function or the survival on short to long term (4 to 28 months) in multiple myeloma patients. CAPD as dialysis support should be considered whenever necessary for all newly diagnosed patients with multiple myeloma and renal function which does not improve with aggressive initial therapy.

P-80

ANTHROPOMETRICS (OBJECTIVE MUSCLE AND FAT MEASUREMENT) TO DIAGNOSE WASTING IN ENCAPSULATING PERITONEAL SCLEROSIS (EPS) PATIENTS UNDERGOING SURGICAL INTERVENTION

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Introduction

EPS is an uncommon but serious complication of peritoneal dialysis where gastrointestinal symptoms reduce appetite and dietary intake. Previously we showed that EPS patients have significant weight loss pre-operatively, which likely impacts on outcome. Here we report how anthropometrics can assess nutritional status.

Methods

Mid-Arm Circumference (MAC), Mid-Arm Muscle Circumference (MAMC- muscle mass), Triceps Skin-Fold (TSF- fat mass) and Hand-Grip Strength (HGS- functional assessment measure) were measured pre-operatively by a single operator in 49 EPS patients in a specialist centre.

Results

The cohort comprised 25 males/ 24 females, 96% non-black/ 4% black, 14% diabietic/ 86% non-diabetic, 90% haemodialysis-dependent/ 10% transplanted with mean age 46yrs (IQR 37-72). Mean BMI was 20.7kg/m² (19-22.7), percentage weight loss 14% (8.5-20), albumin 28.4g/L (24.7-33) and CRP 117mg/L (29.3-182.5).

Mean upper-arm anthropometry revealed MAC 25.4cm (22.2-28.6) with 52% of patients <5th percentile indicating protein-energy malnutrition, MAMC 21.7cm (19.3-23.8) with 48% <5th percentile and TSF 11mm (7-14) with 35% <5th percentile. Mean HGS was 20.8kg (14.7-27.5) with 92% of patients having <85% of a normal value, which may indicate protein malnutrition and predisposition to serious post-operative morbidity. There was no correlation of these anthropometric parameters with age suggesting sarcopenia was not a factor. MAC, MAMC, TSF and HGS correlated significantly with BMI but not albumin. MAC correlated with % weight loss.

Discussion

Upper-arm anthropometrics and HGS are useful for nutritional assessment of EPS patients due to their ascites/oedema, chronic disease and potential for long-term parenteral nutrition. They reveal that a large percentage of these patients are malnourished, and define their malnutrition as wasting with depleted fat and lean body mass. This may be due to anorexia and inflammation in these individuals. Inflammation may also be why albumin was not an accurate nutritional marker. EPS patients must undergo timely dietetic referral to prevent pre-operative nutritional deterioration.
**P-81**

**USSEFULNESS OF CYSTATIN C TO MEASURE RESIDUAL RENAL FUNCTION IN PERITONEAL DIALYSIS**

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In PD patients, different clinical guidelines recommend estimating the residual renal function (RRF) using the mathematical average of the clearance of urea and creatinin (ClUrCr), but there was the inconvenience of requiring the collection of urine for 24h.

The aim of this study is to evaluate the correlation of ClUrCr with other methods for estimating RF in PD patients and to evaluate the use of cystatin C.

**Material and Methods**

Study of a transversal group including 60 patients seen in the PD office between August/2008-January/2011, whose RF was estimated using 4 different methods: ClUrCr, the Cockcroft-Gault equation (C-G), MDRD-4 and TGF based in cystatin C. A correlation of ClUrCr and cystatin C was made with the other methods.

**Results**

Of the 60 patients, 31.7% were women. The average age was 55.8 ± 13.2 years (23-85). The averages of RF estimated (ml/min) by the different methods are: ClUrCr 6.87, C-G 12.74, MDRD-4 9.62 and GFR by cystatin C 4.85. Tables 1 and 2 show the quotients of correlation and significance of ClUrCr and cystatin C with the other methods.

<table>
<thead>
<tr>
<th>Method</th>
<th>Quotient of correlation (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cockcroft-Gault Formula</td>
<td>0.651 (&lt;0.001)</td>
</tr>
<tr>
<td>MDRD-4</td>
<td>0.673 (&lt;0.001)</td>
</tr>
<tr>
<td>GFR by cystatin C</td>
<td>0.692 (&lt;0.001)</td>
</tr>
</tbody>
</table>

Table 1. Correlation between ClUrCr and other methods for measuring RF.

<table>
<thead>
<tr>
<th>Method</th>
<th>Quotient of correlation (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average clearance creatinin and urea</td>
<td>0.692 (&lt;0.001)</td>
</tr>
<tr>
<td>Cockcroft-Gault Formula</td>
<td>0.565 (&lt;0.001)</td>
</tr>
<tr>
<td>MDRD-4</td>
<td>0.644 (&lt;0.001)</td>
</tr>
</tbody>
</table>

Table 2. Correlation between GF by cystatin C and other methods for measuring RF.

**Conclusions**

In PD, C-G equation, MDRD-4 and cystatin C are similar for estimating RF. GFR by cystatin C has a stronger correlation with ClUrCr than the C-G formula and MDRD-4 but it does not offer advantages over other methods using serum creatinina without urine output in 24 hours.

**P-82**

**THE FREQUENCY OF METABOLIC ACIDOSIS IN PATIENTS ON CONTINUOUS AMBULATORY PERITONEAL DIALYSIS**

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**Background/Aims**

Metabolic acidosis is common in patients in peritoneal dialysis has been reported to be rather high. In this study we aimed to investigate the frequency of metabolic acidosis in patients on continuous ambulatory peritoneal dialysis (CAPD) and to examine its possible causes.

**Methods**

Between October 2010 and January 2011, 106 patients on CAPD were recruited for the study from our university hospital peritoneal dialysis clinic. The mean duration of CAPD was 41±36 months. Arterial blood gas analysis was performed to all patients. Biochemical tests and intact parathormone (iPTH), at the time of arterial blood gas analysis were obtained from patient files. Weekly clearance of urea normalized to total body water (weekly total Kt/V) data of the patients was also collected. Body mass index (BMI) of all patients was calculated. A serum bicarbonate concentration of less than 22 mmol/L was defined as having metabolic acidosis. Comparisons between groups were performed using Student-t test for normally distributed variables, whereas the Mann-Whitney U test was used for parametric variables with non-normal distributions. For correlation analysis Pearson's correlation test was used.

**Results**

Fifty-three patients had a serum bicarbonate of less than 22 mmol/L. Patients with metabolic acidosis had significantly higher BMI (30.3 kg/m² vs 26.7 kg/m², P=0.001), phosphorus (4.6 mg/dL vs 4.0 mg/dL, P=0.012), and LDL (131 mg/dL vs. 126 mg/dL, P=0.047) levels. Whereas, the mean age, weekly total Kt/V, serum calcium, albumin, intact parathormone, alkaline phosphatase, triglyceride, total cholesterol and high density lipoprotein cholesterol levels were not significantly different between groups. In the entire cohort, serum bicarbonate was significantly and inversely related to BMI (r = -0.255, P=0.009), and serum phosphorus (r = -0.228, P=0.020).

**Conclusions**

Metabolic acidosis is highly prevalent in patients on peritoneal dialysis. Our study demonstrated that CAPD patients with higher BMI were more susceptible to metabolic acidosis.
CATHETEROGRAPHY: AN EASY TECHNIQUE TO DIAGNOSE MECHANICAL PROBLEMS

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Introduction

It is well-known that most frequent problems of PD treatment are those related with catheter complications. There are few non-invasive methods to diagnose mechanical complications. One of these techniques is catheterography, a procedure described on 90ths but not very used, nowadays. We describe our experience with this procedure in resolving mechanical problems.

Methods

Catheterography is performed in a X-Ray chamber by a radiologist helped by a nephrologist who can manipulate the catheter without complications. With the patient in a supine position, 20 ml of iodinated contrast is installed into the catheter. A series of X-rays are done to see how the contrast is accumulated around the tip of the catheter and passing through the lateral holes. The X-ray serial may be done in different views/positions depending on the suspected diagnosis. After that, 20 ml of normal saline solution are instilled to clean the catheter. The patient can go home immediately after the procedure. A prophylactic dose of antibiotic is recommended.

We show some examples of dysfunctional catheters with different final diagnosis. In these cases, catheterography has helped us to take a therapeutic decision.

Case 1: a 45 year-old man who starts APD without problems after having a severe peritonitis during CAPD. After 2 months, the patient complaints of a big number of alarms during APD in relation with poor UF. The first suspicion was that he was a really high transporter but the TEP didn’t confirm that possibility. An abdominal x-ray didn’t show any problem but with contrast and with other view (oblique) a kink was discovered. The problem was resolved after high doses of laxatives.

Case 2: a 38 year-old woman. Meanwhile she was doing the CAPD training, we could observe many problems during ultrafiltration period: not enough quantity and pain in pelvic area. We suspected a malposition of the catheter. That was not confirmed by catheterography. A TEP was performed and showed that she was a very high transporter.

Case 3: this catheter was inserted by open surgery because the patient could not maintain a supine position (cardiac failure, severe obesity…). Although the intervention was easy, the catheter didn’t work correctly even in the first hour. Before thinking in other surgery, we introduce contrast to see where the catheter was. We could see that the tip was entrapped and that a possible collection has appeared. The patient started Hemodialysis and after some days, abdominal laparoscopy was done. The catheter was situated into the abdominal wall.

Case 4: a 65 year-old woman with a second non-function kidney transplant was on HD during three months. She wanted to try DP. During laparoscopic surgery, many peritoneal adhesions were seen. Although, adhesiolysis was done, the possibilities of malfunction were very high. After 15 days, UF was not possible. With the suspicion of omental wrapping we performed a catherography that showed: the tip was permeable but none of the others holes were functioning. An irregular distribution of contrast was presented too. Re-intervention was performed and confirmed a completely wrapping of the catheter. She returned to Hemodialysis.

Conclusions

Catheterography is a really safe, non-invasive and easy procedure to diagnose catheter malfunction. With these cases, we can see that situations as: wrapping, kinking, dislocation... are easy to differentiate. And, what is more important: we can guide the surgeons directly to the problem if it can be solved by surgery. We can easily differentiate a mechanical problem between a membrane one. With our experience, we can recommend catheterography as a diagnosis procedure in APD problems.

USE OF CARBOXYMALTOSE IRON IN PERITONEAL DIALYSIS (PD) PATIENTS. EXPERIENCE IN A SINGLE CENTER

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The management of anemia treatment in PD patients has one disadvantage: the difficulty for using intravenous (iv) Iron treatment due to lack of vascular access. Currently, we can use iv Carboxymaltose Iron (1000 mg of Iron) in these patients as it has a high dose of Fe and administration will be required. Taking advantage that these patients need periodical analysis controls, we can administer one dose of Carboxymaltose Iron to those with important anemia and important lack of iron.

Material and Methods

We have studied ten patients on chronic and stable PD. Median age of 50 years. 50 % man. They were on treatment for more than 6 months. All of them have levels of Hemoglobin less than 11 g/dl and Ferritin <300. Median dosage of Epo was relatively high (CERA 97 µg/month). We did another control after two months. All of them have levels of Hemoglobin less than 11 g/dl and Ferritin <300. Median dosage of Epo was relatively high (CERA 97 µg/month). We have studied ten patients on chronic and stable PD. Median age of 50 years. 50 % man. They were on treatment for more than 6 months.

Results

Conclusions

- In all patients, levels of Hb and ferritin have increased without changes in Epo dosage.
- Only one dose of intravenous Iron is efficient.
- Repeated administration of intravenous Iron would improved anemic parameters and would probably reduced Epo dosage.
P-85
TREATMENT OF REFRACTORY CONGESTIVE HEART FAILURE (CHF) IN PATIENTS WITH CHRONIC RENAL DISEASE (CRD) WITH PERITONEAL DIALYSIS (PD)
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Introduction
The people with CHF continue to grow in proportion to the growing of the diabetes, obesity, coronary disease and diastolic dysfunction. To live more, these patients also experience more complications of the disease; one of the most clinical relevant is the CRD. With the advances of technology associated with new solutions as the icodextrin, PD became an alternative to treat these patients, at least in some groups.

Methods
We present the results of the 7 patients with CHF - Killip IV with CRF treated with PD in our unit, in last six years. We have 6 males and 1 female, Age - 56.66 years old (37-74) and they stay in peritoneal dialysis 13.5 M (5-24 M). 1) All pts have dilated cardiomyopathies. The etiology was: ischemic heart disease - 5, valvular pathology - 2, D. Fallot - 1. 5 pts do oral anticoagulation and 4 platelet antiaggregation. 2) Comorbidities: 5 pts- atrial fibrillation, 2 - abdominal aneurysm, 2 - cardio-defibrillator, 2 - portal hypertension and one COPD;

Results
1) 4 pts do CAPD and 3 APD. The volume control was obtained with diuretics, hypertonic solutions and icodextrin 2) All patients have a good volume control, with improvement of heart failure’s symptoms. 5 pts resumed their daily activity and 2 resumed occupation. 3) Diuresis residual remained in 6/7 patients. 4) After DP start 4 pts have hypokalemia and hypomagnesaemia. They need correction per os and IP. 5) 4 pts have arrhythmias – 3- ventricular arrhythmias – 2 shots of CDI and 1- atrial fibillation 6) The infectious pathology – we have a MSSA peritonitis, 1 nosocomial peritonitis with MRSE and another patient had two episodes by agents of the intestine multi-drug resistant, 7) The outcomes were: 2 patients died - A patient died at 8M with sudden death and another died after 16M with liver neoplasm. 1 pt regained renal function leaving DPCA. 2 pts were transferred to hemodialysis - 1 after 2 years with MSSA peritonitis and other after 5 months because he has a stroke and were unable to ensure the technique.

Conclusion
A group of patients with extreme comorbidities and CHF the PD proved suitable in resolving complaints of heart failure.

P-86
CONTINUOUS QUALITY IMPROVEMENT (CQI) REPORT-IMPACT OF RENAL REPLACEMENT THERAPY PROGRAM ON PERITONEAL DIALYSIS PENETRATION RATE
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Introduction
In Japan, the incidence of peritoneal dialysis (PD) among renal replacement therapies (RRT) is extremely low (3.1%). One of the main reasons is poor program implementation for PD selection. The purpose of this study is to examine if an organized PD program would increase the PD utilization rate.

Methods
A retrospective cohort study of all the patients with end stage renal disease (ESRD) from May 2009 to May 2011 at the chronic kidney disease clinic in St Luke’s International Hospital was conducted. An organized RRT program was implemented in May 2010. After the implementation, all CKD patients underwent systematic education program on RRT. This consisted of 3 sessions. The first provided information on PD including the idea of PD first which we mostly recommended, the second on HD and the final session on the transplant by specially-trained nurses when their eGFR go down below 15ml/min/1.73m². We then compared the rate of utilization for PD before and after the implementation. The demographics and the mortality rate of the patients between the two groups were also examined.

Results
Fifty patients reached end stage renal disease both before and after the implementation. The rate of PD utilization (including access preparation) increased from 10% before the program to 34% after the implementation. The mean age of patients before and after the implementation was 65±14 years and 70±14 years respectively. The incidence of female and diabetes was 27%/47%, and 43%/46% respectively. The corresponding mortality rates within this period were 11% and 4%.

Discussion
We confirmed the positive impact of the organized RRT program on PD selection. We also certified the decline in mortality rate after the implementation. In conclusion, to raise the PD penetration rate, implementing the systematic education program on RRT seemed to be very effective at our hospital.
P-87
EVIDENCE BASED DIETETIC GUIDELINES: PROTEIN REQUIREMENTS OF ADULTS ON PERITONEAL DIALYSIS (PD)
Louise Foster, Lee Hooper, Helena Jackson, Harriet Naylor, Susan Macafee, Helen Maclaughlin, Karen Magee, Janet Scott, Laura Stewart, Gillian Walker
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Introduction
Protein intake needs of adults on PD are disputed. UK renal dietitians aimed to produce evidence-based guidelines on protein requirements for PD.

Methods
Using AGREE methodology, current evidence-based practice guidelines on nutrition for adults on PD were appraised1. Structured searches were run on Medline, EMBASE and Cochrane from 1997 to 2009 to update evidence from NKF/KDOQI guidelines2. Included studies were experimental, observational or systematic reviews in adult humans on PD and assessed protein intake (as grams of protein, normalised protein nitrogen appearance, normalised protein catabolic rate or nitrogen balance) against a nutritional outcome (subjective global assessment, serum albumin, grip strength or muscle mass, mortality, hospitalisation or quality of life). Identified papers were independently data extracted, critically appraised and graded by two reviewers using Scottish Intercollegiate Guidelines Network methodology3. The guidelines were peer reviewed.

Results
Eighteen studies were included, most at level 3 evidence, resulting in a C-graded recommendation that adults using PD should be advised on a minimum protein intake of 1.0-1.2g/kg IBW/day. This will be adequate where total energy intake is adequate, namely 30-35kcal/kg IBW/day. K/DOQI for PD was selected to guide dietetic practice in areas other than protein requirements as it rated most highly in validity using AGREE1.

Discussion
Evidence based guidelines are needed to support clinical decisions. Protein intake should not be considered in isolation from energy. Dietitians are uniquely placed to guide research on optimal protein and energy intakes in PD and evaluation of diet, body composition and energy balance.

P-88
SUCCESSFUL CONSERVATIVE TREATMENT OF SPINAL EPIDURAL EMPYEMA IN CAPD PATIENT
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Introduction
Spinal epidural empyema is a very rare entity which frequently presents as a diagnostic challenge resulting in late diagnosis and delayed treatment. The infection may evolve to severe permanent neurologic deficit or death. Standard treatment requires surgery for debridement and spinal decompression. Few cases of spinal epidural abscess have been reported in hemodialysis patients. As the outcome can be potentially fatal, we report a case (diagnosis and management) of the abscess in CAPD patient who acquired the infection while temporarily on hemodialysis.

Methods
61 year old man on hemodialysis since 2004 was referred to peritoneal dialysis unit four years later because of difficulties in creating vascular access and thrombotic complications. After two years on CAPD, he was temporarily transferred to hemodialysis due to dialysate leakage to subcutaneous tissue. After 3 weeks he developed fever and blood cultures revealed Staphylococcus aureus. Hemodialysis catheter was promptly removed and he was started on automatic peritoneal dialysis. In addition infective endocarditis was diagnosed based on echocardiography. The patient was complaining of progressive backache. Diagnostic procedures were implemented.

Results
Magnetic resonance imaging confirmed diagnosis of spinal epidural empyema. Due to other comorbidities and the risk of complications in peritoneal dialysis initially he was not considered for surgery. Vigorous antibiotic therapy was continued for six weeks which resulted in cessation of symptoms and regression of laboratory and radiological signs of infection. Neurosurgery was no longer needed. The patient is continuing on automatic peritoneal dialysis.

Discussion
Because of the high incidence of bacteremia in hemodialysis patients, we would recommend that symptoms of fever, backache and spinal tenderness be promptly evaluated for epidural abscess. Early recognition and treatment with antibiotics may prevent surgery and potential complications for peritoneal dialysis in these patients and result in successful outcome.
P-89
INITIAL RATIO OF RENAL CREATININE CLEARANCE TO UREA CLEARANCE PREDICTS THE LOSS OF RESIDUAL KIDNEY FUNCTION IN INCIDENT PERITONEAL DIALYSIS PATIENTS
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Introduction
Residual kidney function (RKF) defined as the mean of renal creatinine clearance (RC\textsubscript{cl}) and urea clearances (RU\textsubscript{cl}), is a key component of solute clearance in peritoneal dialysis (PD) patients. For patients with low glomerular filtration rate (GFR) at the start of PD, variations of renal handling of these molecules lead to the deviations of the ratios of RC\textsubscript{cl} to RU\textsubscript{cl} (RC\textsubscript{cl} / RU\textsubscript{cl}). This study is aimed to investigate the association between the initial RC\textsubscript{cl} / RU\textsubscript{cl} and the rate of GFR decline among incident PD patients.

Methods
A total of 270 incident PD patients were enrolled from a single medical centre between January 1996 and December 2005. 24 hour RC\textsubscript{cl}, RU\textsubscript{cl}, and RKF were recorded from the commencement of PD. The slope for the rate of GFR decline was measured. Patients were stratified by the initial RC\textsubscript{cl} / RU\textsubscript{cl} into a high, middle and low ratio group. Comparative analyses of baseline characteristics, laboratory parameters and the rate of GFR decline were performed among the three groups. Simple and multiple linear regression analyses were used to investigate the predictive role of the initial RC\textsubscript{cl} / RU\textsubscript{cl} on the loss of RKF.

Results
The mean of the baseline RC\textsubscript{cl} / RU\textsubscript{cl} was 1.70 ± 0.51. Patients in ‘low ratio’ group were less likely to have diabetes and congestive heart failure, but more likely to have higher baseline serum levels of albumin and creatinine, a greater daily urine volume, as well as slower rate of GFR decline, compared with the middle and high ratio groups. Multiple linear regression analysis revealed that the initial RC\textsubscript{cl} / RU\textsubscript{cl} is an independent predictor for the loss of RKF.

Discussion
Our preliminary result suggested that PD patients with higher baseline RC\textsubscript{cl} / RU\textsubscript{cl} would experience a faster decline of GFR over time. Further multi-center, prospective studies are needed to confirm this observation.

P-90
PERITONEAL DIALYSIS (PD) IN POLAND – DATA FROM POLISH PD REGISTRY 2010
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Introduction
The decline in PD use is observed in developed countries. In Poland it is attributed to greater availability of hemodialysis, reluctance among nephrologists, aging population incapable of performing PD exchanges. Better reimbursement policy and more common predialysis education for patients resulted in reverse of downward tendency.

Method
Data from Polish PD Registry were assessed concerning methods, adequacy, complications, comorbidities and outcome of patients dialysed in 2010.

Results
There were 1062 patients on PD treated in 67 units as on December 2010. Almost 45% of patients were dialysed in the centers that had less than 10 PD patients and only 16% in units with number of patients of more than 30. In patients treated during 2010 17.2% were new on PD, 21.7% were transferred from hemodialysis. There were 31% of diabetics and 33% patients more than 65 years of age.19% were on active list for transplantation, 13% among diabetics.

CAPD was used by 57% and APD by 43% of patients. Assisted PD was performed mainly by family members in 19 % and 10% of APD and CAPD patients respectively.

More than 1/4 of patients fulfilled criteria of adequate dialysis by means of total weekly Kt/V. Hypertension and hyperlipidemia was treated in majority of patients. ESA was not required in 1/3 of patients, average hemoglobin concentration being 11.35 g/dl.

Peritonitis rate was 1 episode per 24.5 patient/months and hospitalization on average of 1.42 days per patient/month. Main reason for hospitalization was infection and cardiovascular disease was the most frequent cause of death.

Discussion
There is a potential to increase number of PD patients in Poland. In the presence of many frail patients on PD, considerable proportion is considered for renal transplantation. On the other hand professional assisted PD programs should be developed for patients unable to perform their own treatment.
P-91
THE PRELIMINARY RELATION STUDY OF INFLUENCE FACTOR DIETARY NUTRITIONAL IN PERITONEAL DIALYSIS

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Introduction
Peritoneal protein is lost from dialysate in peritoneal dialysis (PD). Adequate dietary nutrition is the important factor for the long-term PD. Purpose: To understand the relationship of life pressure, dietary intake and nutritional problems in PD. Methods: 34 patients, average 53 years in southern of Taiwan. According to hierarchy need of Maslow designed questionnaires of Eating for Living in PD Patients Distress Scale with 6 levels, and PD Patients Stressor Scales as Likert’s 5 score, Cronbach alpha 0.98 and 0.92. Subjective Global Assessment (SGA) and TSN Data Set were the measure tool. Descriptive statistics, frequency, percentage, mean, t-test, factor analysis, Pearson correlation coefficient analysis. Results: Hematocrit (Hct) and SGA were negatively correlated with the amount of EPO (p <0.05). nPCR was a negative correlation with the dietary intake of distress (p <0.05). Love and belongingness needs deficiency and blood glucose problems are relevant to dietary intake and nutritional problems (p <0.05). Hct and Self-actualization needs of life stress was related (p <0.05). Discussion: Living and diet stress need for caring. Conventional practices to follow up and will promote PD prognosis.

P-92
PERITONEAL DIALYSIS: AN INDEPENDENT RISK FACTOR FOR ACUTE PANCREATITIS? A CASE STUDY AND LITERATURE REVIEW ON THE AETIOLOGY AND MANAGEMENT

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Introduction
Acute pancreatitis (AP) is a rare but serious complication of peritoneal dialysis (PD). The aetiology and appropriate management of AP in many patients on PD remains unclear. We present a case AP of unknown aetiology in a patient on PD with a literature review to gain further insight into the pathophysiology and management of the condition.

Methods
A case report was presented, and a Pubmed search was performed with the words ‘acute pancreatitis and peritoneal dialysis’. Only articles describing cases of AP in PD were included.

Results
A 41-year-old woman on PD presented with abdominal pain, fever, vomiting and clear dark dialysate. She was initially diagnosed as PD peritonitis but dialysate and blood culture proved negative. Her serum amylase was mildly raised and computed tomography showed necrotizing pancreatitis. No risk factors for AP were found. She was successfully treated conservatively. An arteriovenous fistula was later formed, as she was failing to meet her dialysis requirements with PD. The literature search found a total of 154 articles. Following exclusion, 27 articles (94 cases; age 2 to 80 years old, with a male preponderance) were reviewed. Majority of patients presented with abdominal pain, nausea and vomiting, and cloudy dialysate. In more than a quarter of patients the cause of pancreatitis remained unknown. Approximately 12% of patients had a normal serum amylase with imaging being required to confirm the diagnosis. In 19 patients, PD needed to be withheld or stopped altogether to treat symptoms and recurrence. 28 (30%) patients died directly of pancreatitis with 2 further deaths from other causes.

Discussion
AP is an infrequent complication of PD with a high mortality. Diagnosis can be obscured by normal serum amylase and similarity in presentation to PD peritonitis. A high index of suspicion is needed for these patients to be managed appropriately.
**P-93**

**BONE MINERAL DENSITY (BMD) AND TEN-YEAR FRACTURE RISK CALCULATED BY FRAX TOOL AS PREDICTORS OF MORTALITY IN PERITONEAL DIALYSIS (PD) PATIENTS**

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**Background**

In the general population fracture risk calculated by FRAX is considered as a better predictor of bone condition than BMD alone. The aim of our study was to assess relationship between ten-year fracture risk, laboratory parameters and mortality in PD patients.

**Methods**

The study was performed in 26 patients treated with PD (15 women, age 55.7±17.7 years, dialysis vintage 16.6, 6.3–45.5 months). BMD was measured in the femoral neck (FN) using dual-energy x-ray absorptiometry. Ten-year fracture risk (major osteoporotic, hip localization) was calculated by FRAX tool. Additionally laboratory parameters (white blood cell count, hemoglobin, blood pH, serum albumin, lipids profile, parameters of iron metabolism and calcium-phosphate balance, total alkaline phosphatase, parathyroid hormone) were analyzed. During 4.5 years observation time 9 (34.6%) patients died.

**Results**

At the beginning of observation time the 10-year risk of major osteoporotic fracture was 4.7; 2.4-18.0% and in hip localization 0.6; 0.1-7.0%. FN BMD was 0.842±0.137 g/cm². In regression analysis for risk of major osteoporotic fracture, blood pH and serum albumin were negative predictors and serum ferritin was a positive one. Blood pH, serum albumin and hemoglobin level were negative predictors for 10-year fracture risk in hip. In Cox's regression models, 10-year risk of major osteoporotic fracture (beta = -0.165, p = 0.015), 10-year fracture risk in hip (beta = 0.294, p = 0.033) and FN BMD (beta = -8.194, p = 0.004) were predictors of mortality. When these 3 parameters were analyzed in the same model only FN BMD remained as statistically significant predictor (beta = -12.661, p = 0.042).

**Conclusions**

FN BMD is a better predictor of mortality than 10-year risk of osteoporotic fracture calculated by FRAX tool.

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**P-94**

**PHOSPHOREMIA CONTROL WITH OSVAREN® VERSUS FOSRENOL® IN PERITONEAL DIALYSIS PATIENTS**

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Hiperphosphoremia appears in patients undergoing Peritoneal Dialysis (PD) because they don’t reach an adequate balance between the P intake and the P lost by the PD and the urinary excretion, and due also to the bone disbalance of P. This is why the P quelants bynders are necessary to reduce the intestinal absorption.

A randomized cross-over study was designed with the objective to know the effectiveness and the safety of Osvaren® to control of plasma P in patients treated with PD compared to Fosrenol, following the next diagram:

After 15 running days the patients were randomized in 2 groups. The flow chart: group 1 Osvaren-Fosrenol-Osvaren, in this group 23 patients were included. In Group 2 there were 22 patients: Fosrenol-Osvaren-Fosrenol. In each period the following parameters were determined: P, Ca, Mg y PTH. The urinary lost of Ca, P, Mg and the peritoneal balances were calculated as well. There were no changes in the dialytic treatment or in the medical treatment. The equivalency is 1Osvaren/1Fosrenol 500 and the dose depending on P mg/dL: for each mg of P increase 2 pills of P bynders.

There were no significant differences: age, sex, residual renal function, protein intake and time in PD. The levels of P, Ca, Mg y PTH were similar in both groups in the basal period but changed significantly in the following periods: Ca y Mg increased in the Osvaren period and PTH decreased significantly. The P evolution is described in the table.

<table>
<thead>
<tr>
<th>Groups</th>
<th>P mg/dL Basal</th>
<th>P 2 months</th>
<th>P 4 m</th>
<th>P 6 m</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6,38±0,7</td>
<td>4,5±0,6</td>
<td>4,4±0,8</td>
<td>4,5±0,8</td>
</tr>
<tr>
<td>2</td>
<td>6,18±0,6</td>
<td>4,5±0,7</td>
<td>4,4±0,7</td>
<td>4,5±0,7</td>
</tr>
<tr>
<td>p</td>
<td>0,34</td>
<td>0,96</td>
<td>0,93</td>
<td>0,91</td>
</tr>
</tbody>
</table>

Osavaren and Fosrenol decrease P significantly and similarly in the majority of patients.

The levels of Ca y Mg increase with Osavaren and decrease with Fosrenol, on the other hand, PTH decreases more with Osavaren than with Fosrenol.

Osavaren was tolerated better than Fosrenol.

This is the first study of Osvaren in PD and comparative with Fosrenol.
P-95

EFFICIENCY OF PHOSPHATE ELIMINATION IN PERITONEAL DIALYSIS (PD) PATIENTS

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Background
Studies observing peritoneal membrane transport characteristics, especially calcium phosphate metabolism.

Aims
To determine how to remove phosphate by PD and how is this process influenced.

Methods
We were observing calcium phosphate metabolism in total of 29 patients with chronic renal failure (CRF) (19 men) with a mean age of 54.5 years treated by PD 22.6 (1-132) months. Using samples of dialysate and plasma during standard peritoneal equilibration tests (PET). We divided our patients in 2 groups. Group A collected patients with oligo-anuria (less than 500ml of urine per 24 hours) and group B where was the rest (more than 500ml of urine per 24 hours). In both of groups was found positive correlation between D/P creatinine and D/P phosphate (R =0,74, p < 0.001), as well as positive correlation between plasma phosphate and parathormone (PTH) (R= 0.53, p <0.01). There was no difference between group A and group B in parameters of Kt/V, PCR (protein catabolic rate), albumine and creatinine. In the group of all patients was significantly elevated plasma level of phosphate. Group B demonstrated low level of weekly creatinine clearance (120 V1.73m opposite 60.2V1.73m ± p <0.01). In group B patients corresponds to requirements of the adequacy and these patients were treated by higher amount of peritoneal dialysis fluid (PDF) (7.32 ± opposite to 11.6 2 ± p <0.0001).

Conclusion
Peritoneal dialysis patients with loss of residual diuresis are not able to eliminate phosphates without the support of diet and phosphate binders even if their peritoneal dialysis is adequate.

P-96

PERITONEAL DIALYSIS DELIVERED CREATININE CLEARANCE- CAN WE PREDICT IT FROM CREATININE BASED EQUATIONS?

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Background
24 hour urine and dialysate collections are the gold standard for measurement of small solute clearance in peritoneal dialysis (PD) patients. However, recent studies have suggested that serum creatinine based equations may be used to predict total creatinine clearance (CrCl). If true, this would be of great clinical advantage. We analysed the correlation and degree of agreement between 3 creatinine based equations with measured creatinine clearance.

Methods
We performed 427 measured CrCl(mCrCl) by 24hr collections of urine and dialysate. These were compared against the predicted CrCl derived from the 4 variables, 6 variables MDRD and CKD-EPI equations

Results
The mean estimated CrCl using the 4variable MDRD was only 7% lower than the CrCl measured from 24hr collections (Table 1). However, the 95% Bland Altman agreement was -3.85 to 4.94 ml/min/1.73m² (Fig 1). The agreement between measured and estimated CrCl based on the other equations were weaker. The Pearson’s correlation(r) between mCrCl and 4 variable MDRD was 0.28.

Conclusion
4 variable MDRD equation performed best in terms of precision (mean difference) and agreement. However, overall correlation and agreement was only moderate and the wide 95% Bland Altman agreement of approximately 50L/wk means that the estimated CrCl cannot be used in clinical practice to manage patients on PD.

Table 1 Measured and estimated Creatinine Clearance values (ml/min/1.73m²)

<table>
<thead>
<tr>
<th></th>
<th>Mean ±SD</th>
<th>Mean Δ relative to mCrCl</th>
</tr>
</thead>
<tbody>
<tr>
<td>mCrCl from 24hr collections</td>
<td>7.89±1.8</td>
<td>---</td>
</tr>
<tr>
<td>4 variable MDRD GFR</td>
<td>7.35±1.9</td>
<td>0.54</td>
</tr>
<tr>
<td>6 variable MDRD GFR</td>
<td>6.33±1.6</td>
<td>1.56</td>
</tr>
<tr>
<td>CKD-EPI</td>
<td>6.68±1.8</td>
<td>1.21</td>
</tr>
</tbody>
</table>

Figure 1
Figure 2
**P-97**

RESULTS AFTER ONE YEAR APPLICATION OF FINANCIAL CONTRIBUTION SUPPORTING DE-HOSPITALIZATION OF DIALYTIC TREATMENT IN PIEDMONT REGION

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**Introduction**

It is a well-known phenomenon the gradual decrease of patients (pts) undergoing haemodialysis (HDD) or peritoneal dialysis (PD) treatment at home, because of aging of incident pts, comorbidities, solitude and the presence of cultural and organizational obstacles.

A study group of the Piedmont Section of the Italian Nephrology Society has designed, according to results of quality of live survival offered by home treatments and potential savings shown by CENSIS (March 2009), an experimental measure approved by Piedmont Region (D.G.R. 8-12316 - 12 oct 2009) which establishes a financial contribution supporting home dialysis (HoD). The measure provides for a points-system assessment (Home Dialysis Assistance Plan - P.A.I.D.D.) of the pts independence lack related to treatment management. The final score defines the pts assistance intensity and therefore the financial support (between 250 and 1100 €/month) according to the caregiver.

**Methods**

On 2011 the Regional Health Management verified the measure application. All 25 Dialysis Centers communicated incidence, prevalence of all pts; drop-outs, transplantations, deaths in HoD pts; assistance intensity, financial support entity, caregiver, dialysis modality for each P.A.I.D.D. activated up to 31/12/2010.

**Results**

Prevalence 2010 vs 2009: all pts 3159 vs 3152; HoD 393 vs 362 (PD 381 vs 347 – HDD 12 vs 15); in center haemodialysis (iHD) 2766 vs 2790. Incidence 2010 vs 2009: all pts 833 vs 800; HoD 198 vs 140 (PD 196 vs 139 – HDD 2 vs 1); iHD 635 vs 660.

**Discussion**

At the end of the first year number of pts population on dialysis was stable; incidence and prevalence (2010 vs 2009) of HoD pts increased; iHD pts slightly decreased; drop-outs of HoD population decreased; transplantations and deaths stable. It is possible an effect of measure on incidence increase and drop-outs decrease and therefore on prevalence of HoD pts.

**P-98**

RELATIONSHIP BETWEEN INFLAMMATORY CYTOKINES IN PERITONEAL EFFULUENT AND PERITONEAL MEMBRANE FUNCTION

–A REPORT FROM THE JAPAN FLUID STUDY–

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**Introduction**

Long-term peritoneal dialysis (PD) leads to the functional and structural alterations in the peritoneum. To date, high-transport membrane is considered to be a risk factor for encapsulating peritoneal sclerosis (EPS) after long-term PD. However, it remains uncertain which marker is suitable for predicting the change in peritoneum and the development of EPS. In the Japan Fluid Study (JFS), we investigate the association between inflammatory cytokines in PD effluents and plasma, and peritoneal membrane function to identify markers for EPS.

**Methods**

We collected PD effluents and plasma from PD patients over a period of more than 4 years. Four hundred seventy one patients (mean age ±SD; 56.0±10.9 years old) who had been on PD for 9.6 ± 3.3 years were included in the study. Plasma and PD effluent samples were collected from the patients every 6 months. Interleukin-6 (IL-6), soluble interleukin-6 receptor (IL-6R), interferon-gamma (IFN-gamma), monocyte chemotactic protein-1 (MCP-1), and vascular endothelial growth factor (VEGF) that are thought to be associated with peritoneal sclerosis were analyzed by ELISA.

**Results**

IL-6 in the PD effluents significantly correlated with IL-6R, IFN, MCP-1 and VEGF in the PD effluents. In addition, the dialysate concentrations of IL-6, IL-6R, IFN-gamma, and MCP-1 positively correlated with the D/P creatinine ratio, indicating that these markers were associated with peritoneal hyperpermeability. Duration of PD was significantly associated with IL-6 in PD effluents.

**Discussion**

The results indicated that IL-6, IL-6R, IFN-gamma, and MCP-1 in PD effluent were closely linked with peritoneal function and measurement of theses markers might help predict the deterioration of peritoneum and the development of EPS.
P-99

INFLUENCE OF EARLY INITIATION OF PERITONEAL DIALYSIS ON THE CLINICAL OUTCOMES IN PATIENTS WITH END-STAGE RENAL FAILURE (ESRF)

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Background
We investigated whether early initiation of peritoneal dialysis (PD) is associated with improved outcomes, as compared with late initiation.

Methods
Incident PD patients (n=491) who started PD at SNU Hospital were enrolled. The patients were divided into ‘early starters (n=244)’ and ‘late starters (n=247)’ on the basis of the eGFR at the start of dialysis. All-cause mortality, technical failure, cardiovascular (CV) event, and composite event defined as either CV event or patient death were analyzed retrospectively.

Results
The early starter group differed markedly from late starter group with respect to the observed pre-dialysis covariates. Propensity score (PS) for being an early starter group was calculated by a regression model including age, sex, BMI, starting year, physician, albumin, CRP, diabetes, and other comorbid conditions. The calculated PS was used for adjustment, one-to-one matching, or stratification analysis by PS quartiles. There was an interaction between time and overall mortality hazard ratio (HR). The PS-adjusted HR for all-cause mortality of early over late starters increased over time using extended COX model. HRs in early starters were 0.71 (0.30-1.66) in 12 months, 1.65 (0.76-3.57) in 36 months, and 2.95 (1.00-8.66) in 60 months, compared with late starters. Initiation timing of PD did not affect technical failure, CV event, and any composite event when adjusted with PS. In PS-matched pairs model, the HRs of primary and secondary outcomes did not show any differences between the two groups (n=136, for each group). 5-year mortality was not different across the quartiles of PS. In the diabetic subgroup, there were no differences of all outcomes between early and late starters.

Conclusion
In PS-adjusted analysis, overall mortality of early starters increased over time after 60 months compared with late starters. However, initiation timing of PD did not influence technical failure, CV event, and any composite event.

P-100

CINACALCET STUDY FOR PERITONEAL DIALYSIS PATIENTS IN DOUBLE ARM ON THE LOWING EFFECT OF IPTH LEVEL (CUPID): INTERIM REPORT

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Cinacalcet, a novel calcimimetic, targets the calcium-sensing receptor to lower PTH levels. This study compared the efficacy of a cinacalcet for achieving the stringent NKF-KDOQI targets for PD patients.

As a multicenter and open-label study, patients were enrolled if they were > 18 yr of age, had received PD for > 3 mo, intact PTH level > 300 pg/ml, albumin corrected Ca level > 9.0 mg/dL. Subjects were randomly assigned to treatment with either cinacalcet and low-dose oral vitamin D or oral vitamin D alone to achieve KDOQI targets (iPTH, Ca, P , Ca x P). For both groups, phosphate binders can be prescribed at the physician's discretion. This study includes a 4-week screening phase, a 12-week dose-titration phase, and a 4-week assessment phase.

Total sixty two patients were enrolled so far. Among them, only the subjects (n=48) who finished 12-week dose titration period were analyzed. No difference were exhibited in terms of age, gender ratio, height, weight, BMI, blood pressure, Kt/V, baseline iPTH, corrected Ca, P , and Ca x P between cinacalcet (n=24) and control (n=24) groups. Cinacalcet group received 32.1 ± 18.2 mg of cinacalcet during titration period and lower dose of oral active vitamin D (89 μg/d vs 322 μg/d, P=0.003) compared with the control. Cinacalcet group achieved K/DQOI target of serum Ca more frequently (83.3% vs 33.3%, P=0.006) and a trend toward better achievement of >30% reduction in iPTH (66.7% vs 50%, P=0.34) and better achievement of PTH goal < 300 pg/mL (33.3% vs 15.0%, P=0.09). Both groups showed similar achievement of targets for Ca x P (<55 mg2/dL2, 73.3% vs 62.5%, P: ns), P (<5.5 mg/dL, 61.1% vs 66.7%, P: ns). Corrected Ca level decreased mildly during cinacalcet therapy (from 9.7 ± 0.55 mg/dL to 9.0 ± 0.8 mg/dL, P=0.01) but no symptomatic hypocalcemia developed.

Our interim analysis suggests that cinacalcet treatment has a beneficial effect in achieving KDOQI targets for the treatment of SHPT in PD patients.
P-101
INTRAPERITONEAL PRESSURE HAS PROGNOSTIC IMPACT ON PERITONEAL DIALYSIS PATIENTS
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Hospital Garcia de Orta, Almada, Portugal

Background
Intra-peritoneal pressure (IPP) measurement in peritoneal dialysis (PD) is not routinely recommended in guidelines. However, it can be a very useful tool in adjusting individual PD prescription.

Objectives
1) To determine the relationship between IPP and baseline clinical characteristics; 2) to evaluate its influence on known complications associated with PD, namely abdominal wall hernias, hydrothorax and gastroesophageal reflux; 3) to assess the effect of IPP on the composite outcome of death and switch to hemodialysis.

Methods
Fifty-four patients (69% male, mean age 58±15 years old) were included. IPP was measured after a 4 hour dwell, using a 2000 ml infusion volume (3.86% glucose) in all the patients.

Results
Mean IPP was 19±5 cmH2O. The only biometric parameter that correlated with IPP was body mass index (BMI) (Pearson’s correlation=0.346, p=0.01).

Statistically significant relationship was not found between higher values of IPP and the incidence of PD complications. However, there was a trend for higher incidence of abdominal wall hernias in patients with elevated IPP.

The composite outcome of death and switch to hemodialysis occurred in 41% of the patients. The optimal cut-off value of IPP for discrimination of patients with higher risk of this outcome was 15 cmH2O. PIP > 15 cmH2O was the only independent predictor of death or switch to hemodialysis by multivariate analysis (OR=5.57, CI 95%, 1.05 – 29.51, p=0.043), after adjustment for potential confounders such as time on PD, age, gender, BMI and diabetes.

Conclusions
This study shows a significant impact of BMI on IPP and a higher incidence of the adverse outcome of death and switch to hemodialysis in patients with higher IPP. These findings support the importance of routine measurement of this simple parameter.

P-102
EFFECT OF KDOQI GUIDELINES IN THE TREATMENT OF MINERAL BONE DISEASE
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Objectives
By retrospective analysis we measured the characteristics of the treatment of renal osteodystrophy with over 18 years of a peritoneal dialysis (PD), setting 2003 as the boundary between two epochs.

Methods
We selected 114 patients, 66.2 years old media.59 (52%) women, Diabetes 27%, 20% hypertension, 8% PQR, 16% CNG. Average duration 30.5 months (± 21). Pre-KADOQI 54 (47%).

Statistical study by Student t and Chi 2 and correlations according to the program JMP 6.0

Results
No differences in age and sex in the GROUP PRE-DOQI had more DM and POST-DOQI more of hypertension and / HTA. Disease.

<table>
<thead>
<tr>
<th></th>
<th>Ca p&lt;0,003</th>
<th>P p&lt; 0,008</th>
<th>F.A. p&lt;0,0002</th>
<th>PTHi n.s.</th>
<th>Ca Administred P&lt;0,0012</th>
</tr>
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<tbody>
<tr>
<td>PRE-DOQI</td>
<td>9,9</td>
<td>5,1</td>
<td>2,21</td>
<td>214</td>
<td>1886,7</td>
</tr>
<tr>
<td>POST-DOQI</td>
<td>9,5</td>
<td>4,6</td>
<td>95</td>
<td>180</td>
<td>611,63</td>
</tr>
</tbody>
</table>

Conclusions
In our study the impact of the publication and implementation of clinical practice guidelines, has had a positive result in better control of metabolic parameters Ca / P. The limitation in the administration of calcium carbonate as a binder seems to be a factor in this conmccurr could also develop new therapeutic armamentarium. The iPTH showed a decrease of 16% without reaching significant levels as espectacularmenete probably because aspects involved in its regulation more complex than a simple mechanical relationship Ca, P, PTH.
P-103
CORRELATION BETWEEN BIOIMPEDANCE AND NORMAL SERUM MARKERS IN THE NUTRITIONAL ASSESSMENT OF PATIENTS ON PERITONEAL DIALYSIS
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Introduction
Malnutrition increases mortality risk in patients on dialysis. There is not a single gold standard test for diagnosis, so both, biochemical and clinical markers are used together. Bioimpedance spectroscopy (BIS) has shown great potential for use in estimating body composition.

Objective
Establish the correlation between biochemical markers and BIS for nutritional assessment on PD patients.

Material and Methods
Retrospective study. We use low PDG peritoneal solutions. 1 year follow up, 97 biochemical and BIS determinations (BCM Fresenius) for the same medical visit.

Results
37 patients included (16 women; 21 men), mean age 59 years. Weekly Kt/V 2.5(1.7-4.2). Descriptive BIS: Body Mass Index (BMI) 25.68 ± 3.65 Kg/m², Lean Tissue Index (LTI) 11.26 ± 2.72 Kg/m², Body Cell Mass (BCM) 16.09 ± 6.34 Kg, Phase Angle (PA) 4.71 ± 0.99, Lean mass (LTM) 44.54 ± 51.18, Fat mass (FM) 38.73 ± 9.

Descriptive biochemical: total proteins 64 ± 6.04 g/l, albumin 36 ± 3.85 g/l, prealbumin 0.37 ± 0.9 g/l, transferrin 1.8 ± 0.36 g/l, cholesterol 195 ± 37 mg/dl, nPCR 1.06 ± 0.2 g/kg/day.

The test results statistically significant correlation (p< 0.05) in Table 1.

<table>
<thead>
<tr>
<th>Test</th>
<th>Correlation (p)</th>
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<tr>
<td>AP total proteins, albumin, prealbumin, transferrin, and nPCR (p&lt;0.01)</td>
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<tr>
<td>BCM transferrin, prealbumin (p&lt;0.01), albumin and cholesterol (p&lt;0.05)</td>
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</tr>
<tr>
<td>BMI albumin, prealbumin and cholesterol (p&lt;0.01)</td>
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<tr>
<td>LTI-LTM albumin, transferrin, and cholesterol (p&lt;0.05)</td>
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Conclusions
BIS is a simple, fast and non-invasive technique that can provide nutritional status data in DP patients. This data seems having a statistically significant correlation with biochemical parameters, in special PA. Although further studies are needed, the findings of our series suggests that BIS is a good nutritional marker that may reduce the frequency of laboratory tests and make a proper nutritional assessment.

P-104
HEMOPHILIA MINORIS IN A PATIENT ON CAPD – A CASE REPORT
Dejan Pilcevic, Jelena Tadic-Pilcevic, Neven Vavic, Milica Petrovic, Miroslav Mitrovic, Vesna Subota, Ljiljana Tukic, Zoran Kovacevic, Djoko Maksic
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Hemophilia A and B are X chromosome-related recessive hereditary disease that d haemostasis disorders with variable clinical manifestations of hemorrhagic syndrome. Deficiency of factor VIII (hemophilia A) occurs in 1 in 5000 to 10.000 men, about 60% have a severe form. About 20% of patients with hemophilia have factor IX deficiency (hemophilia B) - a frequency of 25.000 to 30.000 men, approximately one half of patients have a severe form (in both types if the level of factor VIII or IX less than 1%) with clinical signs of hemorrhage musculoskeletal system / dominant hemarthrosis /, but in the GIT and CNS. In the case of heterozygous form of the clinical picture is not so dramatic, but is often manifested by the appearance of prolonged bleeding after minor surgical procedures, during a tooth extraction or venipuncture.

Case report: A man aged 61 years with diabetic nephropathy and preserved urine output was admitted to our hospital because of development of end-stage renal failure. In a history provides information on the existence of heterozygous forms of hemophilia A minoris with remarks on an episode of severe prolonged bleeding after tooth extraction / made without prior preparation hæmostatikom / why is subsequently received conc. faktoraVIII with transfusion RBC and preparations of the FFP.

That being said, as a modality of treatment of terminal CKD elected CAPD treatment program. The preoperative lab. findings verify the regular findings refer to the CBC. INR values || and a TV with a prolonged aPTT 45 sec. / ref. 26-38sec. / And easily reduced factor VIII - 0.69 / ref. 0.7-2.0. At the same time the value of vWF 1.25 / 0.6 to 1.2. In consultation with the haematologist, the patient was on the intervention preoperatively ordained f VIII in a dose IJi.v 1000, after which the control of surgical hæmostasis PD catheter was placed without complications. Two hours after the procedure the patient was given a second dose of F VIII., Which was continued and the next three days to 12 hours. Control values || f VIII ranged from 0.77 to 1.0 with aPTT max. to 44 sec. The next two days, F VIII dosage was decreased to 500 IU iv on 12h after which the regular monitoring coagulogram same suspended / day except for removing stitches/. All the time of treatment, the patient had not hemorrhagic sindrome. He started IPD on the 10th postoperative day , a few days later he switched on CAPD treatment program with a gradual increase in fill volume up to 1500 ml and achieved a satisfactory balance daily living UF / over 1000 ml/.

Hemophilia Minoris is a rare disease that requires regular review of patients with prophylactic use of factor VIII during surgery. In patients with end stage renal disease who have specified disease, PD is a treatment modality of choice.
P-105

PERITONEAL DIALYSIS IN A PATIENT WITH RECESSIVE DYSTROPHIC EPIDERMOLYSIS BULLOSA - A CASE REPORT

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1Military Medical Academy, Belgrade, Serbia, 2Fresenius Haemodialysis Centre, Belgrade, Serbia

Introduction

Recessive dystrophic epidermolysis bullosa (RDEB) is rare disease which manifests with damages of skin and mucous membrane with multiple blisters and cutaneous infections, loss of dentition, pseudosindactyly and squamous cell carcinomas. It is also associated with organ damage especially within gastrointestinal tract, including dysphagia, esophageal ulcers, constipation and anal fissures. Renal failure is an important cause of morbidity and mortality in patients with RDEB.

Methods

A 23-year-old woman with RDEB and symptomatic Epy developed end-stage renal disease (ESRD) in the form of chronic IgA anti-basement membrane glomerulonephritis. After transitory initially haemodialisys by jugular i.v. catheter, she was switched on CAPD because there was not possibility of creating vascular access.

She had widespread blister and scars formations, only spared part was her belly. The PD catheter was placed on the lateral suprapubic abdomen by mini-laparotomy technique by an experienced surgeon, avoiding obviously any rubbing movements on the skin. We used inhalation anestetics without endotracheal tubus to prevent mucous injure. Postoperative care was meticulos with care taken to apply a dressing that did not injure her skin. She had a modified exit site care with sooner dressing changes the one week, under sterile conditions and early applicatio bactericid cream, without tape.

Results

She started CAPD with low fill volume (500-750 ccm) without last fill for a few days in the begining of the treatment, and increase slowlu - her BSA was 1,4 m².

She is on CAPD more than 22 months with no peritonitis, the skin surounded the exit site of the catheter is without blisters or any manifestations of her skin disease, the exit site is pristine and healthy.

She has 4 excanges (1,5 % glucosae solute) with 1200 ccm fill volume and her rate of ultrafiltration is 450- 850 ml, residual diuresis is over 1000 ml, D/P kre.- 0,59 , Kt/v - 2,1, and clinical status is stable.

Conclusions

Peritoneal dialysis is favorable therapeutic modality in ESRD patients with RDEB.

P-106

LONG-TERM PERITONEAL DIALYSIS-A CASE REPORT

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VM, female, 57 years, the treatment program of the PD back l3 years. Terminal renal failure occurred 19 years ago, underlying disease chronic glomerulonephritis. She was six years on chronic HD treatment initially, due to exhaustion of vascular access modality translated to PD. The first two years she was treated with CAPD, when she translated into the CCPD treatment program. She had four episodes of peritonitis.

The average ultrafiltration around loooml / 800 - 1400ml /, without residual diuresis, Kt / V 2.3. Anemic syndrome is well-regulated intermittent application of recombinant EPO- Hgb 115, nutrition status is satisfactory- BMI 23.11 kg/m2, alb 38, transferin 37, creatinine 787, Hol of 6.64, PTH 26 pmol / l. For the long term survival on PD, the most important concern is a good selection of patients, a favorable predictive factors are female sex, younger age, without diabetes mellitus, the gracious constitution, and preserved urine output.
ENCAPSULATING PERITONEAL SCLEROSIS (EPS) IN PATIENT ON PERITONEAL DIALYSIS (PD) – A CASE REPORT

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1Military Medical Academy, Belgrade, Serbia, 2Fresenius Haemodialysis Centre, Belgrade, Serbia

EPS is rare, but one of the most serious complications in PD patients. The prevalence ranges from 0.54 -7.3%. Progressive deterioration of the peritoneum as a result of the PD procedure and superimposition of inflammatory stimuli (peritonitis, GDP, beta-blockers, plasticizers, autoimmune disease, abdominal surgery) are thought to play a key role in the pathogenesis of EPS. Diagnosis is based on clinical symptoms (subocclusions, signs of inflammation and peritoneal adhesions, hemoperitoneum, UF failure), radiological findings, macroscopic (surgical) and histopathologic criteria. Treatment includes TPN, transfer to haemodialysis, medicaments (steroids, immunosuppressants, tamoxifen, ACEi) and surgery. If recognised, even with all therapeutic modalities, mortality is over 50%.

Case report: We report a 52-year-old male undergoing CAPD and developing EPS. Duration on PD was 42 months with no episodes of peritonitis. He was admitted in our hospital for PD related peritonitis (caused Staphylococcus koag. neg.). After finished antibiotics treatment he prolonged UF failure. We suspected on EPS. He was transferred to HD and treated with conservative therapy that included electrolyte and fluid substitution, temporary nasogastric suction and Tamoxifen but the peritonitis was refractory to these therapy. After two days his general condition was worsened, and PD catheter was surgically removed with presented PH criteria for EPS.

Patient had complete relief from bowel obstruction by operative treatment and switching to HD.

EPS is serious complication on PD program causing high rates of mortality. All suspected cases need to be closely followed for early recognition of disease.

MICROBIOLOGIC PROFIL OF CAPD PERITONITIS- A SINGLE CENTRE EXPERIENCE

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1Military Medical Academy, Belgrade, Serbia, 2Fresenius Haemodialysis Centre, Belgrade, Serbia

Introduction and Aims

To describe the microbiological pattern of continuous ambulatory peritoneal dialysis (CAPD) dialysate specimens in Military Medical Academy

Methods

We analyzed 56 patients [24 male, 28 female; mean age 55,4 +/- 12,4 years /range 22-85 years/; mean CAPD duration 42 +/- 14,2 months]. Between year 2008 and 2010, 26 CAPD related peritonitis episodes was reported. Diagnosis of peritonitis was made based on clinical signs of inflammation, number of white blood cells and culture from the PD fluid. Dialysate specimens were obtained from all cases and were examined for microbiological culture and resistance.

Results

The incidence of peritonitis in our centre was 1 episode / 31 patient months.

Culture revealed: Staphylococcus coag. negative (8 cases; 30,77%), Staphylococcus aureus - methycilin sensitive (1 case; 3,85%), Pseudomonas aeruginosa (3 cases; 11,54%), Acinetobacter anitratus (1 case; 3,85%), Enterococcus spp. ( 4 cases; 15,38%), Bacterosides (2 cases; 7,70%), sterile peritonitis (7 cases; 26,92%)

There was one case not founded resistance on vancomcin /enterococcus/

Conclusions

Gram positive microorganisms are the most common finding ina CAPD peritonitis in our hospital. There was not episodes of fungal peritonitis. Relative high rate of sterile peritonitis is consequence of previously use off antibiotic drugs, but implicates better patients education.
IS IT POSSIBLE TO PREDICT OUTCOME AT BASELINE CLINICAL SCREENING OF PERITONEAL DIALYSIS PATIENTS?

Ana Pinho1, Ana Cabrita1, Helena Carreira2, André Fragoso1, Anabela Malho1, Isabel Pinto1, Idalécio Bernardo1, Pedro Leão Neves1
1Faro Hospital, Faro, Portugal, 2Department of clinical epidemiology, predictive medicine and public health of Oporto University Medical School, Oporto, Portugal

Introduction
Comorbid conditions are highly prevalent among patients with end-stage renal disease (ESRD). The Charlson Comorbidity Index (CCI) and Davies index have been widely used to describe the comorbidity burden and to predict outcomes. Recently, a new index (NI) of comorbidity was developed to predict outcomes among ESRD patients, proven to be as powerful as the CCI. Reported data regarding the use of these indexes in peritoneal dialysis (PD) is scarce. The aim of this study was to assess the predictability of these different index scores for outcome on a population of PD patients.

Methods
We prospectively followed 105 incident PD patients for a period ≥3 months from 2000. Comorbidity was assessed at baseline by ICD-9 CM codes, and the following scores were calculated: CCI, Davies, NI scores. Data regarding cardiovascular events (CVE), hospitalizations and mortality was recorded throughout the follow-up period. Receivers operating characteristic (ROC) curve analysis was used to assess the predictability power.

Results
From the 105 incident patients, 43% were female with a mean age 53 ± 16.3 years. Follow-up mean time was 31 (range 3–99) months. A CVE was observed in 38 patients. 75.2% were hospitalized and 36.2% died. Peritonitis was the major cause both for hospitalization (36.1%) and death (22.4%).

ROC curve analysis showed that the CCI (AUC=0.7;p< 0.001) was a stronger predictor for CVE than both the Davies (AUC=0.66;p=0.01) and the NI (AUC=0.66;p=0.002). Regarding hospitalizations only the NI (AUC=0.65;p=0.034) emerged as a significant predictor. Finally, mortality was best predicted by the CCI (AUC=0.79;p< 0.001) and the NI (AUC=0.76;p< 0.001).

Discussion
In our population the CCI and the NI index were strong predictors of mortality. The NI showed an additional capacity to predict hospitalization whereas the CCI behaved better at predicting CVE. In our opinion both should be performed at the start of PD to predict outcomes.

WHICH ARE RISK FACTORS FOR DEVELOPMENT OF HERNIAS AND LEAKS IN PERITONEAL DIALYSIS PATIENTS?

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Introduction
Patients treated with peritoneal dialysis (PD) have higher incidence of hernias and leaks due to increased intraabdominal pressure. The main aim of study was to identify patients with increased risk for abdominal hernias and peritoneal leaks on PD.

Methods
We collected data from unselected 71 patients treated with PD during past 3 years.Average age was 58 years.54 patients were treated with continuous ambulatory (CAPD), 1 with automated PD (APD) and 16 patients were treated consecutively with CAPD and APD. Dialysate exchange volumes ranged between 1700 and 2600 ml.

Results
15 patients (21%) developed anatomic complications, a total of 11 hernias, 2 late leaks and 3 pleural leaks.1 patient had more than 1 complication.Hernias represented 69% of all complications,late leaks 12%, hydrothorax 19%. PD modality used at the time of complication was mainly CAPD (73%), APD (27%).

Patients with pleural leak and subcutaneous leak were transferred to hemodialysis (HD).Pleural leak recurred in 2 of 3 patients,cardiovascular comorbidities did not allow surgery repair.Subcutaneous leak did not recur.9 patients (82%) with hernia had laparoscopic repair,during follow-up without recurrence.1 patient with hernia preferred to stay on HD,1 was switched to APD without surgery.

The development of hernia and leak did not correlate with duration of follow-up,age,volume of dialysate,history of previous abdominal surgery. Polycystic kidney disease was associated with higher risk of hernia, but not significantly (NS) (p=0,11).In obese diabetics there was found trend toward higher risk of hernias (p=0,20 NS).Female gender was associated with reduction of risk (p=0,003).

Conclusion
Hernias and leaks are frequent complications in PD patients.In patients with higher risk (polycystic kidney disease, diabetics, higher BMI) automated PD should be considered.
P-111

NON PLANNED DIALYSIS START AND PERITONEAL DIALYSIS CHOICE

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Hospital Ramón y Cajal, Madrid, Spain

The underutilization of Peritoneal Dialysis (PD) as renal replacement therapy is well known. It has been published that predialysis information about the different modalities of dialysis would increase the patients who chose PD as dialysis treatment. Furthermore, some authors affirm that non-planned dialysis start affects the selection of dialysis modality towards Hemodialysis (HD)

Aim
To analyze the patients who started dialysis treatment in a non-scheduled manner in our renal unit during 2010 and what was the treatment modality chosen.

Patients and Methods
From January to December 2010, 64 patients started dialysis in our Hospital. 44 patients (69%) started dialysis treatment on a programmed basis and dialysis was unplanned in 20 patients (31%). In those patients acute HD was required through a central venous access for several weeks.

Results
16 non-programmed patients started HD (80%) while 4 chose PD (20%) despite. They were 18 male and 2 female with a mean age of 61.3±13.2 years (range 37-85 years). Causes of unplanned dialysis were: acute renal failure (n=2), unexpectedly rapid deterioration of end stage renal disease (n=7), late start of dialysis (n=8) and other (n=3).

1 out of 20 non-programmed dialysis patients was prescribed HD because having an impracticable abdomen. Finally, 19 patients chose dialysis modality after being informed of the different dialysis modalities. The reasons why 15 patients chose maintenance HD were: personal preference (n=8), social reasons (n=6), expected short survival (n=1). All 4 patients who chose PD to maintain their independence (n=2) and to continue working (n=2). HD patients were older than patients who chose PD (64.3 vs 49.5 years).

Conclusion
When informed, 20% of patients who started on an unscheduled basis were finally included in PD. Younger patients choose PD over HD in order to maintain their independence. In our experience, unplanned dialysis does not always mean HD.

P-112

FACTORS THAT INFLUENCE THE DIALYSIS MODALITY CHOICE

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Peritoneal dialysis is an underutilized dialysis technique. The reasons why this occurs are not well known. In this work we analyze the reasons that condition the choice of hemodialysis (HD) or peritoneal dialysis (PD) in incident patients of our hospital during 2010.

Patients and Methods
64 patients started dialysis from January to December 2010 (49 male and 15 female), with a mean age of 58 years (range 17-85 years). The most frequent cause of chronic renal failure was diabetic nephropathy (23%). 13 patients had a chronic renal graft dysfunction and were transferred to dialysis (20%). 39 patients (61%) started HD and 25 PD (39%). 44 patients (69%) started dialysis treatment on a programmed basis and dialysis was unplanned in 20 patients (31%). At the start of dialysis 18 (28%) were occupationally active and expressed their desire to keep on working. All patient received information about dialysis modalities.

Results
Treatment modality was a personal choice in 55 patients (86%). The remaining patients could not choose to have a contraindication to any form of dialysis. Of the 55 patients who could choose, 31 chose HD and 24 PD. Patients who chose HD were older (62±16 vs 52±14 years, p<0.05) and had a higher comorbidity Charlson index (6.6±2.6 vs 4.7±2.2, p<0.01). The choice of technique was not influenced by patient sex, cause of chronic renal failure, previous failed graft, planned dialysis or time of follow-up in predialysis consulting. PD was chosen by 54% of patients who wished to continue working while only 10% of patients that chose HD wanted to work (p<0.001).

Conclusion
In our unit, the dialysis options information program provides 39% of patients began treatment with PD. In our experience, the main factor that influences the choice of PD was the decision to continue working mainly in younger patients.
P-113

PATIENT VIEWS OF A NEW SYSTEM FOR CAPD – IMPROVED EASE OF USE AND INCREASED CONFIDENCE

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Introduction

Registry data confirms that in Europe, the average age of incident dialysis patients continues to rise and many patients have coexistent comorbidities (diabetes, vascular disease or arthritis) and many live alone. Simpler CAPD technologies to reduce overall complexity are required so that the exchange can be completed easily and with a low risk of touch contamination. This study examined patient views of a new CAPD system design.

Methods

82 existing PD patients (52 male) from 6 European countries were included, mean age 59 years (range 28-86). Patients simulated their current CAPD exchange and then were shown by a trained interviewer how to use the new system. With access to a written procedure guide, the patient simulated a CAPD exchange with the new system, being assessed if the procedure was performed correctly before completing a patient use/satisfaction questionnaire comparing the 2 systems.

Results

96% of patients successfully completed the new procedure at first attempt. All patients completed key steps of connection and disconnection correctly at first attempt. This contrasts to the 15% of the same patients with difficulties observed by the interviewer with their current CAPD exchange. Overall, 94% preferred the new exchange and all features of the new exchange were seen as same or better by 87%. In addition, 56% of patients felt more confident with the new exchange system and 74% perceived less risk of touch contamination.

Discussion

A new CAPD system has been developed and tested for patient useability and found to be an improvement in terms of simplicity and is preferred by the large majority of patients. In addition, patients felt more confident and perceived less risk of contamination which may have positive implications for clinical practice. The new system may help meet the needs of the more challenging patient population commencing dialysis.

P-114

LOW FILL VOLUME AUTOMATED PERITONEAL DIALYSIS – THERAPY PATTERNS AND USE OF IMPORTANT CYCLER SETTINGS

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Introduction

Automated PD (APD) gives potential patient lifestyle benefits and allows the physician and PD nurse several options to prescribe PD therapy and maximise clinical benefits. There are few data from routine clinical practice concerning APD prescribing patterns, in particular the APD cycler settings for specific patient subgroups. Specific cycler setting, low fill mode, is required in patients (predominantly children) prescribed a low fill volume (1 L and under) to prevent excessive ultrafiltration, fluid retention and low drains. This study examined APD therapies in patients using low fill volumes.

Methods

APD therapy prescription parameters were extracted from PD cyclers as they were returned for maintenance. There are no patients or clinical data held within the cycler, only the details of the prescription setting and delivered therapy. 56034 records from Europe were collected and 5430 with fill volume < 1 L, requiring specific cycler settings were analysed separately and results presented below.

Results

Despite the low fill volume prescription, the low fill volume mode setting was selected in only 14% and of these low fill mode prescriptions, only 8% also had the positive ultrafiltration setting enabled. Analysis showed 2722/5430 reflected chronic home therapy and of these CCPDNIPD was the most common mode (87%), 12% used Tidal and only 1% used an extra day exchange. 52% used a last fill with 46% of these using a different [dextrose] fill (will include icodextrin). Cycle number was high;

<table>
<thead>
<tr>
<th>Number of cycles</th>
<th>3-5</th>
<th>7-9</th>
<th>10-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>% of therapies</td>
<td>25.9</td>
<td>35.8</td>
<td>30.9</td>
</tr>
</tbody>
</table>

Discussion

These data demonstrate the variability in APD prescribing in patients using a low fill volume. In particular, key cycler safety settings were not activated in most cases, potentially increasing the risk of raised intraperitoneal volume and fluid balance problems.
P-115

AUTOMATED PERITONEAL DIALYSIS – PRESCRIPTION PATTERNS ACROSS EUROPE

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Introduction

Automated PD (APD) gives potential patient lifestyle benefits and allows the physician and PD nurse several options to prescribe PD therapy and maximise clinical benefits. There are few data concerning APD prescribing patterns in routine clinical practice. This study aimed to examine APD prescribing including mode of therapy, fill volume, cycle number and last fill in Europe.

Methods

APD therapy prescription parameters were extracted from PD cyclers during maintenance. There are no patient/clinical data held within the cycler, only details of the prescription setting and delivered therapy. 56034 records were analysed and divided into 2 groups on basis of fill volume (> and < 1 L fill volume). Fill volume < 1 L should require specific cycler settings (mainly paediatric practice) and were analysed separately.

Results

50604/56034 records related to > 1L fill volume and are presumed to reflect adult PD prescribing. Tidal APD is used frequently - 44% of cases, the majority (75.8%) using tidal volume of 70-90%, whereas only 2% used high dose APD with an extra day exchange. 79% of prescriptions use a last fill and in 81% of these, the fill was with different [dextrose] (includes icodextrin). Fill volume was variable;

<table>
<thead>
<tr>
<th>Fill volume</th>
<th>&lt; or = 2 L</th>
<th>2.1-2.5 L</th>
<th>&gt; 2.5 L</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>32732 (64.7%)</td>
<td>16344 (32.3%)</td>
<td>1528 (3.0%)</td>
</tr>
</tbody>
</table>

Number of cycles prescribed varied from under 3 to over 12 although most common were 4 (22.8%), 5 (28.1%) or 6 (17.5%) cycles.

Discussion

This analysis demonstrates APD practice includes a high use of Tidal therapy (mechanical/alarm issues as likely causes). There is a wide variation in the number of cycles prescribed which may not match membrane transport type in all patients. Fill volume prescription analysis demonstrated most prescriptions are for approximately 2.0 L and only a minority are higher than 2.5L.

P-116

PREVALENCE OF HEMOCHROMATOSIS GENE MUTATIONS IN PERITONEAL DIALYSIS PATIENTS

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Nephrology and Dialysis Unit, Desio, Milan, Italy

Aim

Hemochromatosis is a common inherited disease characterized by iron overload; it is the result of mutations in specific genes. Previous studies evaluated the prevalence of such mutations among hemodialysis end kidney transplant population, but not in patients on peritoneal dialysis. The aim of this study is to evaluate the frequency of hemochromatosis gene mutations in a group of Italian peritoneal dialysis patients.

Methods

Hemochromatosis gene mutations were evaluated in 22 patients (M/F 10/12). We analyzed the frequency of the C282Y, H63D, V53M, V59M, S65C and Q127H mutations in the HFE gene, the frequency of the E168Q, E168X, W169X, H63H, Q238P and Y250X in the TFR2 gene, the frequency of the P160delC, E60X, M172K, AVAQ594-597del, N144H and V162del in the FPN1 gene.

Results

In our study we observed only HFE gene mutations, in 8/22 patients (36.4%); H63D homozygous and heterozygous mutation were found in 3/22 (13.6%) and 4/22 (18.2%) patients, respectively; S65C heterozygous mutation was found in 1/22 (4.5%) patient. Comparing patients with HFE gene mutations to those without mutations, we observed that mean ferritin levels were lower among patients with HFE gene mutations (67±44.3 vs 201.7 ± 192.5).

Conclusion

A prevalence of hemochromatosis gene mutations was observed among peritoneal patients; prevalence of HFE gene mutations in this group was 36.4% and mean ferritin levels were lower among patients with HFE gene mutation. These data, at present inexplicable, need further confirmation; larger studies may clarify the role of hemochromatosis gene mutations as regulators of iron metabolism and erythropoiesis in peritoneal dialysis patients.
P-117

EARLY PERITONEAL TO HEMODIALYSIS TRANSITION: A SINGLE-CENTER EXPERIENCE

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Introduction
Peritoneal Dialysis (PD) is an established and common modality of therapy for patients with end-stage renal disease (ESRD). Despite technical progress, PD failure due to PD-related complications remains high, with a still significant proportion of PD patients transiting to hemodialysis (HD). Based on recent data, it seems that about 40% of failures occur in the first 6 months, and are principally related to catheter and psychosocial problems. The aim of our study was to evaluate this period of vulnerability and determine if the growth of our PD program that occurred in the last 3 years was associated with a lower risk of PD to HD transition.

Methods
We performed a retrospective cohort study of all patients with ESRD enrolled in the PD program of the University Hospital S. João between January of 2008 and June of 2010. Early HD transition (less than 6 months after catheter implantation) was evaluated regardless of whether PD had been started or not. We excluded transplanted patients, those who recovered kidney function or died due to other causes not PD-related during the observation period.

Results
During the study period 114 patients underwent PD catheter implantation. The average number of patients in our PD program was 59 in 2008, 87 in 2009 and 112 patients in the first 6 months of 2010. Of 114 patients, 6 (5.3%) reached our endpoint of early failure, 4 (3.5%) recovered kidney function and other 4 (3.5%) were transplanted. Dividing the study by periods, in 2008 three (8.1%) of enrolled patients reached the endpoint, 2 (3.9%) in 2009 and 1 (3.8%) in the first half of 2010. The principal cause of early failure was peritonitis (83.3%). No deaths related to PD problems occurred.

<table>
<thead>
<tr>
<th>Prevalence, incidence and early HD transition</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
</tr>
<tr>
<td>2009</td>
</tr>
<tr>
<td>Jan-June 2010</td>
</tr>
</tbody>
</table>

Conclusions
Despite the reduced number of dropouts documented, we have observed a substantial reduction in the PD to HD transition rate with the increase in the number of incident patients in our unit over the last 3 years. This is in accordance with previous descriptions in the literature and can be attributed to a greater experience among practitioners. The results of our single-center study need to be confirmed by an extended follow-up and confronted with the experience of other centers that have also experienced a significant growth in the last years.

P-118

HEALTH LITERACY IN PERITONEAL DIALYSIS: IMPLICATIONS FOR CLINICAL SUCCESS

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Introduction
Peritoneal dialysis (PD) is highly dependent on patients’ knowledge and skills necessary to perform their own peritoneal exchanges and related procedures, in a safe and effective way. Inadequate literacy is common in the Portuguese population, particularly in older individuals. Although research on chronic clinical conditions has suggested negative effects of low health literacy in several clinical outcomes, little is known about its impact on technical outcomes in the older peritoneal dialysis patient population. In this study we aimed to assess, in the PD patient population, the association between literacy and peritoneal dialysis complications.

Patients and Methods
This was a cross-sectional observational study including the forty oldest patients from Peritoneal Dialysis Unit of Hospital S. João. Data on demographic and outcomes were collected from the unit charts. Health literacy was assessed with “Rapid Estimate of Adult Literacy in Medicine, Revised”, translated to Portuguese, and then categorized into: “at risk for poor literacy” (≤6) and “adequate literacy” (>6). Mann-Whitney, Chi-square or Fisher’s exact tests, as appropriate, were used to compare differences between the two literacy groups and demographic and outcome parameters.

Results
Thirty-four peritoneal dialysis patients (male:24; female:10), older than 56 years, met the inclusion criteria. Mean age and schooling were 68,1±7,1 and 7,6±4,3 years, respectively. Nine patients (26,5%) were at risk for poor literacy. In this group, all patients were male (100% vs. 40%, p=0,03) and had fewer schooling years compared to the “adequate literacy” group (4,2±1,5 vs. 8,8±4,4; p=0,006). We found no differences between the two literacy groups regarding exit-site infection or peritonitis mean rates.

Conclusions
Among PD patients older than 56 years, poor literacy assessed by “Rapid Estimate of Adult Literacy in Medicine, Revised”, is common and associated with education level. No association was found between health literacy and clinical outcomes, namely exit-site infection or peritonitis.
P-119

PERITONITIS PROFILE IN A PERITONEAL DIALYSIS UNIT: IMPLICATIONS IN THERAPY

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Introduction
Peritonitis remains one of the major complications of peritoneal dialysis and results in reduced technique survival and increased patient morbidity and mortality. Due to the high variety in causative organisms and of the difference of their sensitivity patterns, surveillance of the epidemiology of peritonitis and appropriate adaptation of the therapy are necessary. This study was performed to evaluate the adequacy of the treatment protocol used in our Unit (vancomycin + gentamicine or ceftazidime) with local epidemiology and sensitivity of the most prevalent agents. Demographic and clinical data were also collected in order to identify possible risk factors to peritonitis episodes.

Methods
All episodes of peritonitis at the Peritoneal Dialysis Unit of the Department of Nephrology of S. João Hospital, between 1 January 2009 and 6 October 2010 were analyzed retrospectively. Results of microbiological cultures and antibiotic sensitivities were recorded as well as clinical and demographic data of all patients undergoing peritoneal dialysis in this time-period.

Results
During the study period, 102 episodes of peritonitis occurred in 56 patients, corresponding to 2068 patient-months at risk. Gram-positive agents were cultured in 68 episodes, and gram-negatives were found in 23 episodes. *Streptococcus* was responsible for the majority of gram-positive peritonitis (44.1%) and *Escherichia coli* was the most common organism in gram-negative peritonitis (21.7%). A 97% vancomycin-sensitivity was found in gram-positive agents and resistance to Oxacillin was observed in 14.3% of *S. Aureus* and 28.6% of Coagulase-negative *Staphylococcus*. Among gram-negatives no resistance was found to aminoglycosides and meropenem and only one organism was resistant to ceftazidime and cefepime.

Conclusions
In contrast to other studies, *Streptococcus* was the most common organism isolated in gram-positive peritonitis. Nevertheless, with this study we could confirm that the empirical protocol applied in this Unit is suitable, regarding its own peritonitis profile.

P-120

ANURIC PATIENTS IN PD – CAN WE MAKE IT WORK?

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Introduction and Aims
Anuric patients represent a challenge in every PD center, often being excluded by the fear of inadequate dialysis. In these patients, survival depends completely on peritoneal clearance. Several studies have shown that a large proportion of anuric patients can be maintained successfully on PD. We aimed to describe our experience with this complex group of patients.

Methods
We retrospectively analyzed medical records of prevalent PD patients who had a minimum time of 12 months on the program. We compared several clinical and biochemical parameters between anuric patients (urine output < 100ml/day) and patients with residual renal function, to better understand their differences.

Results
We included 43 patients in the analysis, 13 of them were anuric. Of the 13 anuric patients, nine (69.2%) had previously received HD, and 23.1% were on PD because of vascular capital exhaustion. Of note, 4 patients had already no renal function when initiated PD. When comparing both groups, patients were slightly younger in the anuric group (45.3 vs. 55.2 years-old; p=0.67), but total peritoneal dialysis time was not significantly different between them. Similar to previous studies, most of the anuric patients were on APD (76.9 vs 23.1% on CAPD), which is different from the second group (46.7% on APD vs. 53.5% on CAPD), although this has not reached significance (p=0.067). In the anuric group, 92.1% of patients were using icodextrin (vs. 63.3% in the other group; p=0.052). Mean arterial pressure was significantly higher in anuric patients (113.2 vs. 104.8mmHg; p=0.046), but pulse pressure was not different between groups. Also, we found no significant differences in ventricular hypertrophy. Creatinine clearance and Kt/V were significantly lower in the anuric group (p=0.001 and 0.012, respectively), as opposed to UF volume (589 vs. 1196 ml in patient without renal function; p=0.026). All anuric patients presented UF volume above 750ml/day. Serum phosphorus was significantly higher in the anuric group (5.44 vs. 4.72mg/dL; p=0.038), even with more patients on chelating agents (92.3 vs. 50.0%; p=0.008). We found no significant differences on serum BNP, Hb, Ca and PTH between the study groups.

Conclusions
Anuric patients are considered complex patients on PD. Individualization of dialysis prescription with close attention to UF volume is essential to a successful treatment. Removal of higher molecular weight solutes as phosphorus may be more difficult based solely on peritoneal clearance.
P-121
PERITONEAL CATHETER-RELATED INFECTIONS AFTER RENAL TRANSPLANTATION

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Introduction and Aims
Peritoneal dialysis is a commonly used renal replacement therapy in patients awaiting renal transplantation. However, there are few and conflicting results concerning post-transplantation complications, including infection. The main aim of this study was to retrospectively evaluate the incidence of peritoneal catheter-related infection on the immediate post-transplant period.

Methods
We performed a retrospective analysis using the medical records of patients on peritoneal dialysis, who have been submitted to renal transplantation between January 2009 and December 2010 at our center. Data concerning the presence of culture-proven infection, type of infection and timing of peritoneal catheter removal during the first 30 days after transplantation were recorded for all patients. Whenever available, the presence of infection for an average follow-up period of 6 months was also analyzed.

Results
Seventeen patients previously on PD were submitted to renal transplantation during this time period. Patients’ mean age at the time of transplantation was 49 years old and 59% were male. The median length of PD treatment was 23.5 months. Infectious complications occurred in 70.5% of patients during the follow-up period of 6 months and were mainly due to urinary tract infections (48% of cases). Of the 6 peritoneal catheter-related infections reported, 5 were exit-site infections and one patient had peritonitis. Peritoneal catheters were removed at a median time of 170 days post-transplantation, and the timing of removal was mainly determined by a good and steady graft function (82% of patients).

Conclusions
In our centre, peritoneal catheter-related infections were rare in PD patients in the immediate post-transplant period. According to our experience, the timing of the peritoneal catheter removal was not determined by the presence of infection.

P-122
IMPACT OF COMORBID CONDITIONS ON THE QUALITY OF DIALYSIS IN INCIDENT PATIENTS

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Introduction
Patient with renal failure suffer various concomitant chronic diseases. The Index Coexistent Disease (ICED), Index of Disease Severity (IDS) and Index of Physical Impairment (IP) have been reported to be useful for clinical examination.

Methods
Three indexes have been used to measure comorbidity in 61 incident patients in order to measure the complexity of the patient’s health status. Patients were classified with residual urine output (<100ml; 101-999ml;>1000ml)

Results
The Index of Physical Impairement (IP) of 3 were in 85.7% in patients with residual diuresis <100ml (p<0,05) The ICED level 3 was present in 78.6% (p<0,05)patients. Assotiation ICED level 3 and PCR index was significantly lower 0,77±0,26mg/kg/d (ANOVA;p<0,05)and inversely correlated by Spearman's coefficient (p=-0,322, and p<0,05). Correlation between IDS level 3 and Kt/V (2,27±0,63) and MTAC urea was (28,76±11,42ml/min) significantly ANOVA;p<0,05. During follow up period of 6 months older patients (>50 years) had statistically significantly higer value of Kt/V at the beginning 1,89±055 than after six months ( 1,02±0,64)of therapy (ANOVA; p<0,05).

Conclusion
We found association between chronic diseases, medical conditions and declining quality of dialysis. This can affect the deterioration of the outcome in elderly especially.
P-123

CLINICAL VALIDATION OF A PD PRESCRIPTION MODEL IN THE PATIENTONLINE SOFTWARE

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Introduction

Changing peritoneal membrane characteristics, residual renal function and body size require adaptation of PD prescription to maintain an adequate dialysis dose. A prescription model was established in the software PatientOnLine (Fresenius Medical Care) to facilitate tailoring of the prescription to patients’ individual needs. The present study aimed at assessing accuracy of this model in predicting dialysis dose based on body composition, peritoneal membrane function and residual renal function.

Methods

This prospective international, multicentre study enrolled CAPD patients requiring a PD prescription change. All underwent a first peritoneal function test (PFT) to determine peritoneal membrane characteristics, residual renal function and the current dialysis dose (Kt/V, creatinine clearance). Using the prescription model, a new PD prescription was fixed and Kt/V and creatinine clearance were predicted. A second PFT was performed to measure delivered dialysis dose of this new prescription after 2 to 4 weeks. Accuracy of the prescription was assessed by correlation analysis.

Results

54 CAPD patients received a new prescription modelled by the software. Mean age was 54±15 years, 26% of the patients were anuric (diuresis <100 ml/day), 26% were diabetic. Predicted and measured peritoneal Kt/V was 1.52±0.31 and 1.66±0.35, total Kt/V 1.96±0.48 and 2.06±0.44, respectively. Predicted and measured peritoneal creatinine clearance was 42.9±8.6 and 43.0±8.8 L/1.73 m²/week, total creatinine clearance <100 ml/day), 26% were diabetic. Predicted and measured peritoneal Kt/V was 1.52±0.31 and 1.66±0.35, total Kt/V 1.96±0.48 and 2.06±0.44, respectively. Coefficients were lower for peritoneal ultrafiltration and glucose absorption.

Conclusion

While the present model is well suited to support the clinician in predicting peritoneal Kt/V and creatinine clearances, individual peritoneal glucose absorption and ultrafiltration are less predictable, since they are both influenced by additional factors not considered in the current model.

P-124

PERITONEAL DIALYSIS (PD) IN A PATIENT WITH MITOCHONDRIAL-GASTRO-INTESTINAL ENCEPHALOMYOPATHY (MNGIE) WAITING FOR BONE MARROW TRANSPLANT

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Introduction

MNGIE is a rare autosomal recessive disease caused by ECGF1 gene mutations. ECGF1 gene codifies for an enzyme (Thymidine Phosphorylase) that regulates the catabolism of thymidine and deoxyuridine. The mutation causes enzyme inactivation and leads to thymidine accumulation and alterations in repair/replication of mitochondrial DNA. Clinical features: neurological deficits (peripheral neuropathy, leuko-encephalo-myopathy), bilateral ophthalmoplegia, dysmotility/gastrointestinal atony, malabsorption and malnutrition. We report the case of a MNGIE patient with severe malnutrition treated with PD.

Case report

34 yrs old female, white. Arthritis and gastrointestinal symptoms since 1999: diarrhea, abdominal pain, recurrent sub-occlusions. In 2004, she was started on steroids and azathioprine in the suspicion of Chron Disease. Eventually, persistence of GI symptoms with severe malnutrition and recurrent joint arthritits. After an explorative laparotomy performed in February 2007 excluded inflammatory bowel disease, the pt was started on parenteral nutrition (PN) with improvement of nutritional markers. In December 2007 evidence of leukoencephalopathy, neuropathy. GI dysmotility, ophthalmoplegia; muscle biopsy and genetic study were performed and raised to MNGIE diagnosis (G3867A homozygous intronic mutation of the gene for thymidine phosphorlase TP; uTimidina: 26.5 mmol/mol creatinine (vn 0.04 to 0.05); uDeoxiuridina: 67.8 mmol/mol creatinine (0.02 to 0.04 vn). PN and steroid tehrapy were continued. In October 2009 she was started on PD for persistence of symptoms; kidney function was normal. 4 CAPD exchanges per day with Phisioneal Baxter ® 1.36% x 1000 ml 3/die, Nutrineal Baxter PD4 ® 1000 ml/day. Seven months later the pt had gained 20% of body weight and the nutritional status had improved.

<table>
<thead>
<tr>
<th>Body weight (Kg)/BMI</th>
<th>Albumin (g/dl)</th>
<th>Urea/Creatinine (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>before PD</td>
<td>41/16</td>
<td>3.2</td>
</tr>
<tr>
<td>after PD</td>
<td>48/18</td>
<td>4.1</td>
</tr>
</tbody>
</table>

The pt received a bone marrow transplant in June 2010.

Conclusions

PD, associated to PN, may represent a supportive therapy in MNGIE pts also because of transperitoneal absorption of glucose and aminoacids contained in the peritoneal solutions. We suggest PD as “bridge treatment” to bone marrow transplant in MNGIE pts.
P-125
SURGERY FOR ENCAPSULATING PERITONEAL SCLEROSIS: RESULTS FROM A UK TERTIARY REFERRAL CENTRE
Christopher WATSON, Andrew BUTLER, Julia ERTNER, Elaine CORDEN, Paul WILLIAMS
Addenbrooke's Hospital, Cambridge, United Kingdom

Introduction
The increasing prevalence of EPS in the UK led to the designation of two national referral centres in the UK for its surgical management. This service began on 1st April 2009. This paper reviews the experience of one of those centres.

Methods
The records of all referrals for surgery were reviewed. Surgery comprised decortication, whereby the inflammatory fibrous tissue was removed from the parietal and visceral peritoneum, and complete mobilisation of the small intestine. Any inadvertent enterotomies were exteriorised as stomas.

Results
Until 31 May 2011, 32 decortication procedures have been performed in 28 patients; 2 procedures were in patients referred from overseas. The median age was 51 (range 23 – 83) and mean duration of PD 6.25 years (range 2.25 – 12.75). 22 occurred in patients on haemodialysis after failed PD and 6 in patients who stopped PD following successful renal transplantation.

Of the 28 patients treated, 8 have recurrent disease; 4 have had surgery for recurrence (1 twice), one is yet to undergo surgery and one died with recurrence. The remaining 2 patients are being managed on low residue diets and maintaining their weight. Two patients died in the immediate post surgical period, both as a consequence of aspiration. 5 other patients have died later after surgery, most from sepsis. Three patients have undergone successful renal transplantation 4, 6 and 8 months following decortication surgery.

Conclusion
EPS is an uncommon but serious condition. Surgery is associated with excellent results in some patients, but around a quarter will develop recurrent disease requiring further surgery or dietary adjustment.

P-126
LANTHANUM CARBONATE IS EFFECTIVE IN REDUCING SERUM PHOSPHATE LEVELS IN PATIENTS ON PERITONEAL DIALYSIS
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Introduction
Protein is transferred across the peritoneal membrane during peritoneal dialysis (PD). Treating PD patients with an effective phosphate (P) binder may allow adequate protein intake, while maintaining controlled P levels. We investigated the effects of the non-calcium, non-resin P binder, lanthanum carbonate (LC), on serum P levels in patients on PD. Methods: This was a dose-ranging, double-blind, placebo-controlled study in two parts. Part 1 involved dose titration up to 2250mg LC over a 4-week period. Part 2 was a double-blind, parallel-group phase; patients were randomized to receive their LC maintenance dose or placebo for 4 weeks. This is a subgroup analysis of patients receiving continuous ambulatory PD (CAPD). Results: 39 CAPD patients entered Part 1 of the study (mean age: 53 years). During Part 1, serum P levels were reduced from a mean of 2.23mmol/L (6.91mg/dL) after previous binder washout to 1.68mmol/L (5.20mg/dL) after 4 weeks of titration (P<0.05). Twenty-one patients entered Part 2 (LC: 10; placebo: 11). There was no difference in P levels between treatment groups at the start of this phase (LC: 1.57mmol/L [4.86mg/dL] vs. placebo: 1.58mmol/L [4.89mg/dL], P = 0.96). At last visit, P levels were significantly lower in the LC group (1.56mmol/L [4.83mg/dL] vs. 2.25mmol/L [6.97mg/dL], P=0.0015). Discussion: An effective P binder may enable adequate protein intake to counter protein loss in PD. Data on P binders in patients on PD are lacking. LC was effective in reducing P at doses up to 2250mg. The more commonly used dose of 3000mg may reasonably be expected to provide further reductions.
P-127
EVALUATION OF PHYSICAL ACTIVITY PARAMETERS IN PATIENTS UNDERGOING HEMODIALYSIS & PERITONEAL DIALYSIS
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Few studies have been done on comparing variables of performance between the patients undergoing hemodialysis and peritoneal. This presentation is a study that was designed to compare variables in physical activity between patients undergoing hemodialysis and peritoneal dialysis. Also, factors affecting and determining these variables were examined.

Method
In this study, 58 patients were selected as candidates to be studied. Variables of physical performance that directly measured included: duration of 100 m walking, 12 stairs climbing and chair rising without assistance. Creatinine, albumin, calcium, hemoglobin, BUN and potassium levels were measured. Weight, BMI (Body mass index), KT/V value, CCI (Charlson co morbidity score) were calculated in patients and the relation of these factors were assessed with the variables of physical functioning level by the use of Pearson’s test.

Result
Chair-rising time and gait-speed in hemodialysis patients were significantly lower than in peritoneal dialysis patients. In hemodialysis patients, a positive significant relation was observed between the gait – speed average time and of potassium level and serum BUN. In peritoneal patients a positive relation was observed between the age average, potassium level, serum BUN and chair –rising time; and also between CCI, duration of dialysis, serum calcium level and gait speed time; between BUN and creatinine concentration and stair climbing time; but there was a negative significant relation between KT/V and stair-climbing time. Potassium levels and serum BUN were the most significant predictor factors in physical performance in dialysis patients.

Conclusion
In this study, the average of gait speed and chair-rising time in hemodialsis patients was significantly less and below than that in peritoneal patients. Besides, the average of potassium levels and serum BUN in patients undergoing hemodialysis and peritoneal, age average, dialysis duration, KT/V, calcium, CCI, and creatinine concentration, at least, with one from three variables of physical performance had a significant relation in peritoneal patients.

Key words: Physical activity, Peritoneal Dialysis, Hemodialysis

P-128
CORRELATION OF SERUM MAGNESIUM WITH SERUM PTH LEVELS IN PERITONEAL DIALYSIS PATIENTS
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Background and Aim
It seems that serum magnesium plays an important role in iPTH secretion, with the same pathway. Until now the studies which have evaluated the relationship between magnesium and PTH reported different results. So in this study we have investigated the relationship between magnesium and PTH.

Materials and Methods
In this cross-sectional study, 46 patients(Male:17, Female:29 who underwent peritoneal dialysis for at least 3 month with at least 15 years old and who have had stable status in previous 2 months were enrolled. Patients with active infection or hospitalization in last 2 months were excluded. Calcium, Phosphor, Mg, Alp, Albumin iPTH levels were measured.

Results
Serum level of Mg, Ca, Albumin, Alp and iPTH had no statistically significant difference between male and female but serum level of Phosphor in females was upper than male significantly and there was an inverse relationship between serum level of Mg and iPTH which was not statistically significant(r=−0.111, p=0.467). In patients with iPTH >300pg/ml, there was an inverse significant correlation between serum Mg and iPTH (r=−0.395, p=0.036). But in iPTH <300pg/ml there was no significant correlation.

Conclusion
Our findings showed only an inverse significant correlation between serum Mg and iPTH in patients with iPTH >300pg/ml which can suggested the probable role of low serum level of Mg in secondary hyperparathyroidism.

Key Words: Peritoneal Dialysis, Mg (magnesium), iPTH.
P-129
SEQUENTIAL PERITONEAL EQUILIBRATION TEST: A NEW METHOD FOR ASSESSMENT AND MODELING OF PERITONEAL TRANSPORT
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Introduction
The standard methods for evaluation of peritoneal transport efficiency, as peritoneal equilibration test (PET) or 24h collection of dialysate only roughly describe the transport characteristic of individual patients. Therefore, there is a need to propose new methods to provide detailed information about peritoneal transport system in various groups of patients on peritoneal dialysis (especially about fluid transport characteristics) and to investigate the associations between the transport parameters and other clinical characteristics.

Methods
The test, which consists of PET (glucose 2.27%, 4h) and miniPET (glucose 3.86%, 1h), was performed in 17 stable CAPD patients. Collected data include dwell times, infused and drained volumes, dialysate and plasma solute (urea, creatinine, glucose, and sodium) concentrations. Ultrafiltration volumes, glucose absorption, D/P, sodium dip, free water fraction (FWF) and the ultrafiltration passing through small pores at 60 minutes (UFSP), were calculated using clinical data. Additionally, peritoneal transport parameters were estimated using three-pore model and clinical data, including hydraulic permeability (LpS), contribution of ultrasmall pores (afla), osmotic conductance, and peritoneal absorption, L (for fluid transport), and diffusive mass transport parameters, PS (for solute transport).

Results
Net ultrafiltration from miniPET and D/P sodium at the end of miniPET correlated with the time on PD (r=-0.58, p=0.018 and r=0.66, p=0.005, respectively). D/P creatinine was correlated with PSs for all considered solutes (r from 0.5733 to 0.9331, p<0.03). Additionally LpS was correlated with net ultrafiltration from miniPET (r = 0.73, p=0.001), UFSP (r=0.90, p<0.001), FWF (r=-0.77, p<0.001) and sodium dip (r=-0.56, p=0.025) and the fraction of ultrasmall pores correlated with FWF (r=0.85, p<0.001) and sodium dip (r=0.69, p=0.003).

Conclusions
Proposed modified test, better than standard, described and interpreted mechanisms of ultrafiltration and peritoneal transport. Fluid transport parameters from the three-pore model were independent of the PET D/P creatinine, but correlated with fluid transport characteristics from PET and miniPET.

P-130
PREDICTION OF KT/V: HOW IMPORTANT ARE DIALYSIS EXCHANGE PROCEDURES?
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Introduction
Kt/V is important parameter of peritoneal dialysis (PD) adequacy assessment. There are several mathematical models and software tools that allow predicting Kt/V and optimizing PD regimen. However, they do not consider the real effectiveness of dialysis fluid exchange procedures. It may cause the underestimation of predicted Kt/V. The aim of the study was to assess the underestimation in predicted adequacy of automated peritoneal dialysis (APD) if the real effectiveness of dialysis fluid exchange procedures is not considered, as well as to elaborate a simple method of error correction.

Methods
20 PD patients were enrolled. 1) Assessment of the peritoneal transport of water and urea with 125I-HSA as an intraperitoneal dialysate volume marker. 2) Calculation of the Kt/V values of 8-hours APD night session (2-9 dwells) in three conditions: a) with consideration of real efficacy of dialysis fluid exchange procedures (87% for urea removal, k=0,87, Baczynski et al, 2010) b) with omitting the inflow/outflow procedures (k=0), c) with assumption that effectiveness of disalysis fluid exchange procedure is 50% of urea removal during the pure dwell (k=0,5). 3) Comparison of calculated Kt/V values and analysis of errors. 4) Elaboration of coefficient r for the correction of the error with k=0.

Results
The underestimation of Kt/V ranging 14,4 – 31,7% when k=0 and 8,9-21,3% when k=0,5 was found. The mean value of r was 1,26. After the correction with r, the predicted error decreased to 7%.

Discussion
The reliable prediction of PD adequacy requires the consideration of the whole process of dialysis comprising both “pure” dwells and fluid exchange procedures. Otherwise, the predicted Kt/V value is underestimated. The r coefficient is a simple tool for correcting that error. It may be useful for mathematical models and software that neglect the urea removal throughout dialysis fluid exchange procedures.
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PERITONITIS PREVENTION AND TREATMENT: A SIX YEARS SINGLE CENTER REPORT

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Peritonitis is still an important infectious complication in PD and it is a major cause of hospitalization and drop-out. We reviewed all the peritonitis episodes in our center from 01/01/2005 to 31/12/2010 to verify the effectiveness of the application of an evidence-based prevention protocol on 01/01/2007 and the antibiotic sensitivity profile of cultured germs. The prevention protocol was based on 4 steps from Italian Nephrology Society 2007 Guidelines: eradication of SA nasal carriage with mupirocin, antibiotic perioperative prophylaxis with cephazolin, gentamicin cream on exit site routine medication and oral nystatin during peritonitis treatment. We observed 87 peritonitis episodes in 123 prevalent patients (78 incidents) for a cumulative observation of 2592 patient-months, overall rate was 0.032 ep./patient-months. The yearly rates were: 2005=0.048, 2006=0.051, 2007=0.018, 2008=0.021, 2009=0.025, 2010=0.032. Kaplan-Meier median free of first peritonitis time was 43.7 months while Kaplan-Meier median free of second peritonitis time was 24.6 months. We found a significant difference in the first peritonitis probability before and after the application of the prevention protocol (2007): Kaplan-Meier median free of first peritonitis time 12.3 vs 53.7 months, (Log-Rank test p<0.001) corresponding to a drop of peritonitis rates between years 2006 and 2007. The isolated germs were 62% Gram positive, 28% Gram negative, 10% culture negative and no fungi. We registered a drop mainly of Gram positive isolations from 2006=77.3% to 2007=28.6% while Gram negative and culture negative percentages remained stable. Antibiotic sensitivity the six-year overall cultured germs showed: cephazolin 13.9%, cephtazidime 26.6%, vancomycin 78.5%, gentamicin 49.4%. Consequently, wide spectrum empiric combination protocols showed different sensitivity performances: cephazolin + cephtazidime 27.8%, vancomycin + gentamicin 89.9%, vancomycin + cephtazidime 98.7%. The revision of peritonitis in our center showed the favourable results of an evidence-based preventive protocol and antibiotic sensitivity data showed the superior performance of the empiric protocol vancomycin + cephtazidime.

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EFFICIENCY OF HYPOCHLOROUS ACID (HOCL) IN PREVENTING PERITONEAL DIALYSIS CATHETER RELATED INFECTIONS

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Introduction

Peritoneal dialysis (PD) is an effective choice of end stage renal disease (ESRD) which has been focused for more than two decades. Besides the technical improvements, PD related infections are important complications often results with morbidity and sometimes mortality. In continuous ambulatory peritoneal dialysis (CAPD) patients peritonitis, exit site infections and tunnel infections are leading infectious complications. Povidone iodine %10 solutions are traditionally used for PD catheter care. HOCl is a weak acid and administration of this agent has successful results in wound care. Our study aimed to evaluate the efficiency of HOCl in PD catheter care.

Materials and Methods

Our study included 96 CAPD patients, leading cause of ESRD was diabetes mellitus (%42). Patients are randomized into povidone iodine as controls (n=43) and HOCl groups (n=53). Forty-three patients (21 male, 22 female). Patients have been followed up for 12 months. Patients have been examined monthly by same physician and peritoneal dialysis care nurse. Peritonitis, exit site infections, tunnel infections have been noted.

Results

HOCl use has significantly reduced the rate of peritonitis, 10 and 4 episodes of peritonitis have been diagnosed in control and HOCl group respectively. Even there has been more exit site infections in HOCl group (3 vs 4) the difference was not statistically significant. Two episodes of tunnel infections have been diagnosed in both groups.

Discussion

Peritonitis and PD catheter related infections are the major causes of PD failure, and also associated with high rates of morbidity and mortality. Interventions aimed to reduce the rate of PD catheter related infections may play a major in PD adequacy. Our results show that administration of HOCl for PD catheter care significantly reduces the rate of peritonitis compared to povidone iodine.
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THE VALUE OF THE INITIAL EFFLUENT WHITE CELL COUNT IN THE RISK STRATIFICATION OF PERITONEAL DIALYSIS ASSOCIATED PERITONITIS

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We examined the relationship between PD peritonitis outcome, initial effluent white cell count (WCC), diabetes and blood glucose control. 185 consecutive PD peritonitis episodes in a single centre over a 5-year period were retrospectively analysed (results collected prospectively). Variables: WCC, diabetes status, mean HbA1C, exit site/tunnel involvement, microbiology. Outcome: catheter loss.

44 episodes resulted in catheter removal (24%). Age and gender were not associated with catheter loss. Type of organism was significant (p<0.001) in predicting catheter outcome. Exit site/tunnel involvement was seen in 19% (n=36) of episodes; 53% of these had catheter loss (p=0.007). A receiver operating characteristic curve was constructed to identify the WCC value with optimal sensitivity/specificity predicting catheter loss. Area under the curve was 0.641 (p=0.007). 1985/mm³ had sensitivity of 62.5% / specificity of 65.3%. WCC results were then dichotomized (WCC>2000/mm³, WCC<2000/mm³). WCC>2000/mm³ had a positive predictive value of 37%, negative predictive value of 84% and an odds ratio (OR) of 3.1 in predicting catheter loss (p=0.002). In a logistic regression model controlling for exit site infection and type of organism, WCC>2000/mm³ had an OR of 2.4 (p=0.04) for catheter loss [exit site infection OR 2.4 (p=0.079); type of organism OR 18.0 (p=0.01)]. 36% (n=66) of peritonitis episodes occurred in diabetics. Catheter loss was similar in diabetics (23%) and non-diabetes groups (24%). Amongst diabetics mean HbA1C was 8.4 in catheter preservation vs. 8.8 in catheter loss; p=0.45.

WCC was a strong predictor of catheter loss with a cut off value of 2000/mm³ having the best predictive ability. The presence of diabetes or blood glucose control did not influence outcome. The initial effluent WCC may aid in risk stratification of peritonitis episodes enabling intensification of early antibiotic therapy and consideration of early catheter removal.

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PERITONITIS IN PERITONEAL DIALYSIS: A SINGLE-CENTER EXPERIENCE

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Introduction
Peritonitis is still a severe complication for PD patients in spite of important advances in this technique during past years. Infections are the second most common cause of death among dialysis patients and, in the case of PD, peritonitis is also the principal cause of technique failure.

The aim of this study was to analyze the incidence and outcome of peritonitis, and the causative organisms.

Methods
A retrospective descriptive study of all PD peritonitis episodes in PD unit of Sahloul Hospital from 1 January 2007 to 31 juin 2010 was performed. Peritonitis was defined according to the ISPD recommendations. Culture-negative cases were included in the total number of episodes of PD peritonitis. Patients’ demographic data, time on treatment and, for each episode of peritonitis, the organisms isolated, the empiric initial treatment and outcome were recorded.

Results
During the study period (2007 – 2010), 64 patients were treated with PD in our unit; mean age 47, 1 ± 18 (20 – 82) years, 40% were females. Thirty two patients suffered 70 episodes of peritonitis. Twenty nine episodes (41,4%) were culture-negative peritonitis. The peritonitis was due to one microorganism in 95% of cases and to multiple organisms in 5% of cases. The causative organisms were gram positive in 19 episodes (44,2%), gram negative in 20 episodes (51,2%)and fungus in 2 episodes(4,6%). Two main different empirical initial treatment protocols were used: Vancomycin plus Fluoroquinolone in 74,3%(52/70) episodes and Vancomycin plus Cefotaxim in 21,4%(15/70).During the period study 19 patients were switched to hemodialysis for peritonitis.

Conclusion
Peritonitis is still a common clinical problem among patients on PD and may cause peritoneal membrane damage or even death. The empiric initial antibiotic treatment may have a great impact on the outcome and therefore on peritoneal membrane preservation and patient survival.
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ASSESSMENT OF HAND-WASHING SKILLS OF PD PATIENTS TO IMPROVE PERITONITIS RATE

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Personal hygiene and especially the hand washing technique is the most important aspect of preventing peritonitis in chronic ambulatory peritoneal dialysis (CAPD).

In 2009 peritonitis rate at our dialysis unit has fallen from 1/26 months to 1/17 months and in over 80% of the cases bacteria of the normal skin flora has been identified from cultures. It was suspected that despite thorough education on personal hygiene including the importance of hand washing, patients may not have a good-enough hand washing technique to prevent contamination. For the assessment of the effectiveness of the hand washing routine of the patients a black box equipped with UV light on the inside was provided along with a fluorescing rubbing liquid.

Having scrubbed his hands with the fluorescent liquid by his own routine the patient placed his hand into the black box and through a peek-hole one could see under the UV light the areas that were not covered by the agent. Hand washing was then repeated following our hygienic hand-washing protocol focusing on the areas that were not cleaned at the first time. The result of the second attempt was also checked under the UV light.

Utilizing this equipment our survey resulted in the following:

- we realized that 15 out of 23 patients had moderate to serious deficiency in their hand washing routine
- both nurse and patient were reassured in the proper technique by having visual control over the effectiveness of the hand washing
- patient compliance with hygienic issues has seemingly grown after being confronted with their improper routine
- peritonitis rate has improved significantly since this retraining in personal hygiene

We are planning to repeat this assessment on a regular base to keep up the proper technique for the long term.

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PERITONEAL DIALYSIS-ASSOCIATED INFECTION: LIMITED INFLAMMATORY RESPONSES AND SUPERIOR CLINICAL OUTCOME FROM CULTURE-NEGATIVE PERITONITIS

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Introduction

Peritonitis remains the commonest cause of treatment failure in peritoneal dialysis (PD) patients. Whilst culture-positive episodes have been studied extensively, much less is known about culture-negative cases and their impact on patient outcomes.

Methods

In this study we analyzed patient and technique survival of first-time peritonitis in independent patient cohorts comprising a total of 2307 (ANZDATA Registry, Australia) and 372 PD patients (University Hospital of North Staffordshire, UK), respectively. Episodes were grouped according to the result of organism culture into culture-negative and culture-positive infections. Additionally, we characterized the local immune responses in acute peritonitis in 43 patients treated at the University Hospital of Wales, UK.

Results

Our results demonstrate that culture-negative peritonitis is associated with superior patient and technique survival, and reduced peritoneal inflammation as indicated by lower numbers of infiltrating neutrophils, monocytes/macrophages, and CD4+, CD8+ and gammadelta T lymphocytes. This was paralleled by lower peritoneal levels of inflammatory mediators (TNF-α, IL-1β, IL-6), and immune regulators (IL-10, sIL-6R, MMP-3) in culture-negative patients.

Conclusions

Our findings suggest that overproduction of these effector molecules and activated cellular infiltrates during acute bacterial peritonitis are indicative of severe inflammatory responses and contribute to poor treatment outcomes in PD patients.
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PERITONITIS PREVENTION STUDY (PEPS) - EFFECTS OF REGULAR FOLLOW-UP OF PD-PATIENTS’ THEORETICAL KNOWLEDGE AND PRACTICAL SKILLS WITH FOCUS ON INFECTION PROPHYLAXIS

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Introduction
Peritonitis is a significant problem in peritoneal dialysis (PD). Non-compliance with the PD protocol is shown to be an important risk factor for peritonitis. Reinforcement of PD patients’ knowledge of PD and ability to perform PD therefore appears to be a possible way to reduce the incidence of peritonitis.

The aim of this study is to evaluate if a new model of follow-up of PD patients’ theoretical knowledge and practical skills can reduce the incidence of peritonitis, technique-failure rate, and hospitalisation days due to peritonitis.

Methods
This is a randomised, multi-centre study in Norway, Sweden, Denmark, Finland, Latvia, Estonia, and The Netherlands, which will include 750 incident PD patients able to perform PD without assistance. The study started in 2010 and will go on to 2013.

Patients in the intervention group will be tested regularly. They will perform a practical PD-technique test and fill out a questionnaire at regular intervals after PD-start, and after every episode of peritonitis with focus on infection prophylaxis. If the goals of the tests are not reached, further training will be given. Patients in the control group will be treated according to the routines of the clinic.

Results
In May 2011, around 170 patients were randomised and 50 centres were taking part of the study. The study had recently started in Denmark and Norway and was about to start in The Netherlands.

Conclusion
If his follow-up model proves to be effective, it could be a future tool to keep down the peritonitis rate and increase the technique survival in patients with peritoneal dialysis.

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NGAL DURING PERITONITIS: PRELIMINARY RESULTS

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Introduction
NGAL is a marker of inflammation. The major complication of peritoneal dialysis (PD) is the development of peritonitis. As every infection is supposed to be related with changes in inflammation markers, the purpose of the study was to assess NGAL expression in plasma (pNGAL) and in peritoneal dialysate effluent (dNGAL) during peritonitis in PD patients.

Methods
We performed a longitudinal study of all 69 patients who were on PD in our center. We measured the pNGAL concentration (evaluated by Triage NGAL MeterPro BIOS) and dNGAL concentration (evaluated by Archictet NGAL assay Abbott) collected at routinely control and during the first day of an acute episode of peritonitis. Moreover we evaluated CRP, Ferritin and leucocytes in the blood and in PD effluent at baseline and at peritonitis beginning.

Continuous variables were presented as the median values and interquartile range (IQR). The Wilcoxon tests was used to compare continuous paired variables. All statistical analysis were performed with SPSS version 17.0.

Results
56.5 % of our patients was man. 26.1% was diabetic, 84.1% had hypertension. Median patients age was 61 years (IQR 46.5-71), median duration of PD was 30 months (IQR 11-51). During the 4 months of follow-up, we had 12 peritonitis. In the 12 patients with peritonitis median baseline levels of pNGAL and dNGAL were 487ng/ml (IQR 417.5 - 651.5) and 34.25 (IQR 21.15-46), respectively. Conversely, median levels of pNGAL and dNGAL during peritonitis were 638 ng/ml (IQR 503.75-852.25) and 342.5 (IQR 184-630.75), respectively. The increases in dNGAL (p=0.002 ) and PCR (p=0.028) during peritonitis were statistically significant, whereas those of pNGAL (p=0.239) and ferritin (p=0.182) were not.

Conclusion
In our analysis, levels of dNGAL raised significantly during peritonitis. This date suggests that the levels of dNGAL might be used as a biomarker of peritonitis.
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AN AUDIT OF CULTURE-NEGATIVE RATES FOR PD PERITONITIS BY TWO DIAGNOSTIC TECHNIQUES

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Background

National and International Guidelines recommend that centres aim to achieve a rate of culture-negative PD peritonitis of <25% and <10% in a centre of excellence. There have been few studies to inform the best method to achieve this and it is particularly relevant in healthcare systems which are cost-constrained to using a single method. We aimed to compare the diagnostic performance of two conventional culture methods with respect to culture-negative rates in a single centre.

Methods

We retrospectively identified paired and simultaneous microbiological cultures of PD effluent by the direct broth culture (blood culture bottles, 20 ml effluent) versus water-lysis method (sediment culture of 20 ml effluent) in adult patients with PD peritonitis by ISPD definitions (symptoms + PD effluent white cell count > 100/mm³). 244 samples from 94 consecutive patients over 4 years were examined.

Results

Of the 244 paired samples, 171 (70%) were positive by one of the two methods, with a crude overall culture-negative rate of 30%. The final culture results agreed in 173 samples (73%). This discrepancy was dominated by 57 samples (23%) that were culture-negative by sediment culture but culture-positive by broth inoculation. Conversely 8 samples positive by sediment culture, were culture-negative by broth inoculation. The discrepant samples did not differ by whether Gram-positive, Gram-negative, yeasts or polymicrobial. Overall sensitivity was 93% for broth inoculation and 65% for sediment culture.

Conclusions

Our results support the routine use of the broth culture technique using BacT/Alert blood culture bottles in order to facilitate early streamlining of empiric antibiotic therapy. Sediment culture after centrifugation had a much lower diagnostic yield and may not be cost-effective. The crude culture negative rate was above that recommended by guidelines. The factors underlying this need further local examination but one method might be to increase the volume of effluent cultured.

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PD EFFLUENT SAMPLING AND PROCESSING VARIES WIDELY IN THE UK AND MAY PARTLY EXPLAIN VARIATION IN CULTURE-NEGATIVE RATES: RESULTS OF A WEB-BASED SURVEY

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Background

PD peritonitis is the largest cause of technique failure and accurate diagnosis is important in its successful management. National and International guidelines recommend culture-negative rates of <25% and suggest <10% is achievable in centres of excellence. The most precise and cost-effective way of achieving this is not yet known and UK registry data on peritonitis rates is not routinely reported. We aimed to obtain information about PD effluent sampling and processing practices in the UK.

Methods

A link to two web-based surveys was circulated to 102 UK centres through the EPS network mailing list. The surveys were specific to senior PD nursing staff and microbiologists.

Results

Returns were received from 48 units for the nursing staff survey and 26 units for the microbiologist survey. For nursing staff just under half 20/48 were unsure of the culture-negative rate, 24/48 reported rates of 0-30% (mean 13%, SD 8%). The most common combination of samples was 2 blood culture bottles with 10mls each and 1 sterile container with 20mls. 15% sent >50ml or the whole bag to the lab. Factors affecting who sampled the effluent included working hours, distance of the patient to the unit and PD modality. For sediment culture 46% (12/26) used concentration method, 46% (12/26) used water-lysis method, 1 unit used saponin lysis and 1 unit did not culture sediment at all. For blood cultures 62% (16/26) used BacT/Alert bottles, 23% (6/26) BACTEC with resins and 1 unit brain & heart infusion broth.

Conclusion

There is wide variation in reported sampling volumes and processing methods for PD fluid in the UK and this may in part explain the variation in PD culture-negative rates. Adherence to national or international recommendations on diagnostic methods might reduce culture-negative rates but routine reporting of peritonitis data into national registries is a first step.
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CHANGES IN THE MICROBIOLOGICAL PROFILE IN PERITONEAL DIALYSIS PERITONITIS OVER A DECADE

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Peritonitis is the most important complication of peritoneal dialysis (PD), associating high morbidity, mortality and transfer to hemodialysis. Some studies have described changes in the epidemiology of infectious agents over time. The aim of this study was to examine the microbiological profile in our Unit to determine the best therapeutic approach.

We studied all peritonitis episodes in a ten-year period (01/01/2001-12/31/2010). Our antibiotic protocol consists of Vancomycin and Ceftazidime.

A total of 667 patients were on PD within that period. 412 episodes were recorded in 217 patients (91.7% on CAPD and 8.3% on APD).

Peritonitis rate was 0.68 episodes/patient/year. The microbiological agents isolated in effluents are shown in the figure.

The percentage of gram-positive cultures was stable while gram-negative increased (60.7/27.9% in 2001 to 63/11.1% in 2010 respectively). We observed a decrease in negative cultures (17/27.9% in 2001 and 3/1.1% in 2010). Within gram-positive, St. Aureus decreased (31.6% to 11.1%) being methicillin-resistant scarce (5). The incidence of E. Coli increased in gram-negative group (4.9% to 14.8%).

In conclusion, the incidence of peritonitis and gram-negative agents did not change within the period, with a decrease in negative and gram-positive cultures. There were more E. Coli and less St. Aureus peritonitis. These changes did not result in loss of sensitivity to antibiotics empirically used in our center.

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BETTER TECHNIQUE SURVIVAL WITH AN ALTERNATIVE TREATMENT STRATEGY OF PD RELATED PERITONITIS

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Introduction

The ISPD PD-related infections recommendations suggest (considering) catheter removal in refractory, relapsing and enteric peritonitis. We compared the outcomes of all PD-related peritonitis episodes treated with different treatment strategies in two university hospitals between 1998 and 2008.

Methods

Hospital 1: initial treatment with intraperitoneal (i.p.) rifampicin and gentamicin, if need be adapted to culture results. The decision to remove the PD-catheter was guided by ISPD recommendations.

Hospital 2: (a) Patients < 50 yrs old: i.p. cephalotin; (b) Patients > 50 yrs considered at risk for enteral peritonitis (predisposing factor diverticulosis coli). Assuming that PD hinders omental sealing of (micro) perforations, PD was discontinued and meropenem (broad coverage of intestinal flora) given both intravenously and intracatheter. In cases of proven enteric peritonitis continued for 1 week, followed by restart of PD with 1 week i.p. meropenem. If cultures yielded non-enteral organisms, PD was resumed with appropriate i.p. antibiotics. Fungal peritonitis was treated with i.p. fluconazol, oral flucytosine and intracatheter amphotericin B. Enteral or fungal peritonitis were no indication for catheter removal.

Results

We recorded 323 peritonitis episodes in Hospital 1 and 251 in Hospital 2. Patient and peritonitis episode characteristics were similar. Fungal episodes occurred in 7.4% vs. 3.2%.

Antibiotic treatment alone resulted in cure in 79.9% of episodes in Hospital 1 vs. 92.8% in Hospital 2. The PD-catheter was removed in 16.7% vs. 2.4% of episodes. Recuperation after catheter removal occurred in 11.4% vs. 1.6%, with the patient returning to PD-treatment in 3.4% vs. 0.0%, permanently switching to HD in 8.0% vs. 1.6% of episodes. Technique survival thus was 83.3% vs. 92.8% (OR 2.60; 95%CI 1.48-4.56).

Respectively in 5.0% and 0.8% of episodes patients died despite catheter removal and in 3.7% vs. 4.8% with catheter in place. Patient survival thus was 91.3% vs. 94.4% (OR 1.61; 95%CI 0.83-3.10).

Conclusion

A peritonitis treatment strategy with interrupting PD, intravenous and intracatheter meropenem, tailored to patient age and causative microorganism and particular fungal peritonitis treatment resulted in better PD-technique survival than a strategy consisting of intraperitoneal antibiotics and catheter removal according to ISPD-recommendations.
P-143

DOES ANIMAL HUSBANDRY AND PET KEEPING MEAN A RISK OF PD PERITONITIS?

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Background

Most serious complication of PD treatment is peritonitis. Standard antibiotic regimes are usually effective but if infection does not respond, unusual pathogen opportunity arises. Possible role of companion animals, animal-involved occupations is implicated.

Method

PD peritonitis cases occurring December 2008 - June 2010 analyzed in 18 dialysis centres.

Results

In this period, patient number increased from 375 to 468, with 294 peritonitis episodes, meaning a 1 case / 22 patient monthly rate. 125 male, 169 female patients were affected, 40 males and 45 females above 71 years. There were 37 reoccurrences. 282 patients recovered, 32 had to convert to HD, 12 died. In 38 cases, the catheter had to be temporarily removed and than replaced.

No pathogen directly connectable to companion animals was cultivated, although 19 of peritonitis patients keep farm animals: half keeping cattle, pigs, sheep, goats, rabbits and poultry, the rest keeping “only” poultry, rabbits. 71 people have pet birds, cats and dogs, almost half of them in the flat. In 43 cases, although with specific clinical symptoms, the result of breeding was negative with used methods, so we could not justify the possible pathogenic role of animals.

Conclusion

Peritonitis rate and course of disease did not show difference between patients with or without animal contact. In certain cases special breeding procedures are applicable. Otherwise human bacterial flora gives the highest risk in peritonitis. Considering our results, major factor remains prevention by insisting on particular hygienic measures for animal owner PD patients.

P-144

STERILE PERITONITIS IN PATIENTS USING BAXTER SOLUTIONS

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Introduction

Suspicion about solutions for peritoneal dialysis (PD) produced by the Baxter Company as a cause of sterile peritonitis was raised in report in Peritoneal Dialysis International 2011, Vol 31(1), pp 90-102. We describe the occurrence of sterile peritonitis due to Baxter PD solutions.

On 10 December 2010, we received an announcement by the Agmar Company, a distributer of PD supplies in Croatia, and the Croatian Agency for Drugs and Medicinal Products (HALMED) about possible presence of endotoxins in Baxter PD solutions.

Methods

End of year 2010, 39 PD patients were treated at our Unit; 23 on Baxter solutions (13 on Dianeal, 9 Extraneal, and one on Nutrineal). The patients were invited to participate in the study on 14 and 16 December 2010. Regarding medical history, none of them had clinical signs of peritonitis. At admission, dialysates were drained into empty Baxter dialysate bags. Leukocyte count, and cultures for bacteria, fungi, and yeast was performed. Baxter transfer set was changed to Fresenius CAPD program. In the first effluent of Fresenius solution, leukocyte count in the dialysate, and cultures were determined. The patients on Baxter APD continued with this type if were on 5 liter solution, while those who were on 2 liter changed to 5 liter solution.

Results

5/23 patients (4 on Dianeal and 1 on Extraneal) had elevated leukocyte count in the dialysate (0.7-2.5 x10E9/L). Two of them were given a single IP antibiotic dose (cephuroxime). No antibiotic was administered to other patients under the assumption that sterile peritonitis is present, which was confirmed in all by negative cultures.

Discussion

Considering the results, we decided to temporarily switch the patients on CAPD from Baxter to Fresenius dialysates, and to retain Baxter dialysates in APD treated patients receiving 5 liter solutions.
P-145
WHAT DO OUR PERITONEAL DIALYSIS PATIENTS KNOW ABOUT THE PREVENTABILITY OF THE PERITONITIS?
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Introduction
The most serious complication of the peritoneal dialysis is the peritonitis. It is very important that the knowledge and readiness of the patient should enable him/her to prevent this complication. However, the knowledge sinks into oblivion with the passing of the time; thus the risk of the peritonitis increases.

Goal of the Examination
Surveying the theoretical and practical knowledge of our patients treated presently with PD in relation with the prevention of the peritonitis.

Patients and Method
Between 2000 and 2010 we treated 135 patients with PD, among them 60 patients had peritonitis in totally 119 cases. The peritonitis rate was 27.7 patient-months. Presently, we treat 54 patients.

Results
- 90% of the patients knew the symptoms of the peritonitis correctly – However, only 31 % mentioned that the turbid solution must be put aside.
- 80% of the patients described the symptoms of the exit site (ES) infection correctly.
- 63% of the patients knew well the possibilities of the prevention of the infections.
- During the practical tasks, everybody put up the nasal oral mask correctly – but the mask “slipped down” until the end of the demonstration at 40% of the patients.
- At the solution exchange, 88% of them performed the connection of the Y connector and the transfer set correctly.
- In the practice, the ES care was impeccable at 90% of the patients.
- In case of the occurrence of the connection accidents, only 44% of them told the steps to be followed without mistake.

Discussion
The survey demonstrated that the knowledge of our patients became wanting with the passing of the time; consequently, the regularly performed re-training is indispensable.

P-146
VASCULAR ENDOTHELIAL GROWTH FACTOR LEVELS IN PERITONEAL DIALYSIS PATIENTS
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Introduction
Vascular endothelial growth factor (VEGF) the prototypical cytokine associated with angiogenesis in many disease processes throughout the body.

Aim of the Study
The aim of the study was to investigate the serum and peritoneal effluent concentrations of VEGF in a group of patients (pts) on chronic PD treatment.

Methods
We examined 39 pts mean age 54 years, 27 male and 12 female, affected by different leadind disease. All of the pts were on chronic continuous ambulatory peritoneal dialysis (CAPD) with conventional dialysis solution. Fasting blood samples taken for analyses of VEGF were centrifugated at 4°C at 1000g for 15-30 minutes and frozen at -70°C. VEGF was measured in citrated plasma using ELISA kits.
Peritoneal effluent was collected from a timed overnight (8 hours) dwell using a 1,36% glucose solution. Approximately 20 ml of overnight drain fluid was collected for storage at -70°C. The samples were filtered prior to assay.
Quality of dialysis was assessed calculating total weekly creatinine clearance, Kt/V and residual renal function according to international guidelines. The peritoneal equilibration test (PET) was performed according to the method described by Twardowsky.

Results
The pts performed adequate dialysis. VEGF concentration in serum was 188,5±69,4 ng/ml. VEGF concentration in dialysate effluent was 30,5±16,7 ng/ml. There were no correlations between concentration of VEGF in serum and in dialysate effluent and age, gender, leading cause of renal failure, duration of dialysis treatment and quality dialysis markers.

Discussion
Significant variability was seen in PD effluent concentration of VEGF and low concentrations of VEGF in PD effluent were found in our patients. Prospective studies on higher number of pts are needed to assess the role of VEGF in chronic peritoneal dialysis treatment and to define factors influencing its concentration in serum and effluent on chronic PD treatment.
A NEW WAY OF CONCEIVING CAPD. PRELIMINARY RESULTS
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CH Jacques Lacarin, Vichy, France
The objective of an adequate CAPD treatment is to achieve both small and middle molecules clearance as well as optimal ultrafiltration (UF) and salt extraction. Hypertonic exchanges are usually used for UF generation during a same dwell duration. UF obtained with hypertonic solutions have a metabolic cost with concerns regarding glucose reabsorption and bioincompatibility. We propose to dissociate molecules clearance and ultrafiltration steps by modulating dwell time and infusion volume by shortening the high glucose concentration dwell duration.
We compared the achieved UF and the metabolic consequences of the use of a short 30 min high glucose concentration (2.27% or 3.86%) solution in 2 period study in five patients (3 men, 2 women, mean age: 69.0 ± 7.3, D/Pcreatinine averaged was 0.61 to 0.72, mean BMI : 25.2 ± 2.9 kg/m²), followed by one 2 liters exchange using a 1.36 % solution for 4 hours. Each patient was his own control.

Results

<table>
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<tr>
<th></th>
<th>Study 1</th>
<th>Study 2</th>
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<tbody>
<tr>
<td></td>
<td>G 2.27 %</td>
<td>G 1.36 %</td>
</tr>
<tr>
<td>30 min</td>
<td>250 ± 212</td>
<td>387 ± 217</td>
</tr>
<tr>
<td>UF (ml)</td>
<td>30 min</td>
<td>4 h</td>
</tr>
<tr>
<td>Na</td>
<td>25.5 ± 3.38</td>
<td>39.7 ± 4.75</td>
</tr>
<tr>
<td>removed (mmol)</td>
<td>3.45 ± 3.09</td>
<td>20.8 ± 3.68</td>
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<tr>
<td>G</td>
<td>9.7 ± 3.39</td>
<td>21.8 ± 3.68</td>
</tr>
<tr>
<td>absorption (mmol)</td>
<td>20 ± 2.01</td>
<td>21.8 ± 3.68</td>
</tr>
<tr>
<td>UF/G</td>
<td>25.8</td>
<td>17.7</td>
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<td>absorption</td>
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UF can be achieved using one liter of a 2.27% glucose solution with a low metabolic cost.
We propose to dissociate molecules clearances and ultrafiltration processes in CAPD. Further studies including a larger number of patients would be required.

PROGESS IN PERITONEOFILTRATION (PF) - THE NEW RENAL REPLACEMENT TECHNIQUE
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Introduction
Comparative to HD and PD, PF does not use glucose solutions and reduces mesentheric sclerosis; it is a „closed” procedure in which peritoneal capillars replaces glomerulus: by increasing the pressure in the portal system we obtain – daily, permanent and continuous – an artificial ascites which is eliminated through the bladder. In 2010 we registered the technique; now we are able to reveal some results of the first experimental studies.
Method
We studied a group of 12 patients with uremia and ascites of different causes (congestive heart failure, nephrotic syndrome); patients with hepatic diseases were excluded. Paracentesis was performed, withdrawing 1.5 – 2L of peritoneal fluid which was biochemicaly analised. We initiated PD in all patients, analysing the peritoneal fluid after 1 month, using PET technique.
Results
Medium values in the group, for natural ascites were: urea 302 mg%+-36, creatinine 11 mg%+-3,05, proteins 2,6g%+- 0,7, glucose 69 mg%+-11, uric acid 6,3mg%+- 1,4. The values for serum concentrations in the same day: urea 312 mg%+-43, creatinine 11,2+-1,8, glucose 98mg%+-20, proteins 6,2g%+-1,7, uric acid 6,8mg%+-2,4.
Values at 1 month of PD (PET) – in the peritoneal fluid: urea 64 mg%+-21, creatinine 2,2 mg%+-1,4, glucose 44 mg%+-16, proteins 58 mg%+-18; serum concentrations: urea 137 mg%+-45, creatinine 7,35+-1,9, glucose 99mg%+-19.
Conclusions
PF removes more urea and creatinine than PD, with the possibility to adjust the quantity by raising the volume of „peritoneal urine”; proteins are lost in the same quantity as in PD. D/P creatinine in PF is 1.
Other estimated advantages of PF:
- Cost – lower than 10% of the PD costs.
- Risc of infections – near to zero.
- Minimal hemodinamic oscilations.
- Reduced risk of cardiac insufficiency.
P-149  
**PERITONEAL FLUID TRANSPORT, PERITONEAL EQUILIBRATION TEST, AND BODY COMPOSITION**

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**Introduction**

Monitoring of the effectiveness of fluid removal is crucial for peritoneal dialysis. The goal of this study was to check whether the parameters of peritoneal fluid transport [osmotic conductance (OsmCond), ultrafiltration efficiency (UFE), and peritoneal fluid absorption rate (PA)] are related to the peritoneal equilibration test (PET) data and body composition.

**Methods**

A PET test with glucose 2.27% and daily dialysate collections with three different combinations of dialysis fluid were carried out in 99 CAPD patients. Each patient performed three separate 24 hour collections with three daily exchanges of glucose 1.36% each time and one night exchange of either: 1) glucose 1.36%, 2) glucose 2.27%, and 3) glucose 3.86%. The infused volumes and dwell times were according to individual prescriptions, except for the 8 hour night exchange in all patients. The bioimpedance measurements were performed in each patient. OsmCond, UFE, and PA were calculated from the linear regression between net ultrafiltration (net UF) and average glucose gradient or glucose absorbed, respectively, in three 24 hour collections.

**Results**

No correlation was found between PET D/P for creatinine at 240 minutes and the fluid transport parameters (UFE, OsmCond, PA). The only correlation found for glucose PET D/D0 was with PA (r=-0.35). No correlation between PET UF and the fluid transport parameters was found. The fluid transport parameters correlated with total body water, (r from 0.22 to 0.40), but not with fat mass and body mass index. UFE and PA correlated with body surface area, with r=0.23 and r=0.27, respectively. OsmCond correlated with UFE (r=0.59), and both parameters (OsmCond and UFE) correlated with PA (r=0.52 and r=0.89, respectively).

**Conclusion**

This study shows that the fluid transport parameters are related to body composition and independent of peritoneal transport status as characterized by PET.

P-150  
**LOW UREA KT/V AS A PREDICTOR FOR SURVIVAL OF PERITONEAL DIALYSIS**

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**Introduction**

Urea Kt/V lower than 1.7 in patients on peritoneal dialysis (CAPD) can be marker for high risk of patients mortality, morbidity and technique survival. Aim of the study was to investigate impact of low urea Kt/V on technique survival in patients on CAPD.

**Methods**

We analyzed 82 peritoneal equilibrium tests in 48 patients on peritoneal dialysis. For calculation of urea Kt/V, volume of water was calculated using Watson and Hume formula; Kt/V per week= peritoneal Kt/V + renal Kt/V. Urea concentration was analyzed using Beckman Coulter analyzer. A standardized PET test was performed in all patients, 4-6 weeks after initiation of regular PD. This was retrospective single center study. Survival of CAPD was analyzed with Kaplan-Meier method. p <0.05 was used as a level of statistical significance.

**Results**

37 males and 11 women were included in the study. There was no statistical difference in total body water calculated with Watson and Hume formula between male and females (P=0.714). 55% of patients were still on CAPD after 4.1 year of the beginning. In groups with urea Kt/V more than 1.7 and lower than 1.7 there was no statistical difference in method survival (p=0.436). According to the Peritoneal Equilibration Test (PET) 10.1% patients belong to low transporter, 44.3% low average, 39.2% high average and 6.3% patients had high peritoneal transport status category.

**Conclusion**

High percentage of patients that survived on CAPD for more than 4 years, with urea Kt/V lower than 1.7 suggest that close surveillance of patients is main predictor of method survival. Urea Kt/V is only one of the parameters that must be taken in account in the evaluation of a prognosis for CAPD survival.
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EFFECTS OF PERITONITIS IN A PERITONEAL DIALYSIS PROGRAM ON PERITONEAL TRANSPORT

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Introduction
What degree peritonitis modifies the permeability of the peritoneum.

Methods
Had a look at data for 135 patients treated between 2000 and 2010. PET is carried out for all patients every 6 months (earlier after peritonitis). There were 10 peoples whose PET results constantly changed and they could therefore not be included in this analysis, as was the case with others who were left out for other reasons (exitus, transfer to HD, transplantation).

Results
There were 122 cases of peritonitis in 61 patients. Our peritonitis rate was 1/28 patient months. Data for only 38 of the 61 could be analysed. The 38 patients accounted for 80 cases of peritonitis. 4 weeks after peritonitis, temporary PET changes were in 29 cases, after 6 months the original membrane function was restored with a 3 exception. 50 patients without peritonitis was analysed: 47 produced similar PET results.

Discussion
The frequency of peritonitis wasn’t influence the permeability of peritoneum permanently, but temporarily.

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ARE MATRIX METALLOPROTEINASE-2 AND PLASMINOGEN ACTIVATOR INHIBITOR-1 DETERMINED BY PERITONEAL TRANSPORT OR LOCAL PRODUCTION?

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Introduction
Solute transport in peritoneal dialysis occurs from the peritoneal microcirculation to the peritoneal cavity and visa versa by diffusion and by hydrostatic and osmotic pressure gradients. The peritoneal effluent contains clinical relevant substances derived from intra- or transperitoneal transport or both. Matrix metalloproteinase-2 (MMP-2) is a glycoproteinase that cleaves denatured collagen, and complement other collagenases in the degradation of fibrillair collagens. Elevated intraperitoneal levels of plasminogen activator inhibitor-1 (PAI-1) have been demonstrated to be present in patients with intra-abdominal adhesions. Therefore, the aim of this study was to investigate the potential use of MMP-2 and PAI-1 in effluent as markers in the development of peritoneal alterations.

Methods
For this purpose the roles of peritoneal transport and local peritoneal production of these parameters was studied. This single centre cohort study included 86 incident PD patients. All patients were treated with biocompatible dialysis solutions and underwent a standard peritoneal permeability analysis (SPA). The presence of local production as well as correlations between MMP-2, PAI-1 and peritoneal transport parameters were studied.

Results
Effluent levels of MMP-2 ranged from 0-77.6ng/mL and from 0-12ng/mL for PAI-1. Median values attributed to local production of 23.9ng/mL for MMP-2 and 1.0ng/mL for PAI-1 were found. Also, when expressed as ratio, D/PmMMP-2 or D/PaPAI-1 over D/PAlbumin exceeded 1 and therefore local production could be established. Furthermore, correlations between MTACcreatinine and MMP-2 (r=0.36, p<0.001) or PAI-1 (r=0.43, p<0.001) were present.

Conclusions
In conclusion this study demonstrates that MMP-2 and PAI-1 pass the peritoneal membrane via peritoneal transport. Additionally, the presence of local production was established. This data illustrates the potential of MMP-2 and PAI-1 as biomarkers of peritoneal modifications, but the components of peritoneal solute transport and local production should be clearly separated in every patient.
P-153
ASSESSMENT OF DIALYSIS EFFICIENCY IN PERITONEAL DIALYSIS USING BIOIMPEDANCE SPECTROCTROSCOPY FOR VOLUME MEASUREMENT
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Introduction
Dialysis efficiency in peritoneal dialysis (PD) is assessed by weekly Kt/V. K and t are objective factors whereas V is usually calculated by mathematical estimation. In this study, we use bioimpedance spectroscopy (BIS) to determine our patients’ body volume in aim to compare the differences in dialysis efficiency using Watson equation or BIS for Kt/V calculation.

Methods
39 patients on PD: 24 men (61.5%), 15 women (38.5%). Mean age 59±17.8 years (24-79). CAPD: 29 patients, APD: 10 patients. Through blood, urine and peritoneal effluent tests we calculated weekly Kt. Finally, we calculated weekly Kt/V using as volume the result obtained both by bioimpedance (Kt/Vbis) and by Watson formula (Kt/Vw). Kt/V goal ≥1.7. We used t-Student test for statistical analysis.

Results
Mean Vbis: 34.7±5.9 litres (24.6-48.2). Mean Vw: 37.3±5.4 litres (28.3-50.8) (p<0.0001). Mean Kt/Vbis: 2.42±0.78 (1.49-4.95). Mean Kt/Vw: 2.23±0.67 (1.48-4.01) (p<0.0001).

Patients within adequacy rate: 89.7% (35 patients) when considering Kt/Vbis, 79.5% (31 patients) according to Kt/Vw.

Patients with a change in the status of dialysis adequacy: 15.4% (6 patients). 12.8% (5 patients) were not well-dialyzed according to Kt/Vw and adequately dialyzed as KtV/bis. In 1 patient occurred otherwise.

Discussion
In PD patients, the use of BIS to calculate volume avoids the overestimation that occurs when we use anthropometric formulas. With the use of bioimpedance, we get a measure of dialysis efficiency (calculated with Kt/V) more objective, avoiding the underestimation inherent in using mathematical estimation of the volume.

According to the guidelines for PD adequacy, the use of Kt/V calculated with bioimpedance compared with traditional Kt/V represents a change in “not well/well dialyzed” status in a significant percentage of patients.

The use of BIS is a safe, objective, cheap and applicable way to assess the volume in PD patients.

P-154
EFFICACY OF VARIOUS ESTIMATED CREATININE CLEARANCE METHODS IN COMPARISON WITH MEASURED GFR (TC99M DTPA CLEARANCE) IN INDIAN POPULATION
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Introduction
The aim of this study was to compare measured glomerular filtration rate (GFR) with estimates of GFR derived from various estimated creatinine clearance methods of Jelliffe, Cockcroft and Gault, and 4MDRD equations in Indian population.

Methods
We enrolled 80 patients in the study. GFR was determined by technetium-99m diethyl triamine penta-acetic acid (Tc99mDTPA) clearance. Height, body weight and serum creatinine were measured, and GFR and creatinine clearance (CrCl) estimates calculated by various equations. Speraremans correlation was used to assess relationships between measured GFR (Tc99mDTPA clearance) and estimated clearances using the three formulae. Difference between the measured GFR and estimated clearances compared with measured GFR were examined to determine whether prediction error was independent from measurement magnitude. Analyses of differences were used to determine bias and precision. Bias was assessed by mean percentage error (MPE), calculated as the percentage difference between the estimated clearances for each formula and measured GFR. A positive bias indicates overestimation of GFR, and a negative bias indicates underestimation. Relationships were also assessed by gender and varying levels of renal function: GFR <60 ml / min, and GFR >60 ml/ min.

Results
The mean measured GFR was 77.2 ml / min (range 17 to 152 ml / min). The mean bias (mean percentage error) was -4.9, -10.3 and -1.57% respectively for the, Jelliffe, Cockcroft and Gault, and 4MDRD formulas, respectively. The 4 MDRD formula overestimates the GFR in patients having GFR less than 60ml/ min, where as underestimates for GFR more than 60ml / min.

Conclusions
4 MDRD equation seems to be best for estimating GFR in Indian population.
Keywords: Estimated creatinine clearance, measured GFR, Tc99mDTPA clearance.
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ATORVASTATIN REDUCES HIGH GLUCOSE TOXICITY IN RAT PERITONEAL MESOTHELIAL CELLS

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Introduction
Continuous exposure of the peritoneal membrane to high glucose dialysis solutions can produce functional alterations in this membrane. We studied the toxic effects of high glucose (50 mmol/L and 83 mmol/L) and its reversal by atorvastatin (0.5 – 5 µmol/L) on cultures of rat peritoneal mesothelial cells (PMCs).

Methods
Rat PMCs were harvested from the peritonea of male Sprague–Dawley rats and grown in M199 medium supplemented with 10% fetal bovine serum. The effects of high glucose (50 mmol/L and 83 mmol/L) on levels of reactive oxygen species (ROS), on caspase 3 activity, and on phospho-p38 mitogen-activated protein kinase (MAPK) in the cultures were evaluated.

Results
Exposure to high glucose (for 4, 8, and 24 hours) increased intracellular levels of ROS and phospho-p38 MAPK (indices of cellular toxicity). Atorvastatin blocked these toxic effects of high glucose, being more effective against 50 mmol/L glucose (protective effects were observed above 0.5 µmol/L) than against 83 mmol/L (protective effects were observed above 2.5 µmol/L). Atorvastatin was also able to prevent glucose-induced increase in caspase 3 activity.

Discussion
The present study shows that high glucose may promote oxidative stress and may activate apoptotic pathways in rat PMCs. These toxic effects could be reversed by atorvastatin.

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UNDERSTANDING THE VARIABILITY IN ULTRAFILTRATION OBTAINED WITH ICODEXTRIN – FROM THEORY TO BEDSIDE

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Background
There is considerable between patient variability in ultrafiltration (UF) obtained with icodextrin (ICO) that is not fully understood. The 3-pore model suggests that both hydrostatic and oncotic pressure differences as well as membrane characteristics need to be considered. The study was to elucidate clinical predictors of the variability in UF.

Methods
Net UF obtained during ICO dwell was recorded as well as membrane characteristics and clinical factors every 6 monthly. Multi-level analysis was used to identify the predictor of UF taking account of within subject correlations.

Results
690 dwells in 202 patients were analysed, among which 280 were CAPD (typically 9 hours overnight), 289 APD long day exchanges (typically 15 hours), and 126 in APD patients using an additional day-time exchange (typically 9 hours day time). In multi-level mixed linear modelling, on CAPD predicted 160mls more UF compared with APD, no matter 9 hours or 15 hours. High input volume (2.5L) was related to an 111mls less UF compared with 2L. The UF negatively correlated to time on PD therapy and serum albumin. D/P creatinine, UF capacity (UF in PET) and BMI were positively contributed to UF.

Discussion
These observations confirm the impact of membrane characteristics on UF that high transport status and better UF capacity indicate more UF and prolonged time on PD decreases UF. They also clarify that factors which are likely to affect the oncotic pressure gradient (plasma albumin) and hydrostatic pressure gradient (input volume, patient position, BMI and gender) are more important than the dwell length in explaining UF variability. These observations have clear implications for dialysis prescription.
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THE POTENTIAL ROLE OF IMMUNOLOGICAL FACTORS IN THE COURSE OF CONTINUOUS AMBULATORY PERITONEAL DIALYSIS

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Introduction
The immune mechanisms of peritoneal membrane dysfunction during continuous ambulatory peritoneal dialysis (CAPD) treatment are still poorly investigated.

Methods
The immunological status of 6 CAPD patients with end stage of renal disease (ESRD) was investigated. 2 of 6 CAPD patients had developed bacterial peritonitis. The duration of CAPD treatment varied from 3 days to 3.8 years. Lymphocytes subsets were determined among peripheral blood mononuclear cells and peritoneal cells obtained from the overnight dialysis effluents using flow cytometry analysis (FC500, «Beckman Coulter»).

Results
The strong correlation between peripheral blood CD4+, CD8+, gdT-cells as well as B1-cells (CD19+CD5+) numbers with the same one’s in peritoneal effluent of CAPD patients (R=0.6-0.9, p<0.01) was established. The higher CD4:CD8 T-cells ratio in peripheral blood and peritoneal effluent was detected in patients with longer CAPD treatment (p<0.05). During episodes of bacterial peritonitis CD4:CD8 T-cells ratio significantly elevated in peripheral blood up to 5.7 (2.0 – 9.4) and in peritoneal effluent up to 2.7 (1.5 – 3.8). In patients with chronic glomerulonephritis and polycystic renal disease gdT-cells number was higher in peritoneum than peripheral blood, while in patients with diabetes mellitus and arterial hypertension gdT-cells distribution varied. During episodes of bacterial peritonitis the percent of gdT-cells and B1-cells significantly decreased in peritoneal effluent in 5.8 (4.3 – 7.3) and 2.5 (1.8 – 3.2) times, respectively, characterized cells’ redistribution and immune response generalization. At the same time in CAPD patients glomerular filtration rate depended on peripheral blood gdT-cells (R=0.81, p<0.04) as well as peritoneal gdT-cells (R=0.92, p<0.007) and B1-cells (R=0.94, p<0.05) numbers demonstrated their influence on residual renal function.

Conclusion
Both conventional and unconventional lymphocytes subsets involve in immune response during developed peritonitis in CAPD patients as well as course of treatment what favor to work out early immunological criteria of peritoneal dialysis nonadequacy possible formation.

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MEAN PLATELET VOLUME IN PERITONEAL DIALYSIS IS ASSOCIATED TO PERITONEAL MEMBRANE FUNCTION

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Introduction
Mean platelet volume (MPV) is gaining recently scientific interest with regard to cardiovascular risk stratification. Patients with high values of MPV are prone to arterial and venous thromboses like myocardial infarction. On the other hand, MPV decreases as glomerular filtration rate falls below 70 ml/min. MPV might be of interest in peritoneal dialysis (PD) as the distribution and integrity of vessels in the abdominal space determines its function.

Aim
The aim of the study was to evaluate the possible association between MPV values and peritoneal membrane or PD function.

Materials and Methods
In 47 PD patients (median age 65 years) MPV was measured together with anthropometric patient data (age, weight, height), peritoneal membrane and PD function during the first peritoneal equilibration test (standard 4 hour test with glucose 2.27% bags) after PD start. Evaluated markers were weekly creatinine clearance, BUN clearance and Kt/V (renal, peritoneal, total) and D/P creatinine. All patients had a residual diuresis of at least 100ml per day. MPV was determined with a fully-automated haematological analyser. Multiple step forward regression analysis with MPV as dependent variable was performed.

Results
Weekly total creatinine clearance was in median 78 ml/min (renal 47 ml/min, peritoneal 30ml/min), total weekly BUN clearance in median 73 ml/min (renal 25 ml/min, peritoneal 46 ml/min) and Kt/V in median 1.90 (renal 0.72, peritoneal 1.23). Neither anthropometric patient data, nor creatinine clearance, nor BUN clearance, nor Kt/V (renal, peritoneal and total) were associated to MPV. D/P creatinine (at 120 or 240 minutes) remained the only significant variable in the multiple step forward regression analysis (beta 0.43, p=0.015). Slow transporters had significantly lower MPV than average transporters (mean MPV: slow transporters 7.3 fl, average transporters 8.2 fl, p=0.03).

Conclusions
Peritoneal membrane function might reflect differences in MPV, already at the start of PD therapy.
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