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FROM THE EDITORIAL OFFICE

Dear All,

In this issue, we are delighted to have Dr. Somchai Yongsiri from Thailand to share the experience of managing hypokalemia in PD patients. In addition, Dr. DJ Campbell from Australia will discuss the problem of implementing antibiotic prophylaxis, while Dr. CY Su from China will describe how payment scheme affects the outcome of PD patients.

The 16th ISPD Congress will be held in the coming February. We look forward to seeing you at Melbourne, Australia !

Sincerely,
Dr. Cheuk-Chun SZETO
Editor, Asia-Pacific Chapter Newsletter
E-mail: ccszeto@cuhk.edu.hk

Erratum
Tht title of the paper by Dr Konstadina Griva in the August 2015 issue should be "**Health Related Quality of Life in Peritoneal Dialysis – recent evidence and future directions**". We are deeply sorry for the mistake.

Hypokalemia in Peritoneal Dialysis Patients

Somchai Yongsiri[1], Jiranuch Thammakumpee[2], Raweewan Witoon[1]

[1]Facutly of Medicine, Burapha University, Chonburi, Thailand
[2]Internal Medicine Department, Chonburi Hospital, Thailand

Correspondence and reprint requests:
Dr. Somchai Yongsiri
E-Mail: syongsiri@yahoo.com

The incidence of hypokalemia in peritoneal dialysis (PD) patients, defined by a serum potassium of less than 3.5 mEq/l or required potassium supplements to maintain normal serum potassium is about 15-58 percent (1). This condition is seen more frequently in Asian population, a study of 266 PD patients during 3 consecutive clinic visit in Hong Kong reported incidence of 22.2% and related to poor patient outcome (2). Cause of hypokalemia in PD patients is not well understood and supposed to be multifactorial in origin. Proposed hypothesis includes poor oral intake, malnutrition, increased colonic potassium excretion, transcellular shift from high dialysate glucose concentration stimulate insulin release causing potassium influx into intracellular compartment (3), and dialysate or urinary potassium loss (4). It has several clinical consequences include fatigue, malnutrition, decreased quality of life, peritonitis (especially gram negative bacteria), and even increase risk of death (2,5). Treatment of hypokalemia can theoretically improve these consequences but still lack of evident. In our institution, the point prevalence of hypokalemia in PD patients is 29 percent and 7 percent of them are still hypokalemic despite oral potassium supplementation. Our previous studies did not find significant association between serum potassium concentration and body composition (as measured by multifrequency bioimpedance analysis), dialysate glucose exposure, or quality of life (6). Mean dose of oral potassium supplementation in our patients is 35.71+/-13.71 mmol per day.

Currently, there was no standard treatment recommendation for this condition. It is generally recommended to increase oral potassium intake (e.g. fruits, vegetables, and meat) and/or oral potassium supplementation with potassium chloride (7). But the use of oral potassium chloride is usually limited by G.I. side effects and it is poorly tolerated. Intra-peritoneal administration by means of adding potassium into dialysate solution (20 mmol/L) significantly improve serum potassium but it is not widely used since it may cause peritoneal irritation especially if use with high concentration (>40 mmol/L) (8). Daily use of Icodextrin demonstrated an improvement in nutritional status but it did not significantly improve serum potassium (3). The use of ACEI/ARB could temporarily increase serum potassium but this effect was not sustained. Several studies using ACEI/ARB had failed to improve serum potassium in these patients (9,10). Our recent study demonstrated that the use of spironolactone 25 mg/day in PD patients with history of hypokalemia for 4 weeks did not significantly increase serum potassium nor decrease the need for potassium supplement, and both urinary and peritoneal potassium excretion rate was not affected (11). A recent study by the Nagoya Spiro Study group examined the same dose of spironolactone in 78 normokalemic PD patients versus 80 controls for 2 years. They found a significantly higher serum potassium at 6 and 12 months without significant side effect (12). Further study is needed to determine risk factors, pathophysiology, impact of treatment on patient outcome, and treatment strategies for hypokalemia in PD patients. Study on higher dose and longer period of spironolactone (or other mineralocorticoid receptor antagonist) treatment should also be conducted to determine whether hypokalemia in CAPD patients can be corrected by this drug or not.

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Assessment of Current Practice and Barriers to Antimicrobial Prophylaxis in Peritoneal Dialysis Patients

Denise J. Campbell [1,2], Jonathan C. Craig [1,2], David W. Johnson [3], David W. Mudge [3]

[1]Centre for Kidney Research, Sydney Children's Hospital Network (Westmead), Westmead, NSW, Australia; [2]School of Public Health, University of Sydney, Sydney, NSW, Australia; and [3]University of Queensland at Princess Alexandra Hospital, Brisbane, QLD, Australia

Correspondence to:
Denise J. Campbell; E-mail: denise.campbell@health.nsw.gov.au

Peritoneal dialysis (PD) is an accepted form of renal replacement therapy among Australians and New Zealanders with end-stage kidney disease. More than 20% of all prevalent dialysis patients receive PD (1). However, PD technique survival in Australia and New Zealand is lower than in many other parts of the world, attributed to a higher incidence of peritonitis (2, 3). Clinical practice patterns are known to vary widely between centres in Australia and New Zealand and variations from clinical practice guidelines are known to contribute to poor infection outcomes (2). In 2008, over 30% of Australian and New Zealand PD units did not meet the ISPD minimum accepted peritonitis rate of one episode per 18 patient-months (0.67 episodes per patient-year) (2, 4-7). PD-related infections are also a key contributor to technique failure in PD patients in Australia and New Zealand with this being cited as the second and third most common cause of technique failure, respectively, in the 2012 ANZDATA registry report (6). The KHA-CARI Guidelines organisation established a prospective multicentre network study designed to assess the adherence to the KHA-CARI (published in 2004) (8) and ISPD guidelines (published in 2011) (9) targeting the prophylactic use of antibiotics at the time of Tenckhoff catheter insertion, the prophylactic use of antibiotics to prevent exit-site infection (ESI), and the prophylactic use of antifungals during courses of antibiotic therapy. Eight PD units took part in the study; 7 were located in Australia and 1 was located in New Zealand. We evaluated current practice at each unit, current exit-site infection (ESI) and peritonitis rates and identified perceived barriers and enablers to adherence to the relevant guideline recommendations. Data on PD-related infections were obtained from the ANZDATA registry for the period 1 January 2011 to 31 December 2011.

The 8 participating PD units treated a total of 582 PD patients, which comprise 28.1% of the total PD population in Australia and New Zealand (6). Two of the units were categorized as large (>107 patients), two were categorized as medium-large (57-107 patients), two were classified as medium (32-56 patients) and two units were classified as small (<32 patients). Comparison of the baseline demographic characteristics of patients in the individual units and the overall PD cohort found no significant differences between the PD units for sex, age, body mass index or diabetes mellitus. There were significant differences between PD units for race, number of patients per unit, duration per patient of treatment with PD and the numbers receiving ambulatory peritoneal dialysis (APD) or continuous ambulatory peritoneal dialysis (CAPD).

Assessment of current practice at each unit revealed wide variation in the current practices in place at each PD unit. All units had protocols in place for the administration of intravenous antibiotics to patients prior to catheter surgery. Seven of eight units had protocols for the routine prescription of antibiotic prophylaxis against ESI and five of eight units had protocols for the routine prescription of an antifungal agent during courses of antibiotics. We found that the clinical staff were generally aware of these clinical practice guideline recommendations but there was considerable variation in application of the recommendations in practice. An unexpected finding was that the definitions of PD-related infections used by some units varied from those recommended by the International Society for Peritoneal Dialysis (ISPD), particularly the definition for exit-site infection (ESI).
The data on current ESI and peritonitis rates also showed wide variation across the units. The peritonitis rates for the Australian units ranged from 0.31 to 0.86 episodes per patient-year while the New Zealand unit had a rate of 0.52 episodes per patient-year. These compare with median rates for all PD units in Australia in 2011 of 0.55 episodes per patient-year and a median rate of 0.62 episodes per patient-year for all New Zealand PD units (1). Most of the units in this study did not meet the ISPD minimum recommended standard of 0.36 episodes per patient-year. The ESI rates for the study units varied hugely from 0.06 to 0.53 episodes per patient-year. The variable definition of ESI in use by the units probably contributed to the wide range of reported ESI rates.

The perceived barriers to adherence to guideline recommendations were obtained from the completion of 'cause and effect' diagrams by the nephrologist and PD nurse at each unit. The Australian National Institute of Clinical Studies barrier tool was also used (10). Barriers at the organizational, medical staff and patient levels were identified. At the time of Tenckhoff catheter insertion, the most common barrier reported by medical staff was the nominated person forgetting to give an antibiotic at surgery whereas the most common organization-based barrier was the lack of a centralized patient database so that staff could not check whether or not the antibiotic had been administered. Fifty per cent of the units did not have a centralized patient database.
The most common barriers to ESI prophylaxis reported by medical staff were concern by infectious diseases staff that routine use of mupirocin would result in the development of antibiotic resistance, difficulty in gaining agreement on the routine use of mupirocin at the exit site at units with more nephrologists on staff, and insufficient staff to test and treat patients if nasal carriage of *Staphylococcus aureus* was to be routinely monitored. The most common organization-based barrier was when the unit had a blanket policy against the routine use of antibiotics at the exit site. Of the various patient-based barriers identified, the most common was distance from the PD unit and when the patient's first language was other than English.

The same process was used to identify barriers to adherence to the guideline recommendation on antifungal prophylaxis. The most common medical staff-based barriers included lack of awareness of junior doctors or of doctors outside the hospital system of the need to co-prescribe antifungal medication with an antibiotic course. The only organization-based barrier identified was the lack of a formal policy around the need for antifungal medication when an antibiotic course is prescribed to a PD patient. The most common patient-based barriers were the taste of the antifungal medication, the patient's lack of understanding of the importance of taking the medication, and the cost of the medication.

In summary, the perceived barriers included awareness of the relevant guideline recommendation and attitude to the guideline (healthcare providers); practical and cost impediments, knowledge and compliance issues (patients); and care processes, staffing and capacities (organization). Several factors were identified that may contribute to the high rates of ESI and peritonitis that occur in Australia

and New Zealand compared with accepted international standards. Nearly all of these factors are potentially modifiable through improved education, creation of a centralized patient database and routine checking of patient exit-site care and exchange technique. Having an understanding of the barriers to good clinical practice that exist within each organization is a key step in the process of improving PD-related infection outcomes (11).

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News from the ISPD

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Asia-Pacific Chapter Scholarship

This is a scholarship to support up to 3 months training in clinical PD for doctors and nurses from Asia-Pacific region. Deadline for application for each round: twice a year at 30 June or 31 December. **The next deadline is 30 December 2015.** Details and application procedures can be found under the Regional Chapters – Asia-Pacific Chapter, at the ISPD website.

Upcoming Meetings

16th Congress of International Society for Peritoneal Dialysis
27 February – 1 March 2016
Melbourne Convention and Exhibition Centre, Australia
Website: http://www.ispdmelbourne2016.com/
Early birth registration deadline: 4 December 2015

Influence of Different Payment Schemes on the Clinical Outcome in Peritoneal Dialysis Patients

Chun-Yan Su, Xin-Hong Lu, Tao Wang

Division of Nephrology, Peking University Third Hospital, Beijing, China

Correspondence to:
Chun-Yan Su
E-mail: scybmu@126.com

Cost is always a big issue for dialysis patients. Healthcare coverage is not universal in mainland China. There are several reimbursement systems or payment schemes, namely free medical service (FMS, mainly for government officials and employees), medical insurance system (MI, mainly for urban workers and citizens), and new rural cooperative medical scheme (NCMS) for farmers. In Beijing, in 2006 and 2007, FMS had the highest reimbursement rate, with 90% or even a higher percentage of the dialysis cost being supported under this payment system, while reimbursement was about 85% for the MI system, and 30%~50% for the NCMS. Besides, there were some patients at that time who did not have any insurance coverage. This financial limitation encourages us to provide 'fitted' dialysis doses to the individual dialysis patients instead of the adequate dialysis doses recommended by the international guidelines, which raises concerns on the potential suboptimal outcome for our patients. Therefore, in the present study, we analyzed the effect of different payment schemes on dialysis adequacy and clinical outcomes in our PD program.

This is a single center cohort study. A total of 175 patients who began dialysis from January 2006 to December 2007 were included. Baseline data, including volume status, dietary intake and nutrition status, dialysis adequacy, and sodium removal were collected at 6 months after peritoneal dialysis. Based on the different payment schemes, the patients were divided into 2 groups, higher payment group (GHP, 130 cases, with more than 85 percent reimbursement), and lower payment group (GLP, 45 cases, with less than 50 percent payment or totally self-paid). There were no significant differences in age and primary renal disease between the 2 groups, but the patients in the GLP group had more females, smaller body size, and lower diabetic prevalence than the GHP group. Patients were followed up until dropout or until December 31, 2013.

At baseline, patients in the two groups had nearly the same residual renal function. But the GLP group patients dialyzed at a lower dose (4,516.91 ± 1,768.20 ml vs 6,058.17 ± 2,013.43 ml, $p < 0.001$). They had lower creatinine clearance (51.64 ± 24.23 l/w vs 70.54 ± 30.27 l/w, $p < 0.001$) , sodium removal (2.23 ± 1.29g vs 2.77 ± 1.29g, $p = 0.027$), and fluid removal (970.33 ± 545.97 ml vs 1,146.66 ± 460.93 ml, $p = 0.038$). Normalized by height (in meters), the GLP group patients still had a lower normalized dialysis dose (2,890.61 ± 1084.44 ml/m vs 3,761.34 ± 1,237.10 ml/m, $p < 0.001$). Baseline nutritional and dietary parameters were comparable except that a lower daily protein intake (42.73 ± 10.99g vs 47.26 ± 14.30g, $p = 0.032$) and higher serum urea level (23.43 ± 6.88 mmol/l vs 19.84 ± 5.92 mmol/l, $p < 0.001$) were presented in the GLP group. There was no difference in volume status. There was no difference in blood pressure control and extracellular water (ECW)/intracellular water (ICW) (E/I) level. However, GLP patients had lower ECW (13.82 ± 3.66 vs 16.15 ± 3.95 L, $p < 0.001$) and lower normalized ECW by height (8.82 ± 1.97 vs 9.97 ± 2.15, $p = 0.001$ group) than GHP patients.

During the follow-up, there was no significant difference in dialysis duration (median 54.15 vs 58.88 months, Mann-Whitney U test, p = 0.703) and clinical outcome between the 2 groups. Seventeen GLP patients died (8 from cardiovascular and cerebrovascular events, 1 from peritonitis, 1 from withdrawing from dialysis for economic reason, and 7 from other causes), while 61 GHP cases died (30 from cardiovascular and cerebrovascular events, 5 from peritonitis, and 26 from other causes). Nine GLP patients transferred to HD (7 for peritonitis, 1 for catheter problems, and 1 for payment problems), while 13 GHP patients transferred to HD (8 for peritonitis, 2 for leakage, 2 for surgery, and 1 for inadequate dialysis). Kaplan-Meier analysis showed that there was no significant difference (log rank = 0.677, p = 0.411) and technique survival (log rank = 0.000, p = 0.994) during the follow-up. In multivariate Cox regression analysis, after adjusting for related factors, payment was again not a strong predictor of survival in the study population.

It is still unknown what dialysis dose is appropriate for our ESRD patients. Ideally, dialysis doses should be tailored to completely replace kidney filter function (optimal dialysis). However, a higher dialysis dose means a higher cost and is difficult to achieve for those patients with poor economic status. Thus, due to economical and practical restraints, a compromised way to provide adequate dialysis is usually practiced in clinics with Kt/V as a surrogate for dialysis adequacy. Unfortunately, it is still uncertain what the adequate Kt/V is for our PD patients (1). Based on ADEMEX and a series of other studies (2–7), several guidelines set a minimum target for small solute clearance of Kt/V urea at 1.70 (8,9), but the guidelines also mention that when these targets cannot be met targets should be balanced against potential side effects, the patient's lifestyle, and cost considerations. In our clinical practice, we tried to limit our patients' dietary protein intake to the level of 0.6~0.8 d/kg/d for those patients with limited peritoneal removal due to financial difficulties. The present study supports the feasibility of our approach.

However, even if low dialysis doses can satisfy solute clearance based on dietary control, volume control may still be a problem because of possible low ultrafiltration caused by fewer exchanges and long dwell time. Fortunately, our data indicated that GLP patients seemed to be adherent to salt and fluid restriction; they had similar volume status despite less fluid and sodium removal after 6 months on dialysis. It is thus possible that although cost itself works as a barrier to treatment adherence, cost saving may become a strong motivator of behavior change for the low SES patients.

In summary, our study found that CAPD patients on a lower payment scheme were adherent to lifestyle modifications with lower dialysis doses, and they also had nearly the same long-term clinical outcomes compared with patients on a high payment scheme. Thus lower dialysis doses combined with controlled dietary intake may be an effective approach to solve the dialysis problem for the low SES population in China.

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