FROM THE EDITOR

Investigating Hyponatremia, Exit-Site Management and Discharge Planning

Hyponatremia is both common and important, and is the subject of a recent European clinical practice guideline (1), although the guideline does not deal with patients on dialysis. It is classified as mild (serum sodium 130 – 135 mmol/L), moderate (125 – 129 mmol/L) and severe (< 125 mmol/L). The diagnostic approach is based on the evaluation of serum osmolality and volume status. In patients with intact renal function, serum sodium is maintained via the adjustment of extracellular water through regulation of thirst and urine volume by the action of vasopressin, but in dialysis patients, of course, this is disrupted. Instead, the management of extracellular volume is based on day-to-day assessment of volume status—a core challenge of dialysis management. Early in the diagnostic algorithm it is important to exclude hyperglycemia and other causes of non-hypotonic hyponatremia, which include the metabolites of icodextrin.

Two papers in this issue bring useful insights to the interpretation of hyponatremia in patients on peritoneal dialysis (PD). A paper from Toronto (Dimitriadis *et al.*) explores the relationship between hyponatremia (less than 130 mmol/L on 2 occasions at least 1 month apart) and clinical and biochemical components. Of 166 PD patients included in the study, 24 (14.5%) developed hyponatremia over a median follow-up of 364 days. An important observation was that this was more likely to occur in patients with less residual renal function (urine volume was almost significantly different, but there was no difference in peritoneal ultrafiltration between the groups). Given the role of urine flow in the regulation of extracellular volume, that is perhaps not surprising. Perhaps more surprising was a relationship between the fall in serum sodium and a reduction in body weight. This is counter-intuitive to the concept of an increase in extracellular water being causative in the hyponatremia. Appropriately, the authors interpreted this as probably representing nutritional impairment although, without objective evaluation of body composition, it was not possible to confirm this. However, this was supported by a correlation between the fall in serum sodium with a fall

in serum potassium—itself a marker of poor nutritional status. Patients with higher levels of residual renal function are likely to have higher sodium removal and, linked to this, higher dietary sodium intake (2). Sodium removal in patients on PD is intrinsically linked to residual renal function, nutritional status, and survival (3).

The second paper is from New Mexico (Sun *et al.*), presenting 5 clinical PD cases to illustrate that hypotonic hyponatremia can present in the context of hypovolemia, euvolemia, or hypervolemia. Patients can be classified into these categories using mathematical relationships between serum sodium, total body cation concentrations (sodium + potassium) and total body water that are presented in the article. The logical therapeutic response is based on these classifications. However, the calculations are not for the faint-hearted. I would encourage you to examine the cases and respond to the authors using the Rapid Responses feature on the PDI website that is located alongside the Full Text version of the article.

In this issue, we publish 2 randomized controlled trials (RCTs). The first is an open label study of polyhexanide, a polymeric biguanide with antimicrobial activities (4), as prophylaxis against exit-site infection (Núñez-Moral *et al.*). It was compared in this study with “traditional” exit-site care using saline serum and povidone-iodine. Evaluations were performed at baseline and every 4 to 6 weeks for 1 year, with 30 patients being randomized to each group. Nine exit-site infections occurred in the traditional care group (6 due to *Staphylococcus aureus*) and 3 in the intervention group (all due to *Pseudomonas aeruginosa*), with the difference being statistically significant. It could be argued that a better comparator group would have included topical antibacterial prophylaxis as used in the recently published, and much larger, HONEYPOT study (5), which showed no significant impact of the use of antibacterial honey. Polyhexanide has been demonstrated to be safe and cost-effective in burn patients (6), and it is promising to see a positive result in PD patients. However, this clearly needs to be replicated in a larger patient group.

The second RCT is an innovative evaluation of nurse-led telephone supportive care following discharge from 2 local regional hospitals in Guangdong province, China (Li *et al.*). The objective was to evaluate the impact of a

nurse-led telephone support model on patient reported quality of life and readmission rates. The intervention group received comprehensive discharge planning including weekly nurse-led telephone support up to 6 weeks; controls received routine post-discharge care that involved information given by a doctor, combined with the provision of a telephone hotline and printed material. The study demonstrated a positive impact of the intervention on patient reported quality of life scores, including symptoms, work status, and patient satisfaction, although there was no impact on readmission rates.

Other reports in this issue include 3 cases of peritonitis due to the fungus *Paecilomyces variotii* occurring within 4 months the 2010 Chilean earthquake, with tragic consequences for 2 patients (Torres *et al.*). The authors speculate that this slow-growing soil fungus may have colonized stored bags and lines as a consequence of the massive dust release at the time of the earthquake. There is a detailed study of 90 episodes of *Escherichia coli* peritonitis from South China, where extended spectrum β lactamase (ESBL) producing organisms were responsible for 35.5% of isolates (Feng *et al.*). Although a history of peritonitis was a risk factor for ESBL, contrary to previous reports, clinical outcome was not influenced by that isolate. Another study from China examines the outcome for older patients on PD, and although the death rate was clearly higher among those aged 65 or older versus the younger group, technique survival was no different (Joshi *et al.*).

There are many more interesting papers in this issue of Peritoneal Dialysis International that I have not had space to identify individually. This issue is additional to the usual bimonthly publication, possible through

generous financial support from the ISPD as part of a program to reduce the time to publication of accepted articles. I hope you find it stimulating.

Martin Wilkie
Editor-in-Chief

REFERENCES

1. Spasovski G, Vanholder R, Allolio B, Annane D, Ball S, Bichet D, *et al.* Clinical practice guideline on diagnosis and treatment of hyponatraemia. *Nephrol Dial Transplant* 2014 Apr; 29(Suppl 2):i1–39.
2. Coelho S, Yu Z, Davies S. Do we really know the meaning of sodium removal? *Perit Dial Int* 2011 Jul-Aug; 31(4):383–6.
3. Dong J, Li Y, Yang Z, Luo J, Zuo L. Time-dependent associations between total sodium removal and mortality in patients on peritoneal dialysis. *Perit Dial Int* 2011 Jul-Aug; 31(4):412–21.
4. Minnich KE, Stolarick R, Wilkins RG, Chilson G, Pritt SL, Unverdorben M. The effect of a wound care solution containing polyhexanide and betaine on bacterial counts: results of an in vitro study. *Ostomy Wound Manage* 2012 Oct; 58(10):32–6.
5. Johnson DW, Badve SV, Pascoe EM, Beller E, Cass A, Clark C, *et al.* Antibacterial honey for the prevention of peritoneal-dialysis-related infections (HONEYPOT): a randomised trial. *Lancet Infect Dis* 2014 Jan; 14(1):23–30.
6. Piatkowski A, Drummer N, Andriessen A, Ulrich D, Pallua N. Randomized controlled single center study comparing a polyhexanide containing bio-cellulose dressing with silver sulfadiazine cream in partial-thickness dermal burns. *Burns* 2011 Aug; 37(5):800–4.

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