Peritoneal dialysis related infections: challenges ahead

Philip Kam-Tao Li

Continuous ambulatory peritoneal dialysis (CAPD) is now a standard therapeutic modality of end-stage renal disease (ESRD) (1). About 80% of ESRD patients in Hong Kong are treated by CAPD. Peritoneal dialysis (PD) related infections, notably peritonitis, are major complications leading to patient morbidity, mortality and technique failure: In this issue, we have two papers addressing these problems (2,3).

A recent systematic review of randomized controlled trials showed that although there had been a lot of improvements with peritonitis rate after the advent of connectology device, mainly disconnect system, the peritonitis rate remained at one episode per 24 to 34 patient-months using double bag system (4). Our own Hong Kong multi-center data on 111 patients also showed that double bag can achieve a peritonitis rate of 33.5 patient-months per episode with exit site infections (ESI) of 17.4 patient-months per episode (5). There were a trend of more gram-positive peritonitis in Y-set (52%) than double-bag (32%), compatible with the hypothesis that double-bag system reduces the risk of contamination during spiking procedures (5). However, the beneficial effect was offset by slightly more gram-negative peritonitis in double-bag system (32% in double-bag vs 16% in Y-set). As a matter of fact, Pseudomonas account for 10.7% of all bacterial peritonitis in that study (5). Piraino et al (6) found that Pseudomonas aeruginosa replaced Staphylococcus epidermidis as the second most common cause of catheter infections in the patients using the Y-set. The number of catheters that had to be removed due to catheter infections, mainly those due to Staphylococcus aureus or P. aeruginosa, was the same in the Y-set and in control groups and they concluded that the Y-set system is associated with reduced numbers of catheter infections, but that catheter loss from catheter infections remains a serious problem. Thus we have been successfully reducing the peritonitis rate but are still bothered by the severe ones that are more difficult to treat and with more complications.

One of the risk factors for peritonitis is ESI. Toronto group reported their experience of 467 patients out of whom 19 had P. aeruginosa exit site and tunnel infections. Out of these 19 patients, 12 had to be treated with systemic antibiotics (7). Only one of the 12 patients with P. aeruginosa exit site and tunnel infections treated with antibiotics resolved; the remaining 11 patients developed P. aeruginosa peritonitis over a 1-month to 7-month period. One recent local data also found that the prevalence of ESI was 55% in the review of 353 CAPD patients (8). A total of 131 episodes (range 1-5) of P. aeruginosa ESI occurred in 78 (40.2%) of the 194 patients who experienced ESI (8). Leung et al (2) in this issue's Nursing Section reported their retrospective experience using vinegar together with an oral antibiotics (ciprofloxacin in this regimen) and found a very good response rate when compared with their previous experience using 0.05% aqueous chlorhexidine or eusol as cleansing agents. The incidence of relapse is also very low. This has potential implication towards a better management of P. aeruginosa ESI though a prospective study is needed to confirm the results.

Apart from ESI and tunnel infections, peritonitis is obviously another major problem complicating PD and its treatment poses a major challenge to nephrologists. The recent International Society of Peritoneal Dialysis guidelines on PD related peritonitis recommended the empiric initial use of cefazolin or cefalothin together with cefazidime or aminoglycoside if there is no renal function (9). Alternate use of aminoglycoside is not re-commended if there is residual renal function. This is in the light of the problem associated with the non-discriminate use of vancomycin causing vancomycin-resistant infections so that vancomycin is not recommended as initial empiric therapy (10). During a recent 2-year prospective cohort study in USA (11), rectal swabs obtained from patients at the beginning and end of the study period and during interim hospitalizations were cultured for vancomycin-resistant enterococcus (VRE). Sixteen of 90 patients (17.8%) became colonized with VRE, an incidence rate of one case per 9.8 patient-years of follow-up. Of the 29 patients who did not receive vancomycin, none have developed VRE compared with 26% of those treated with vancomycin (11). The recent incidences of VRE discovered in our dialysis patients in Hong Kong showed that this problem needed to be addressed and actively prevented. Qi et al (3) in this issue published their retrospective analysis of using first-generation cephalosporin plus tobramycin versus vancomycin plus an aminoglycoside. The primary response rates were 70.2% for the former and 76.7% for the latter regime respectively. As the authors used vancomycin plus amikacin for more severe peritonitis, it might favor a better response rate in the cephalosporin group as they are used for probably milder cases. Nevertheless the fact that initial empiric regimen without vancomycin can be quite effective. On the other hand, the potential problems of resistance, ototoxicity and damage of residual renal function associated with aminoglycoside have to be borne in mind and other regimens without aminoglycoside and vancomycin need to be developed (12).

The challenges ahead are to reduce the incidence of peritonitis of the more serious pathogens like S. aureus, Pseudomonas and fungi. New dialysate with a neutral pH and bicarbonate buffered may provide a better environment for peritoneal defense against various micro-organisms. The study by Cardiff Group recently suggested that patients continuously exposed to bicarbonate- and bicarbonate/lactate-buffered PD fluid might have better-preserved peritoneal macrophage function and thus improved host defense status (13). More effective antibiotics towards these "serious" organisms especially Pseudomonas need to be developed as peritonitis caused by them can lead to a higher incidence of technique failure, morbidity and mortality (14). (Hong Kong J Nephrol 2001;3(1):1-2)