

## **Simultaneous Catheter Replacement for Infectious and Mechanical Complications without Interruption of Peritoneal Dialysis**

**PD Management, 2**  
**Saturday, March 11, 2017, 11:00-11:45 AM**

by  
John H. Crabtree, M.D.

Conventional management for peritoneal dialysis (PD) related infections that fails antibiotic treatment is catheter removal, hemodialysis (HD) via a central venous catheter, and, if patients desire to return to this modality, re-implantation of a new PD catheter after an interval period. This staged approach significantly increases the cost of care as well as exposing patients to the complications associated with central venous catheters. Moreover, once on HD, the majority of patients will not return to PD.

Simultaneous catheter replacement with good results has been previously described for selected cases of peritonitis and exit site/tunnel infections (1, 2). In addition, it has been used for mechanical complications, e.g., flow failure, pericatheter leaks, and irreparable tubing damage (3). Often, PD was continued after the catheter exchange procedure without temporary HD, but the practices were incompletely described (4-7). On occasion, management included temporary HD with a central venous catheter while waiting for surgical wounds to heal sufficiently to prevent dialysate leakage.

With adherence to certain details, there is no reason not to expect that simultaneous catheter replacement can be performed for infectious and mechanical complications without interruption of PD in most cases. The success of the procedure relies upon proper patient selection and technical performance of the procedure. General guidelines of performance that promote a positive outcome are listed in the accompanying table.

### **General Guidelines for Simultaneous Catheter Replacement**

- Procedure acceptable for peritonitis not due to mycobacteria, fungi, enteric organisms, or Pseudomonas species.
- Procedure acceptable for bacterial exit site and tunnel infections.
- Clinical signs of peritonitis must be resolved and peritoneal leukocyte count is  $< 100/\mu\text{L}$ .
- Continue appropriate antibiotic coverage perioperatively.
- Insert new catheter (clean step) before removal of old catheter (dirty step).
- Close watertight all penetrating points through musculofascial layers of abdominal wall.
- Utilize intermittent regimen of supine, low-volume peritoneal dialysis during interval of postoperative recovery; leave peritoneum dry during ambulatory periods.

Good outcomes can be expected. In our recently reported series of 55 simultaneous catheter replacement procedures, we were 100% successful from the standpoint that there were no catheter losses from infectious or mechanical complications during the first 8 weeks, representing a 6 weeks period beyond any antibiotic exposure for infectious indications (4 weeks for catheter replacement for *Pseudomonas* tunnel infections) (8). In a previously published review of 20 studies, the overall success of simultaneous catheter replacement was 93% for exit site and tunnel infections and 86% for peritonitis with or without concurrent exit site/tunnel infection (2).

PD catheters can be used immediately following simultaneous catheter replacement if care is taken to create a watertight seal at the insertion site and at any other points of abdominal wall penetration. Although no standard dialysis prescription exists for immediate resumption of PD, a low volume, supine, intermittent PD protocol to minimize the risk of leak has been used (5, 7, 9, 11, 12). The use of a cyclers in this clinical setting is particularly convenient. It is a simple task for the PD nursing staff to assist patients in reprogramming their cyclers for the postoperative low volume intermittent PD protocol. To minimize low drain alarms, starting volumes of 1 to 1.2 L may be used. Because most patients have residual renal function, no problems with inadequate dialysis are usually encountered using an intermittent APD protocol over the short term. Patients are generally able to resume their usual dialysis regimen after 2 weeks (7, 9, 11).

Following catheter removal for infectious and mechanical complications with transfer to HD, only 18 – 45% of patients will return to PD (6, 9, 13). Therefore, simultaneous catheter replacement becomes an important strategy for retaining patients on PD therapy.

In summary, simultaneous catheter replacement can be safely performed without interruption of PD for selected cases of peritonitis and tunnel infection and for mechanical catheter complications. The procedure spares the patient from a central venous catheter, a shift to HD, the ordeal of a change in dialysis modality, and a second surgery to insert a new catheter. Technique survival is improved.

## REFERENCES

1. Singhal MK, Vas SI, Oreopoulos DG. Treatment of peritoneal dialysis catheter-related infections by simultaneous catheter removal and replacement. Is it safe? *Perit Dial Int* 1998; 18:565-7.
2. Mitra A, Teitelbaum I. Is it safe to simultaneously remove and replace infected peritoneal dialysis catheters? Review of the literature and suggested guidelines. *Adv Perit Dial* 2003; 19:255-9.
3. Swartz RD, Messana JM. Simultaneous catheter removal and replacement in peritoneal dialysis infections: update and current recommendations. *Adv Perit Dial* 1999; 15:205-8
4. Fredensborg BB, Meyer HW, Joffe P, Fugleberg S. Reinsertion of PD catheters during infections performed either simultaneously or after an intervening period. *Perit Dial Int* 1995; 15:374-8.

5. Paterson AD, Bishop MC, Morgan AG, Burden RP. Removal and replacement of Tenckhoff catheter at a single operation: successful treatment of resistant peritonitis in continuous ambulatory peritoneal dialysis. *Lancet* 1986; 2:1245-7.
6. Swartz R, Messana J, Reynolds J, Ranjit U. Simultaneous catheter replacement and removal in refractory peritoneal dialysis infections. *Kidney Int* 1991; 40:1160-5.
7. Cancarini GC, Manili L, Brunori G, Camerini C, Zubani R, Colombrita D, Pezzola D, Maiorca R. Simultaneous catheter replacement-removal during infectious complications in peritoneal dialysis. *Adv Perit Dial* 1994; 10:210-3.
8. Crabtree JH, Siddiqi RA. Simultaneous catheter replacement for infectious and mechanical complications without interruption of peritoneal dialysis. *Perit Dial Int* 2016; 36:182-7.
9. Majkowski NL, Mendley SR. Simultaneous removal and replacement of infected peritoneal dialysis catheters. *Am J Kidney Dis* 1997; 29:706-11.
10. Ludlam HA, Young AE, Wing AJ. Removal and replacement of Tenckhoff catheter at single operation. *Lancet* 1989; 1:1028.
11. Lui SL, Yip T, Tse KC, Lam MF, Lai KN, Lo WK. Treatment of refractory pseudomonas aeruginosa exit-site infection by simultaneous removal and reinsertion of peritoneal dialysis catheter. *Perit Dial Int*. 2005; 25:560-3.
12. Posthuma N, Borgstein PJ, Eijsbouts Q, ter Wee PM. Simultaneous peritoneal dialysis catheter insertion and removal in catheter-related infections without interruption of peritoneal dialysis. *Nephrol Dial Transplant* 1998; 13:700-3.
13. Cho Y, Badve SV, Hawley CM, McDonald SP, Brown FG, Boudville N, et al. Peritoneal dialysis outcomes after temporary haemodialysis transfer for peritonitis. *Nephrol Dial Transplant* 2014; 29:1940-7.