Early Surgical Intervention May Prevent Peritonitis in Cases with Tenckhoff Catheter Infection by Nontuberculous *Mycobacterium*

Editor:

Catheter infection, including exit-site infection (ESI), tunnel infection, and peritonitis, is a major cause of technique failure in patients on peritoneal dialysis (PD). Nontuberculous mycobacteria (NTM)-associated catheter infection in PD patients may be overlooked because of difficulty in its diagnosis. Recently, the importance of NTM in PD peritonitis has been realized, especially given the high frequency of its occurrence reported in Asian patients (1). A standard diagnostic procedure and treatment regimen for NTM infection have not yet been established.

CASE SERIES

Of 137 PD patients who returned for follow-up visits to our hospital between 2005 and 2010, 7 had an NTM-associated catheter infection (Table 1). All episodes began with an ESI that had involved application of topical gentamicin.

Among those 7 patients, the first 3 developed peritonitis (cases 1, 2, and 3) because of delayed diagnosis. After the experience of those 3 cases, we began to perform cultures for acid-fast bacilli in addition to bacterial cultures, especially when cultures were negative for common bacteria or when the patient had history of refractory ESI. Catheter removal and transfer to HD were eventually necessary in case 4, because the infection had extended beyond the external cuff at diagnosis. By contrast, in cases 5, 6, and 7, partial catheter reimplantation was performed as soon as the pathogen was discovered to be NTM, before infection extended beyond the external cuff; the patients were subsequently treated with at least 2 oral antibiotics. Our partial catheter reimplantation technique is the same as previously described (2), with the new exit and the subcutaneous tunnel being made far from the existing ones.

After this change in our clinical practice, all 3 patients (cases 5, 6, and 7) were successfully treated. In case 5, the 2 antibiotic agents were administered for 16 weeks after partial catheter reimplantation, based on American Thoracic Society recommendations (6). Case 6 has already been presented as a case report (3). In case 7, antibiotics were terminated after 2 weeks because of adverse gastrointestinal effects. The mean periods between the first manifestation of ESI and the first positive culture for NTM were 10.7 weeks in the early cases (cases 1 – 3) and 5.3 weeks in the later cases (cases 4 – 7). In patients who were able to continue PD technique (cases 4 – 7), the average period for NTM isolation from the start of culture for acid-fast bacilli was 13 days, and the period from isolation of NTM to surgical intervention was less than 1 week. To date, more than 1 year after completion of treatment, no relapses have been observed.

DISCUSSION

Peritoneal dialysis-related NTM infections are characterized by delayed diagnosis, initial negative cultures, refractoriness to treatment with standard antibiotics, and a high rate (60% – 80%) of PD catheter loss (4,5) with high mortality (5). To reach an early diagnosis, non-culture isolation techniques such as real-time polymerase chain reaction (7) and loop-mediated isothermal amplification (8) might be useful in the future. Prior prolonged use of antibiotics and of topical gentamicin might be risk factors for PD-related NTM infections (4). Removal of foreign bodies such as the percutaneous catheter is important and probably essential to recovery. For serious skin, soft-tissue, and bone

TABLE 1
Characteristics and Outcomes of Peritoneal Dialysis–Related Nontuberculous *Mycobacterium* (NTM) Infection

Variable	1	2	3	Case 4	5	6	7
Age (years)	70	66	54	69	49	62	56
Sex	Male	Male	Male	Male	Female	Female	Male
Cause of ESRD	Diabetes	Unknown	CGN	CGN	Diabetes	TA	Diabetes
Past ESI episodes (<i>n</i>)	0	>4	>4	>4	2	0	>4
Topical gentamicin	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time to NTM diagnosis ^a (weeks)	8	12	12	2	6	4	9
Organism	<i>M. chelonae</i>	<i>M. fortuitum</i>	<i>M. fortuitum</i>	<i>M. abscessus</i>	<i>M. fortuitum</i>	<i>M. goodii</i>	<i>M. chelonae</i>
Acid-fast bacilli smear ^b	Positive	Negative	Negative	Positive	Negative	Negative	Negative
NTM reached external cuff ^c	Yes	Yes	Yes	Yes	No	No	No
Peritonitis	Yes	Yes	Yes	No	No	No	No
Surgical intervention ^d							
Partial catheter reimplantation	Yes	Yes	Yes	No	Yes	Yes	Yes
Catheter exchange	No	No	Yes	No	No	No	No
Catheter removal	Yes	Yes	Yes	Yes	No	No	No
Postoperative antibiotic treatment (duration)	CAM (26 weeks) AMK (4 weeks) →LVFX (9 weeks)	DOCX (5 weeks) IPM/CS (2 weeks) →MOX (2 weeks)	None (11th week)	CAM (14 weeks) IPM/CS (5 weeks) →DOCX (9 weeks)	CAM (16 weeks) MOX (16 weeks)	CAM (5 weeks) LVFX (5 weeks)	CAM (2 weeks) ^e MOX (2 weeks) ^e
Outcome	Alive	Alive	Alive	Alive	Alive	Alive	Alive
Technique	HD	HD	HD	HD→PD	PD	PD	PD

ESRD = end-stage renal disease; CGN = chronic glomerulonephritis; TA = Takayasu arteritis; ESI = exit-site infection; CAM = clarithromycin; DOCX = doxycycline; AMK = amikacin; IPM/CS = imipenem/cilastatin; MOX = moxifloxacin; LVFX = levofloxacin; HD = hemodialysis; PD = peritoneal dialysis.

^a From the first manifestation of ESI to the first positive culture for NTM.

^b Of peritoneal fluid (cases 1–3) and of exit-site discharge (cases 4–7).

^c Determined during ESI or tunnel infection from physical examination alone (cases 1–3) or from physical examination, ultrasonography, and culture of the external cuff (cases 4–7).

^d From the first manifestation of ESI timing for surgical interventions.

^e Therapy terminated because of gastrointestinal side effects.

NTM disease, a treatment combination that includes a macrolide and a second agent for a minimum of 4 months would likely be successful (6), although the optimal length of medical therapy remains to be determined.

antibiotic use may be a risk factor for NTM infection. Partial catheter reimplantation followed by combined antibiotic therapy, especially when the infection does not extend beyond the external cuff, could be a new catheter-preserving treatment strategy.

SUMMARY

Infection with NTM should be suspected in cases of culture-negative ESI. A history of ESI or of repeated

DISCLOSURES

The authors have no financial conflicts of interest to declare.

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