Laparoscopic correction of peritoneal catheter dysfunction

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Abstract

Purpose To present our experiences with laparoscopic repair of peritoneal catheter dysfunction

Methods Total of 24 patients with peritoneal catheter malfunction were considered for two-port laparoscopic manipulation. Two patients with unsuccessful result in the first trial and 3 patients with successful peritoneal dialysis results were reoperated because of catheter dysfunction.

Results The success rates at the first and second manipulation was 79% and 80%. The most frequent cause of catheters dysfunction was migration of catheters out of the true pelvis. During the follow up, 8 patients were referred for renal transplantation, 8 underwent hemodialysis and 5 continued with normal catheter function. The mean longevity of the catheters after laparoscopic correction was 42 months. One year longevity rate as measured as 79%.

Conclusion Laparoscopy is the procedure of choice even in recurrent cases, for correction of malfunctioning continuous ambulatory peritoneal catheters, because this procedure is the only technique that can detect pathologic causes of

catheters malfunction and can resolve those problems at the same time.

Keywords Laparoscopy · Peritoneal catheter · Dysfunction

Introduction

Continuous ambulatory peritoneal dialysis (CAPD) is an effective choice treatment for patients with end-stage renal disease [1], and peritoneal catheter is their lifeline [2]. Over the years, obstruction or displacement of the peritoneal catheter (PD) catheter has been one of the common complications of CAPD [3]. It occurs often shortly after insertion, due to omental wrapping [3], catheter malposition or fibrin clot [4]. Various methods for treatment of catheter malfunction have been described, including double guide wire method [5], fluoroscopy-guided wire manipulation [2], use of a channel-cleaning brush [6], and peritoneoscopy or laparoscopy [2, 7–8]. In some articles, a successful outcome has been defined as maintaining a normal peritoneal catheter function at least 30 days after the manipulation [2].

We conducted this study to present our experiences with laparoscopic repair of Tenckhoff catheter dysfunction.

Patients and methods

Twenty-nine CAPD patients with catheters malfunction were referred to vascular surgery ward between May 2001 to August 2006. All catheters were inserted by authors using open surgical methods and were double-cuff Tenckhoff. Before any manipulations, all of patients underwent medical treatments via changing positions, optimal physical

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activity, laxatives and enema. Excluding five patients who responded to conservative management, 24 patients were considered for laparoscopic manipulation.

Catheter malfunction was defined as inflow obstruction or poor outflow of dialysate when the drainage volume was substantially less than the inflow volume without evidence of pericatheter leakage. Adequate peritoneal catheter function for inflow and outflow of dialysate in the immediate post manipulation and at least 1 month later was considered as successful outcome.

Laparoscopy was performed using two-port technique: the first port in the midline for camera, and the second one in the opposite side of catheter insertion for manipulation. All patients received general or local anesthesia accompanied with IV sedation.

Procedures were performed included: (a) Adhesionolysis; (b) Catheter cleaning; (c) Peritoneal tunnel clipping when needed, especially in patients undergoing remanipulation; and (d) Repositioning of the catheter. We did not include omentectomy in the procedure. All patients followed carefully between 2 to 68 months.

In cases of recurrent malposition, we created a tunnel with a fold of peritoneum clipped to the anterior abdominal wall to prevent new migration.

Results

Male to female ratio was 1:1.4 (10 men and 14 women). The mean age of all patients was 38.9 ± 14.2 years ranged 15 to 66.

We didn't have any complication and no conversion to open surgery was necessary during our procedures. The success rate at the first manipulation was about 79% (19 of 24). Five patients with unsuccessful result were reoperated because of catheter dysfunction. Among these 5 patients who experienced second manipulation, 4 patients returned to CAPD (success rate: 80%).

The most frequent cause of catheters dysfunction in our study was migration of catheters out of the true pelvis. Fibrin clot alone or with omental wrapping were the main complications and causes of catheter occlusion (Table 1).

During the follow up, 5 individuals continued on PD for averagely 18.2 months (ranged 2 to 68 months). Seven

patients were referred for renal transplantation, all of them were transplanted with normal-functioning catheters. In 2 patients catheters were removed because of refractory peritonitis, one of them underwent hemodialysis. Only in one patient catheter was removed because of recurrent catheter occlusion.

Six patients expired during our long-term follow up; three of them died with normal function catheter, one after transplantation and two following hemodialysis (Table 2).

Among 5 re-operated patients, 4 cases could maintain peritoneal dialysis after successful laparoscopic manipulations and 1 was referred for hemodialysis. From them, 2 patients had early catheters dysfunction after primary laparoscopic correction (less than 1 month) and 3 patients had late catheter dysfunction (after several months of continuous CAPD).

Table 2 shows outcomes of patients and causes of discontinuing CAPD.

Regarding to Kaplan-Meier test, the mean of catheters longevity was measured as 42.04 ± 7.36 months. As mentioned below, one-year longevity rate was 79.2%. This rate decreases to 65.8% and 52.6% for two and five year longevity (Fig. 1).

Table 2 Outcomes of our patients

Outcome	Due to	n	%
Changed to hemodialysis	Infection	6	33.4
	Obstruction	1	
	Intolerance	1	
PD Continued with normal function		5	20.8
Transplantation with normal function		8	33.3
Death with normal function		3	12.5
Total		24	100

Table 1 Causes of catheters malfunction

	Frequency	Percent
Fibrin clot	5	20.8
Fibrin clot & omental wrap	4	16.7
Malposition	10	41.7
Malposition & fibrin clot	3	12.5
Malposition & omental wrap	1	4.2
Omental wrap (Entrapment)	1	4.2
Total	24	100.0

Fig. 1 Longevity of PD catheters after laparoscopic correct

Discussion

Peritoneal dialysis is an important therapy for patients suffering from end-stage renal disease, especially in them who have not any vascular access for hemodialysis. CAPD catheter malfunction is one of the major causes of discontinuation of this therapeutic modality. CAPD catheter malfunction is occurred resulting peritoneal catheter tip displacement or obstruction of lumen by fibrin, clots, omental wrapping or intestinal adhesions [9–10].

The incidence of catheter malfunction ranges from 12–73% of patients [11]. Among these, incidences of catheter malposition varies from 5–24% in long-term studies [12–14]. In the present study, the rate of catheter malposition alone was 41% and 17% associated with fibrin clot or omental wrapping. Although this rate of malposition of catheters seems to be high, in some studies this rate has been reported as high as 56% [2, 15]. The application of laparoscopic surgical techniques has revolutionized the surgical approach to the PD catheter-related complications and dysfunctions [16].

Although in some articles, non-surgical techniques including enema, stiff wire manipulations, and thrombolytic infusions all too often fail to correct the poorly functioning PD catheter [17], in our study 17% of patients (5 of 29) responded to non-surgical managements and excluded from the study. Of course, since catheters were “swan neck” type, manipulation and catheter correction with stiff wire was impossible in our cases. Open surgical correction of dysfunctional PD catheters is not a good procedure because patients operated with this technique, won’t be able to receive peritoneal dialysis soon after surgery and dialysis leakage is another problem.

Peritoneoscopy has a definite role in evaluation and salvage of malfunctioning catheters [18]. On the other hand, regarding simultaneous identification and correction of other surgical problems that could otherwise complicate dialysis therapy, laparoscopic surgery is an ideal method to salvage malfunctioning PD catheters [14]. Laparoscopic repositioning and adhesiolysis with or without omentectomy are simple and effective procedures that can prolong catheter survival, even in recurrent malfunctions [15]. In our experience, despite 5 remanipulation, omentectomy was not required at all. On the other hand laparoscopic management is a valid means of correction of a malfunctioning dialysis catheter if the catheter is anchored with a suture [19]. In our study we created tunneling with a fold of peritoneum when required specially in re-manipulated cases.

In literatures, the most frequent laparoscopic finding was catheter tip migration, with or without adhesions [20, 21]. In our study too, the most frequent causes of catheter dysfunction was catheter’s migration from true pelvis.

Multiple studies have demonstrated successful laparoscopic manipulation of obstructed catheters with salvage rates between 50% and 80% [10, 15, 22]. The effectiveness

of our technique was excellent with 79% success rate in primary laparoscopic PD catheter correction. It rose to 83% after re-operation which is comparable with other studies [15].

Conclusion

Laparoscopy is the procedure of choice even in recurrent cases, for correction of malfunctioning CAPD catheters, because this procedure is the only technique that can detects pathologic causes of catheters malfunction and can resolve those problems at the same time.

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