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Laparoscopic management of Tenchkoff catheters in continuous ambulatory peritoneal dialysis

A one-port technique

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Abstract. We describe a one-port laparoscopic technique for assisting in Tenchkoff catheter placement and salvaging obstructed ones in patients requiring continuous ambulatory peritoneal dialysis (CAPD). This unique technique enables diagnostic laparoscopy, adhesiolysis, repositioning of catheters, and omentectomy to be performed without laparotomy. Six patients were treated. Only one 10-mm port was required, using an operating laparoscope and an instrument introduced through the working channel of the laparoscope. Adhesiolysis was performed under laparoscopic vision; omentectomy and flushing of blocked catheters were carried out extracorporeally. The catheters were then repositioned to the pelvic cavity under laparoscopic vision. All patients were followed up for 6–10 months. No mechanical problem was noticed. Our one-port laparoscopic technique is a simple and effective method for treating patients who have mechanical problems with their peritoneal dialysis catheters.

Key words: Obstruction — Dysfunction — Peritoneal dialysis — Chronic renal failure

Continuous ambulatory peritoneal dialysis (CAPD) is a well-established method of treating patients with end-stage renal disease (ESRD). However, mechanical complications such as inflow or—more commonly—outflow obstruction often occur. They may occur in ⩽60% of patients on peritoneal dialysis [6, 8].

Various methods of salvaging these catheters have been described. Some of these methods include induction of active peristalsis by enemas [10, 11], manipulation of these catheters [3, 5], or infusion of urokinase in order to lyse the fibrin clot [13]. However, most of them are not effective in the long run. Removal of the catheter is the usual eventual outcome [6, 8].

Laparoscopic management for obstructed catheters was first described in 1985 [14]. Since then, a number of authors have reported their success in using laparoscopy to assist in the placement or salvage of obstructed catheters [3, 6–8, 12]. However, all the methods described require more than two ports. We find this is not necessary; a single port is adequate in most cases. We describe herein our unique one-port laparoscopic technique.

Materials and methods

In the first 6 months of 1996, we performed four laparoscopic salvages of obstructed Tenchkoff catheters and two laparoscopy-assisted placement of catheters. The clinical data for all the patients are shown in Table 1. They ranged in age from 33 to 64 years old. There were five male patients and one female patient.

All procedures were performed under general anesthesia with the patient in the supine position. A 2-cm supraumbilical incision was made in the four patients with obstructed catheters. For the two patients who required placement of catheters, a right paramedian incision was made just below the level of umbilicus. The open method was employed for all patients. A Hasson trocar was inserted under direct vision. A 10-mm operative laparoscope (Karl Storz, Hopkins, Zero degree, Germany) with a 5-mm working channel was then introduced into the abdomen (Fig. 1).

Pneumoperitoneum was created, followed by a detailed laparoscopic examination of the peritoneum. The obstructed catheter was examined to identify the cause of obstruction. Adhesiolysis was then performed with a 42-cm long, 5-mm diameter operating instrument inserted through the working channel of the laparoscope.

The proximal end of the catheter was identified and held by a pair of grasping forceps. The catheter was then pulled out of the peritoneum together with the forceps, the laparoscope, and the Hasson trocar. All obstructing elements, such as adherent omentum or fibrin clots inside the lumen, were removed manually. The catheter was then flushed clean with heparinized saline and pushed back into the peritoneum.

In cases where the omentum was the main obstructing element, omentectomy was performed at the same time. The omentum was gently pulled out as much as possible from the small trocar insertion site and omentec-

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Table 1. Clinical data and postoperative results

Patient nos. (age/sex)	Previous operations	Time between insertion and obstruction	Operative finding and procedures performed	Results
1 (F/52)	2 cesarean section, 1 laparotomy	4 wk	Encased in adherent small bowel, adhesiolysis performed	Functioning >10 mo (OT time = 75 min)
2[a] (M/64)	2 laparotomy and colostomy for colorectal cancer	—	Mild adhesion at pelvis, adhesiolysis and Tenchkoff catheter placement	Functioning >10 mo (OT time = 45 min)
3[a] (M/56)	3 Tenckhoff catheter, removed, 2 due to blockage and 1 due to peritonitis	—	Adhesion at anterior abdominal wall, adhesiolysis and Tenckhoff catheter placement	Functioning >8 mo (OT time = 45 min)
4 (M/33)	Appendectomy, 1 Tenckhoff catheter, removed due to obstruction	4 wk	Catheter stuck by fibrin clots and bowel loops, reposition and catheter flushed clean	Functioning >8 mo (OT time = 45 min)
5 (M/39)	1 Tenckhoff catheter, removed due to obstruction	2 wk	Encased by omentum and clots, omentectomy and catheter flushed clean	Functioning >7 mo (OT time = 65 min)
6 (M/43)	Appendectomy, 2 Tenckhoff catheter, 1 laparotomy for peritonitis	6 wk	Encased by omentum, clots and adhesion. Adhesiolysis and omentectomy performed, catheter flushed clean	Functioning >6 mo (OT time = 75 min)

[a] Patient referred for insertion of Tenckhoff catheter

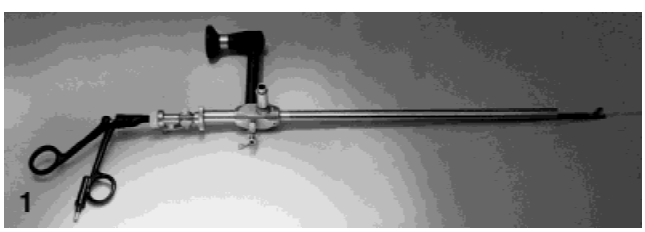

Fig. 1. Operating laparoscope with scissors passing through the working channel.

Fig. 2. Omentectomy accomplished by division between successive pairs of ligatures.

tomy carried out extracorporeally by division between successive pairs of ligatures. The Hasson trocar was reinserted and the peritoneal cavity reinflated. The tip of the catheter was identified laparoscopically and directed by the grasping forceps to the pelvic cavity. After that, all instruments were withdrawn and the incision was closed with a single layer of continuous 2-0 Vicryl (polyglactin 910) sutures. Dialysis was immediately resumed with 1.5% dialysate.

For the remaining two cases of complicated abdomen referred for placement of catheters, adhesiolysis was initially performed under laparoscopic vision. The Hasson trocar was then withdrawn, and the catheter was inserted through the same wound and positioned in the pelvis. The wound was closed with layered sutures, followed by immediate flushing of the catheter with 1.5% dialysate.

Results

Four of our six patients required adhesiolysis (cases number 1, 2, 3, and 6). The extent of adhesion was mild to moderate in all cases. Adhesiolysis was done from the level of the umbilicus downward to the pelvic cavity, separating the bowel from the anterior abdominal wall. Due to the tenting effect of the pneumoperitoneum, all adhesions were easily dissected with a pair of 5-mm scissors inserted through the working channel of the laparoscope. Fibrin clots were found inside all the catheters, so they were all flushed manually. Two of the four obstructed catheters were encased in adherent bowel loops; the other two cases were obstructed by omentum (cases number 5 and 6). Omentectomy was also performed in cases number 5 and 6 (Fig. 2).

There was no need for replacement of the catheter in any of the cases of obstructed catheters. All patients had uneventful postoperative recovery. They were able to resume oral feeding on day 1 postoperatively. The mean operating time was 58 min. The patients have been followed up for 6–10 months. No mechanical problems were encountered during this time.

Discussion

Tenchkoff catheter are frequently blocked after they are inserted. They can be obstructed by omentum, encased in adhesions, or buried in small bowel [12]. Obstructions caused by structures such as the fallopian tube, appendix, or even appendices epiploicae of the sigmoid colon have been reported [2, 4].

The use of laparoscopy in managing obstructed catheters has been reported since the early 1980s. As surgeons have become more familiar with laparoscopic surgery, numerous reports on laparoscopic management of obstructed catheters have been published. However, all of them required more than one port. Every port insertion carries with it the risk of developing port-site hernia, leakage of dialysing fluid, and injury to the abdominal wall vessels, particularly the inferior epigastric vessels. Although the chance of port-site hernia can be minimized by using a 5-mm port [1, 9], the catabolic nature of the disease, together with the constant stretching of the abdominal wall by the fluid, will increase the likelihood of developing port-site hernia. Leakage of dialysing fluid often delays the start of dialysis, hence increasing the chance of fibrin clot formation. Some authors advocate suturing the abdominal fascia at all trocar sites [4]. However, it is never easy to close a 5-mm port.

We have found that it is feasible to use a single port to salvage obstructed catheters and to place catheters into complicated abdomens. All of our patients had a history of multiple abdominal procedures, and initially we expected that some of them might have adhesions too extensive to be managed laparoscopically. Fortunately, we were able to perform adhesiolysis successfully in all cases.

As for the omentectomy, although we have only been able to excise the free-hanging omentum below the level of the umbilicus, we found that this procedure is adequate to eliminate the possibility of the omentum becoming stuck to the catheter tip. Since the catheter tip is situated lower down in the pelvic cavity, this procedure is preferable to the more invasive method of laparotomy and omentectomy.

Our patients have been followed up for 6 to 10 months and no mechanical problem has developed. We believe that these catheters will have the same survival time as newly inserted ones.

In conclusion, our one-port laparoscopic technique is simple and effective, and it carries minimal morbidity. We highly recommend its use as the initial procedure for managing the malfunctioning dialysis catheter or placing a catheter into the complicated abdomen.

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