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# Laparoscopic Salvage of Obstructed and Displaced Peritoneal Dialysis Catheter - Case Study

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### Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

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Case Study

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## ABSTRACT

This paper presented a case of a young male patient with end-stage renal failure, treated with chronic peritoneal dialysis, who was referred to our department due to peritoneal dialysis catheter malfunction, which was laparoscopically inserted three month earlier also in our institution. Diagnostic laparoscopy was performed. The catheter tip was displaced from pelvic region and was also wrapped with omentum. Laparoscopic salvage of the catheter was performed successfully. The postoperative course was uneventful and the catheter remained fully functional.

**Keywords:** Peritoneal dialysis; catheter obstruction; laparoscopy; laparoscopic salvage.

## 1. INTRODUCTION

Peritoneal dialysis (PD) is a well accepted method for renal replacement therapy in patients with end-stage renal failure (ESRF). It offers them more freedom and autonomy and is especially attractive for younger patients with ESRF [1]. The key to successful PD is to provide

a quality peritoneal access with minimum complications. The inserted PD catheter must be functional, without restrictions of inflow and outflow of the dialysate fluid [2,3]. The most common catheter problems are flow dysfunction, pericatheter leaks and hernias, cuff extrusions and infectious complications. Mechanical catheter problems and infectious complications

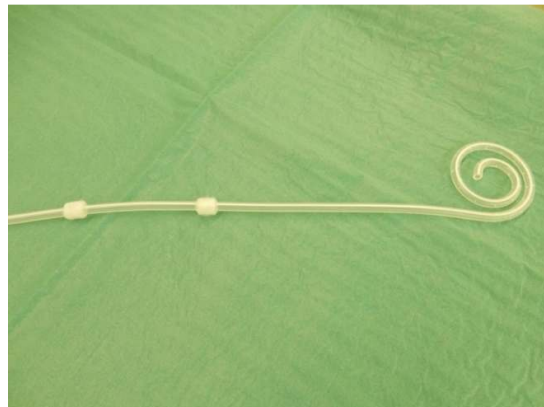
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are the two most common causes of PD catheter malfunction and conversion back to the hemodialysis [2]. Mechanical catheter obstruction can be a consequence of catheter kinking, fibrin deposition, omental wrapping or obstruction secondary to intraperitoneal adhesions. The other possible cause of catheter malfunction is dislocation of catheter tip from normal pelvic position [3]. Options for management of malfunctioning catheters include urokinase administration, stiff wire manipulation, laparoscopy and catheter replacement, and each salvage method has been associated with variable rates of success [3]. PD catheter malfunction managed conservatively is associated with a very high rate of failure. Catheter replacement was historically the standard surgical treatment of choice in patients with a PD catheter malfunction. In the era of minimally invasive surgery, laparoscopy has been introduced as an alternative surgical modality to rescue the malfunctioning PD catheter and also offers the possibility of catheter replacement [4,5]. In our institution patients with ESRF, who are candidates for a PD, are managed within a multidisciplinary team with nephrologist having the leading role. The role of the abdominal surgeon is to provide a reliable PD access with insertion of a PD catheter and to participate in resolving PD catheter-related complications. In this paper is presented a case of a young male patient with mechanical catheter obstruction, that was easily solved with laparoscopy.

## 2. CASE STUDY

A 16-year old male patient with ESRF, already on PD, was referred to our department due to malfunction of the PD catheter. Three months earlier he had a laparoscopically assisted insertion of a PD catheter in our institution. A standard straight double cuffed Tenckhoff catheter was inserted (Fig. 1). The insertion was performed without any problems and the inserted PD catheter was functioning perfectly for almost three months. Then he has appeared problems with outflow and later also with inflow of the dialysate fluid. We decided to perform a diagnostic laparoscopy. The patient was prepared for surgery in a standard manner. He was in supine position, endotracheally intubated under general anesthesia. Perioperative antibiotic prophylaxis with cefazolin was administered. Sterile operative field was prepared in a standard manner. Skin incision above the umbilicus was made and a

pneumoperitoneum was created with Veress needle. The intraabdominal CO2 pressure was maintained at 12 mmHg. A 5 mm trocar was inserted above the umbilicus in to the abdominal cavity and a 5 mm 30° laparoscope was used to perform a diagnostic laparoscopy (Fig. 2). We found a displaced tip of the PD catheter, that was located in the left iliac fossa. The curved catheter tip was wrapped with omental tissue (Fig. 3). We inserted another 5 mm trocar and relieved the catheter tip of omentum with a laparoscopic grasper (Fig. 4). Then we put the tip of PD catheter back in to the pelvic region (Fig. 5). The inflow and outflow were tested with saline. Laparoscope and the trocars were removed, the pneumoperitoneum was released. The fascia and skin wounds were closed with sutures. The postoperative course was uneventful. The patient started the PD a few days later with low volumes. He is regularly followed up by nephrologist and the PD catheter remained completely functional.



**Fig. 1. Straight Tenckhoff catheter with curved tip and two cuffs, that we use in our institution**

*(Source: Personal - intraoperative image)*

## 3. DISCUSSION

Our patient had a displaced and mechanically obstructed PD catheter, which was easily diagnosed and solved with laparoscopy. The cause of mechanical catheter obstruction was omental tissue, that was wrapped around the curved catheter tip. There was no need to remove the malfunctioning PD catheter or to replace it with another one or to transfer the patient back to the hemodialysis. Laparoscopy proved to be easy, safe, minimally invasive and effective method for salvaging the malfunctioning PD catheter. The deficiency of laparoscopy is the need for general anesthesia and is inappropriate



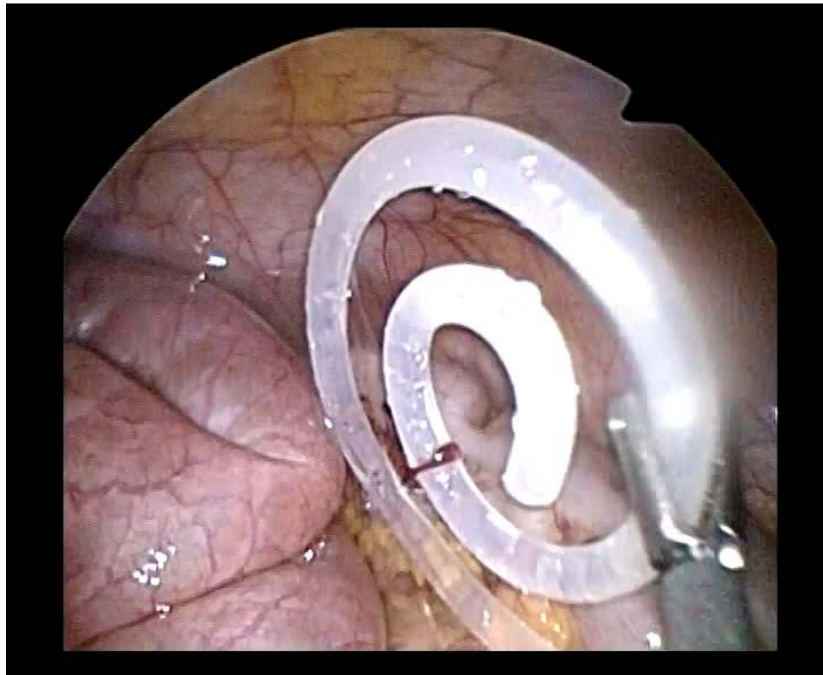
**Fig. 2. Laparoscopy, using two 5 mm trocars and a 5 mm 30° laparoscope**  
(Source: Personal - intraoperative image)



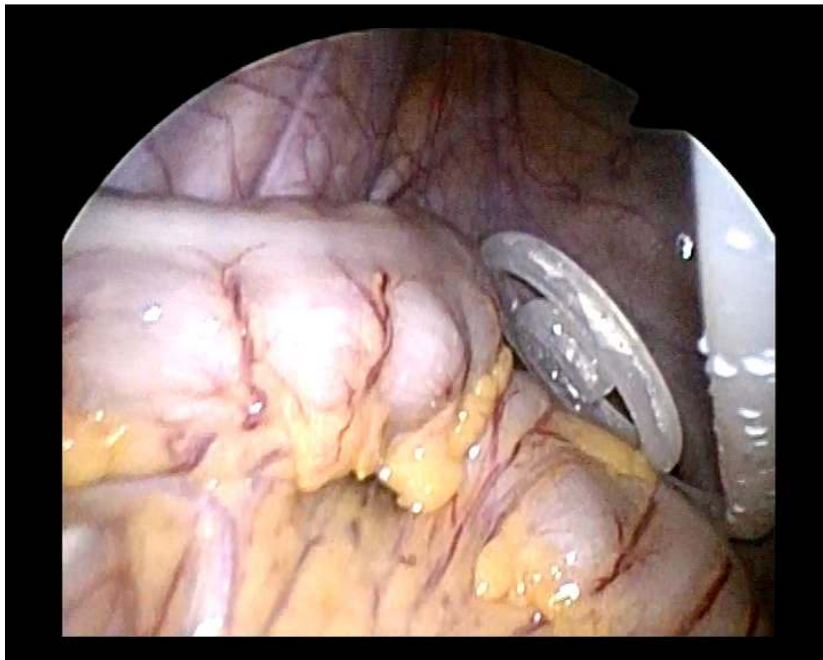
**Fig. 3. Displaced tip of the PD catheter, that is also wrapped with omental tissue**  
(Source: Personal – intraoperative image)

for patients, that are unfit for a procedure under general anesthesia. In our institution we perform laparoscopic insertions of PD catheters in adults, who are candidates for a chronic PD because of ESRF. This method has become in our institution a standard method for providing a

peritoneal dialysis access for patients requiring a chronic PD. Also the method of choice for evaluation and management of catheter malfunction is laparoscopy in our institution, which proved to be very effective, with minimum complications.



**Fig. 4. The catheter tip was freed from omental tissue with a laparoscopic grasper**  
(Source: Personal – intraoperative image)



**Fig. 5. The tip of the PD catheter is placed back in to the pelvic region**  
(Source: Personal – intraoperative image)

Catheter malfunction is common and often occurs shortly after insertion. The common cause of mechanical catheter obstruction is omental

tissue, as occurred in our patient. Laparoscopic salvage of PD catheters has been reported in literature on several occasions [6]. In the past

PD catheters have been inserted mainly with open surgical technique, but nowadays the laparoscopic approach has become widely accepted and the rate of catheter failure is in decline. Laparoscopic placement of PD catheter offers advantages such as minimal invasiveness, visualization of the peritoneal cavity, concomitant operation of omentectomy and adhesiolysis during the procedure [7,8]. To avoid early catheter malfunction it is important to properly orient the catheter toward the pelvis, to put the catheter tip in to the pelvic region and to prevent kinking [9]. Partial omentectomy can also be performed selectively to avoid further omental wrapping [10]. According to many authors, a laparoscopic placement of PD catheters using rectus sheath tunneling, selective omentopexy or partial omentectomy and proper positioning of deep and subcutaneous cuff, is clearly advantageous to other techniques described in literature [11,12]. Laparoscopy has also many advantages in management of PD catheter malfunction. It offers the opportunity to evaluate the etiology of catheter failure, which may then lead to appropriate modifications to avoid recurrent errors in catheter placement. Some authors report 96%-100% success rate in laparoscopic management of PD catheter malfunction and they recommend laparoscopy as the treatment of choice in cases of PD catheter malfunction [6].

In our institution we have very positive experiences with laparoscopic management of PD catheters. In the past two years, we performed 38 laparoscopic insertions of PD catheters. Two patients had problems with catheter malfunction. In both patients the cause was displaced catheter tip and wrapped omental tissue around the catheter tip. Laparoscopic salvage was successful in both cases.

#### 4. CONCLUSIONS

Laparoscopic salvage is a feasible and very effective method in cases of PD catheter malfunction. Laparoscopy can be diagnostic and therapeutic method for management of malfunctioning PD catheters and should be the method of choice in such cases.

#### CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author.

#### ETHICAL APPROVAL

It is not applicable.

#### COMPETING INTERESTS

Author has declared that no competing interests exist.

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