

Revision techniques for failed PD catheters: outcome in a University Hospital

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ABSTRACT

Purpose: A disfunctioning peritoneal dialysis (PD) catheter has been reported in upto 35%. We report different salvage techniques used and its outcome.

Methods: We retrospectively reviewed our database on PD patients from 2009 to 2014. Operational data and data on PD catheter function were checked.

Results: From 2009 to 2014, we operated on 32 patients. Malfunction of their PD catheter was found in 23 patients and hernias in nine patients. Different laparoscopic techniques were used, including reposition of the catheter, fixation of the catheter, removal of adhesions and omentectomy. Of these 23 patients, 18 (78%) had a normal functioning catheter after the operation. Nine patients of the total of 32 patients had a correction of their hernia. In all cases, a non-absorbable mesh was used. Of those nine patients with a hernia, eight (89%) had a normal functioning catheter after the procedure.

Conclusions: The salvage of the catheter by means of a laparoscopic procedure or correction of a hernia is worthwhile and can save up to 81% of the catheters.

Keywords: Catheters, Dialysis, Malfunction, PD, Revision, Technique

Introduction

Peritoneal dialysis (PD) is a useful method in patients with end-stage renal disease. The insertion technique is still on debate. Open surgical placement, laparoscopic placement and percutaneous placement of the PD catheter are all advocated. The different techniques have been developed to diminish catheter malfunction, which is one of the disadvantages causing non-function of the PD catheter. Although the incidence of failure rates varies in the different studies on different techniques used, no randomized trial has shown benefit of one technique over the other. The incidence of malfunction varies in these different studies between 17 and 35% (1-3).

We believe that there are several different time periods in the failure of the PD catheter. First, there is the failure di-

rectly related to the operation or the first postoperative time (weeks to months). This is because of displacement of the catheter or because of omental wrapping, postoperative infections or postoperative leakage of fluid. Second, patients have to stop because of hernias that arise a longer period after the operation. Third, there is a proportion that has to stop because of an infection of the catheter itself not responding to antibiotic therapy.

The conservative management will only be briefly mentioned, as it is out of the scope of this study. In case of an infection of the catheter that does not respond to antibiotic therapy, the catheter is surgically removed and a central venous catheter is placed for haemodialysis if necessary. Several days later, a new PD catheter can be inserted.

PD catheter placement has been performed in both open surgical technique and laparoscopic technique in the Maastricht University Medical Center, the Netherlands. Both techniques are currently tested in a randomized controlled trial. We report the different salvage techniques used and the outcome of the different surgical techniques used.

Results

From 2009 to 2014, we operated on 32 patients with a mean age of 63.7 years ($SD \pm 12.9$). Malfunction of their PD catheter was found in 23 patients and hernias (incisional/umbilical/inguinal/epigastric) in nine patients. The demographic parameters are summarized in Table I.

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TABLE I - Demographic parameters

Total	N	32
Male/female	N	19/13
Age mean $\pm$ SD	years	63.7 $\pm$ 12.9
Malfunction operations	N	23
Hernia repairs	N	9

TABLE II - Operational data and outcome

	N	Improved function	Failed procedure
Malfunction operation	23	18	5
- Reposition of PD catheter	2	1	1
- Reposition and fixation	10	7	3
- Reposition, fixation and omentectomy	8	7	1
- Reposition, fixation and removal of adhesions	3	3	-
Hernias (always mesh used)	9	8	1
- Laparoscopic correction (umbilical/incisional/epigastric)	5	4	1
- Lichtensteinplasty (inguinal hernias)	4	4	-

Of those 32 patients, 23 underwent a laparoscopic procedure because of malfunction of the PD catheter. Several different techniques were used according to the cause of the malfunction. Solely, a reposition of the catheter was used in two patients. A reposition with a fixation of the catheter was used in 10 patients. Also in eight patients, an omentectomy was performed besides a reposition and fixation of the catheter. Removal of adhesions with reposition and fixation of the catheter was used in three patients. Of these 23 patients, 18 (78%) had a normal functioning catheter after the operation. Usually, patients had to wait 2-4 weeks before they could start PD again. If necessary, a central venous catheter was placed to overcome this interval period for dialysis. The procedures performed and their outcomes are summarized in Table II.

Nine patients of the total of 32 patients had a correction of their hernia. In all cases, a nonabsorbable mesh was used. Four patients had an inguinal hernia, and in those cases, a Lichtenstein procedure was performed. Five patients had an incisional, epigastric or umbilical hernia, which was corrected in all cases with a laparoscopic procedure. Of those nine patients with a hernia, eight (89%) had a good functioning catheter after the procedure. Here, also a rest period of 2-4 weeks was applied. The procedures performed and outcomes are summarized in Table II.

Discussion

In Maastricht University Medical center, the Netherlands, malfunction of PD catheter consist of a multidisciplinary approach. First, an X-ray has been performed to verify the position of the catheter. Noninvasive steps are undertaken

by the division of nephrology. Different positions of the patient, laxantia and thrombolytic agents insufflated in the catheter are undertaken if appropriate. Antibiotic therapy is administered if necessary. If this does not result in a proper function of the catheter, invasive management is undertaken. In case of PD catheter displacement, the radiology department is consulted for repositioning the catheter with different guide wires and stiff wires; this technique can be time-consuming and has been done in an interventional radiologic suite. In case of displacement, the outcome can be good; however, in case of omental wrapping, the outcome will be less favourable. Success rates of up to 75% have been reported (4).

In case of failure of the above techniques, a surgical intervention is required. Several laparoscopic techniques are used and its success rate is up to 78%. Nowadays, we rarely use the technique of solely repositioning the catheter. Usually, the catheter is also fixated with nonabsorbable stitches. As mentioned, other additional techniques can be added such as removal of adhesions and omentectomy if appropriate. The latter is used if the the omentum is capable of reaching the tip of the catheter. Others have also reported the good outcome after fixation of a PD catheter with use of the omentum (5).

In case of inguinal hernias, the preferred technique is still on debate. We used the open approach of the Lichtenstein plasty; however, the laparoscopic approach without entering the peritoneal cavity (TEPP) is also advocated and gives probably equal results. We advocated however an approach in which the peritoneal cavity is not opened. Opening the peritoneal cavity can lead to leakage in case of early start of PD. In case of incisional, umbilical or epigastric hernias, a laparoscopic procedure is advocated and a nonabsorbable mesh is preferred over primary closure. These techniques require larger trocars ports of up to 12 mm. The Mesh is tacked to the abdominal ventral wall with absorbable tackers. Because of several trocars ports used and the diameter of the trocars, we advocate to wait up to 4 weeks before PD is used again. In case of inguinal hernias, our success rate was 100%, and in case of laparoscopic correction of the other hernias, the success rate was 80%.

Conclusion

In case of malfunction of a PD catheter, this is not the end of PD dialysis. The salvage of the catheter by means of a laparoscopic procedure or correction of a hernia is worthwhile and can save up to 81% of the catheters.

Disclosures

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