LAPAROSCOPIC PLACEMENT OF OREOPoulos–ZELLERMAN CATHETERS IN CAPD PATIENTS

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♦ Background: Continuous ambulatory peritoneal dialysis (CAPD) is widely accepted for the management of end-stage renal disease. Various techniques have been described for the insertion of peritoneal dialysis catheters. Lately, with the evolution of laparoscopic surgery, different laparoscopic techniques have also been presented, suggesting the technique is preferable to the open and percutaneous methods.

♦ Objective: To introduce and evaluate a new laparoscopic technique for insertion of Oreopoulos–Zellerman catheters in CAPD patients.

♦ Setting: The study was carried out in the First Department of Propaedeutic Surgery, Athens University Medical School, Hippokration Hospital.

♦ Patients and Methods: Between November 2000 and March 2002, the technique was applied in 20 consecutive patients (mean age 62 years, range 54 – 70 years) with end-stage renal disease. During this technique, a 10-mm trocar is placed just below the umbilicus for the optics and a 5-mm trocar is placed in the right lower quadrant. With the help of a 10-mm trocar, a tunnel is formed in the standard paramedian position on the left side, 2 – 3 cm below the plane of the umbilicus, for the insertion of the peritoneal catheter. A laparoscopic needle (GraNee needle; R-Med, Oregon, Ohio, USA) is used for the closure of the 10-mm trocar-induced peritoneal and fascia defect using a purse-string suture. The catheter is advanced into the abdomen under direct vision and guided toward the Douglas pouch. The subcutaneous tunnel and the patency test of the catheter are performed as the last main steps in our procedure. One surgeon undertook all procedures.

♦ Results: All procedures were completed laparoscopically. The mean operative time was 30 minutes (range 25 – 40 minutes). There was no intraoperative complication or surgical mortality. One patient developed leakage at the catheter exit site 3 days after surgery; it was corrected under local anesthesia. During a mean follow-up time of 17 months (range 12 – 28 months), 1 patient required catheter removal due to fungal peritonitis.

♦ Conclusion: Laparoscopic insertion of the Oreopoulos–Zellerman catheter is a simple, quick, and safe method. We believe future experience will encourage the laparoscopic technique as the method of choice.


KEY WORDS: Laparoscopic placement; Oreopoulos–Zellerman catheter.

Continuous ambulatory peritoneal dialysis (CAPD), hemodialysis, and renal transplantation are the modalities of today for management of patients with end-stage chronic renal failure. Worldwide, peritoneal dialysis (PD) is becoming more and more popular and, in addition to the development of different types of catheters (Tenckhoff, Toronto–Western Hospital (TWH), etc.), different types of surgical techniques (open, percutaneous, and laparoscopic) have been presented for catheter insertion. Lately, with the evolution of laparoscopic surgery, various laparoscopic techniques have been described not only for the insertion of peritoneal catheters but also for management of the catheters in case of malfunction (1–13).

In our department, PD is achieved by CAPD, hemodialysis, and renal transplantation are the modalities of today for management of patients with end-stage chronic renal failure. Worldwide, peritoneal dialysis (PD) is becoming more and more popular and, in addition to the development of different types of catheters (Tenckhoff, Toronto–Western Hospital (TWH), etc.), different types of surgical techniques (open, percutaneous, and laparoscopic) have been presented for catheter insertion. Lately, with the evolution of laparoscopic surgery, various laparoscopic techniques have been described not only for the insertion of peritoneal catheters but also for management of the catheters in case of malfunction (1–13).

In our department, PD is achieved by CAPD using the permanent peritoneal catheter of the TWH type; so far, our experience concerning its insertion has been based on the open method (14). In this study, we present and discuss the results of a new laparoscopic technique for insertion of the TWH catheter.

PATIENTS AND METHODS

Between November 2000 and March 2002, 20 consecutive chronic renal failure patients (12 females and 8 males; mean age 62 years, range 54 – 70 years) underwent laparoscopic placement of TWH catheters. All patients were eligible to receive general anesthesia and none had a previous peritoneal catheter placed. Prophylactic antibiotics, usually consisting of a cephalosporin, were administered prior to the procedure.
During this technique, the patient is placed in a supine position. Initially, a 10-mm trocar is placed for the optics through an infraumbilical incision and with open cut-down technique. Alternatively, a 5-mm trocar and scope can be used. Insufflation with carbon dioxide is used to achieve pneumoperitoneum. Abdominal pressure during the operation is maintained below 12 mmHg as standard. The next step is the placement of two trocars under direct vision. First, a 5-mm trocar is placed in the right lower quadrant of the abdominal cavity and is used as a working port. Finally, a 10-mm trocar is placed 2 – 3 cm below the umbilicus, to the left side and through the rectus sheath in order to form a tunnel for the insertion of the catheter. Particular attention has to be paid in the placement of this trocar to avoid injury to the inferior epigastric vessels. Moreover, this trocar must be caudally angulated to facilitate the PD catheter remaining oriented in the pelvis and to avoid kinking of the catheter.

After placement of all trocars, a thorough inspection of the abdominal cavity is performed and special attention is paid to the presence of adhesions and herniations that could cause malfunctioning of the catheter after the induction of PD. Adhesiolysis can be performed, as was the case in two of our patients with prior abdominal surgery.

The 10-mm trocar is then removed and pneumoperitoneum is retained with the use of our index finger. By using a laparoscopic needle (GraNee needle; R-Med, Oregon, Ohio, USA) and with the help of a grasper from the 5-mm working port, a purse-string suture is performed under direct vision for the trocar-induced fascia and peritoneal defect [Figure 1(a) and 1(b)]. The tip of the catheter is advanced into the abdominal cavity, guided by the surgeon’s index finger. This maneuver is relatively easy because the disks of the catheter are flexible (Figure 2). With the help of a grasper, the tip of the catheter is directed into the pelvic cavity until the deep cuff of the peritoneal catheter is situated in the rectus muscle. During this step, the purse string is slightly tightened to retain the pneumoperitoneum.

The purse-string suture is then tightened as much as needed so there is no air leak from the catheter exit site. This is controlled by dropping a few milliliters of saline onto the port site and checking for bubble formation. In addition, catheter flow is tested to avoid excessive tightness of the suture.

A percutaneous tunnel is then formed in a cranial direction (Figure 3). To ensure satisfactory function of the catheter, we make sure there is no kinking; the patency test is performed as the last main step in our procedure. This is done with small amounts of peritoneal fluid flushed through the catheter’s lumen (in-out). The abdomen is gradually deflated while the position of the catheter tip is checked. The trocars are removed and the fascia of the 10-mm laparoscope site is closed with an absorbable suture.

**RESULTS**

All procedures were completed laparoscopically and the dialysis catheter was successfully placed in the desired position. General anesthesia was tolerated well by all patients. The mean operating time was...
We have not seen any outflow obstruction or herniation and, to date, 19 patients remain on PD. We observed these results in a mean follow-up time of 17 months (range 12 – 28 months). One surgeon undertook all procedures.

**DISCUSSION**

During the past decade, various teams have shown the technical feasibility of laparoscopic placement of different PD catheters (9,10,15–17). Moreover, they have shown that the laparoscopic placement of dialysis catheters has potential advantages over other techniques. In general, laparoscopic surgery is associated with minimal incision, less surgical trauma, and decreased adhesion formation (18). With the laparoscopic approach, adhesions, which are one of the main causes of obstruction, can also be resolved. Peritoneal entry is safer and the peritoneal catheter is placed accurately under direct vision. This seems to be of major importance for the lowering of incidences of outflow failure (4). This was the case in our study too; we did not notice any outflow obstruction. It is also essential that, along with placing the catheter, other surgical procedures could also be done, such as cholecystectomy (6). Laparoscopy is also considered the ideal method for salvaging malfunctioning PD catheters (2,7,19–21).

Laparoscopy is being utilized increasingly; however, experience with laparoscopic placement of TWH catheters is limited (9). This is due probably to the presence of disks, which do not facilitate entrance of the catheter into the trocars that have been so far developed. Our experience is favorable for the use of the TWH catheters, and for this reason we developed a laparoscopic technique for their insertion (14).

The core of our technique is the formation of the purse-string suture with the use of the GraNee needle. This is a needle we are familiar with, as we use it in our department for the closure of all fascia defects during laparoscopic procedures. In our series, we noticed one leakage at the catheter exit site, and this was due to a technical mistake. The observed port-site infections were early and were attributed to extensive intraoperative manipulation in the early stages of the study.

In one randomized study, the open and the laparoscopic techniques were shown to be equivalent (17). In another study, the authors were in favor of the laparoscopic method (16). However, it is too early to come up with safe conclusions because we do not yet have a standard technique for the different types of PD catheters. Moreover, we need a larger number of patients and a longer period of follow-up.

From our study we can reach the conclusion that the laparoscopic insertion of the Oreopoulos-
Zellerman catheter is a simple, quick, and safe method, with good long-term results. We believe future experience will encourage the laparoscopic technique as the method of choice.

REFERENCES