Laparoscopic Placement of “Self-Locating Catheter”: Our Experience and a Review of Literature


ABSTRACT

Among the available devices for peritoneal dialysis, the Di Paolo self-locating catheter (SLC) represents a milestone using to its ability to ensure a permanent reliable means of access to the peritoneum. Our experience included 20 laparoscopic peritoneal catheter placements from 2008 to 2011. We performed the laparoscopic surgical technique using 3 trocars: 2 10 mm and 1 5 mm. The technique allows catheter introduction into the pouch of Douglas under direct vision. Among 20 treated patients, 1 died due to causes unrelated to peritoneal dialysis; 1 underwent transplantation, and 1 was switched to hemodialysis because of ultrafiltration failure. The complications included 2 catheter displacements, only 1 of them needing repositioning by open laparotomy, and 1 case of peritonitis. No infection in the subcutaneous tunnel or obstruction and malfunction occurred among our patients. The Di Paolo SLC is similar to Tenckhoff catheter but includes a small tungsten cylinder at the tip that engenders continuous gravity in the peritoneal cavity, producing a reduced risk of dislocation. In a large series of cases, Di Paolo et al. reported a 0.8% dislocation rate after SLC placement compared with 12% using Tenckhoff catheters. They also demonstrated a reduced risk of other complications, such as peritonitis, infection, obstruction, and failure. These data have been confirmed by other authors with smaller case series. Thus, introduction of the SLC and improved surgical techniques result in better efficiency of peritoneal dialysis.

The displacement of a peritoneal dialysis (PD) catheter from its correct location in the pouch of Douglas is one of the major causes of dysfunction. In particular, it can cause PD failure by increasing effluent outflow and incomplete drainage of the abdominal cavity. Various catheter modifications have been proposed to reduce the tendency for migration.1–3 In 1993, Di Paolo reported his experience with a new catheter designed by his group. The Di Paolo self-locating catheter (SLC) is similar to a Tenckhoff catheter (TC), but includes a small tungsten cylinder at the tip (12 g in weight) that is coated in Silastic to prevent dislocation. The SLC displays important characteristics: continuous automatic gravitation of the tip to the pouch of Douglas, an internal force that opposes movements that gradually pull the subcutaneous cuff, and easier radiologic detection.1 SLC placement techniques, that vary among centers, provide the key to PD success: surgical insertion using an open technique, or laparoscopic or peritoneoscopic methods. Alternatively, catheters may be inserted by a percutaneous technique or by a fluoroscopy-assisted method.3–6

MATERIALS AND METHODS

From January 2008 to March 2011, 20 patients with end-stage renal disease underwent laparoscopic placement of the SLC. The patients consisted of 14 men and 6 women of overall mean age 49 years (range 20–80) but 53 and 44.5 years, respectively. All SLCs
were implanted by using the same laparoscopic method. The patients underwent antibiotic prophylaxis from the day before surgery. The same team operated on all 20 patients. The laparoscopic procedures were performed under general anesthesia with the patient in the Trendelenberg position. We preferred to induce a pneumoperitoneum with an open procedure according to Hasson, by a minimal periumbilical laparotomy, with placement of a 10-mm trocar. Carbon dioxide was insufflated into the intraperitoneal cavity with pressure limits set at 10–12 mm Hg. A 30° optic was placed through the trocar to perform a diagnostic laparoscopy. Two other trocars were placed under direct vision: 1 5-mm trocar in the left iliac fossa, at the site of the planned exit-site position of the PD catheter, and 1 10-mm trocar in the right iliac fossa. The SLC was introduced through a paraumbilical port with the tip placed in the pouch of Douglas and laparoscopic adhesiolysis performed to avoid possible malfunction of the peritoneal catheter. The distal cuff of the PD catheter was placed in the parietal peritoneum, creating a tobacco pouch to prevent leakage around the catheter. The proximal cuff was positioned in a subcutaneous tunnel tract constructed between the umbilical incision and the 5 mm trocar incision, leaking catheter from this last. Catheter patency was checked to ensure adequate inflow and outflow without leakage. The entire procedure was executed under direct vision. The correct position of the catheter was evaluated by a postoperative X-ray of the abdomen in the anteroposterior and laterolateral projections.4–6

RESULTS
The following parameters were evaluated during the follow-up: average operative time; mean duration of hospitalization; number of dislocations; cuff extrusion; exit-site infections; peritoneal infections; peritonitis episodes; and number of suspensions of PD procedures. Among 20 patients who underwent laparoscopic placement of the SLC, the average operative time was 30 ± 5 minutes and mean hospitalization 3 ± 1 days. Two catheter displacements occurred among our group, but only 1 needed repositioning by open laparotomy. Three catheters were removed: 1 from a patient undergoing transplantation, 1 from a patient who switched to hemodialysis because of ultrafiltration failure, and 1 from a patient who died due to causes not related to PD. The one episode of peritonitis had Staphylococcus aureus identified as the infectious agent. No tunnel or exit site infection was observed. Also, there were no perforations or external cuff extrusions. One patient reported pain after insertion of the SLC that progressively decreased and disappeared at 3 weeks after beginning PD. The 85% catheter survival and function at 1 year continues at the time of writing.

DISCUSSION
In our experience, the use of Di Paolo SLC has proved to be beneficial in many ways. First, it is associated with a low rate of complications. We observed only 2 cases of catheter dislocation (only 1 needing surgery) and 1 episode of peritonitis. Some studies have focused on the possibility that the catheter tip, which is heavier, and potentially detrimental due to the presence of tungsten, could perfo-
REFERENCES