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Clinical Research

Laparoscopic Peritoneal Dialysis Surgery is Safe and Effective in Patients with Prior Abdominal Surgery

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Background: Despite the lower cost, improved early survival, and preservation of the remaining kidney function, peritoneal dialysis is used by only 8.8% of the dialysis population in the USA. Intraabdominal adhesions reported in 70−90% of patients with prior abdominal surgery (PAS) reduce the peritoneal surface area and may increase the intraoperative and postoperative morbidity. The objective of this study is to evaluate the outcomes of laparoscopic peritoneal dialysis (LPD) catheter placement in patients with and without PAS.

Methods: Patients who had LPD catheters placed between January 2014 and August 2016 were retrospectively reviewed. A Kaplan-Meier analysis was performed to assess the revision-free catheter survival (RFCS) and revision-assisted catheter survival (RACS) between the 2 groups.

Results: One hundred forty-two patients had had LPD catheter placed during the study time, 82 (58%) with PAS. Lysis of adhesions (LOA) was required in 26 patients (28%) with PAS. Demographics and comorbidities were similar, but more women had PAS (65% vs. 35%, $P < 0.001$). Seventeen patients (12%) required revision, with no difference between the 2 groups. Both RFCS and RACS were similar in patients without and with PAS ($P = 0.38$ and 0.98, respectively). RFCS was 73% vs. 64% at 1 year (no PAS versus PAS) and 62% vs. 51% at 2 years, whereas RACS was 84% vs. 77% at 1 year (no PAS versus PAS) and 69% vs. 68% at 2 years. Only 2 intraoperative complications occurred, namely a superficial liver injury and pelvic hematoma. Three complications (0.02%) occurred within 30 days, namely 1 peritonitis and 2 catheter malfunctions. Overall complication rate was 25%, predominantly poor drainage (17% and 22% for PAS and no PAS, respectively), and there were no differences between the subgroups. No deaths occurred within a year of surgery during the study follow-up.

Conclusions: LPD and LOA can be performed safely in patients with multiple PAS. When possible, LPD catheters should be part of the vascular surgery training armamentarium and offered to patients with PAS.

INTRODUCTION

Since its introduction in 1968, peritoneal dialysis (PD) became popular as an effective home dialysis option providing flexible treatment times and better quality.[1] For effective and efficient PD, it requires a functioning catheter and adequate peritoneal surface area.[2] Extensive intraperitoneal adhesions are absolute contraindication for PD per National Kidney Foundation Kidney guidelines as they limit the peritoneal surface area, compromise membrane

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transport, and predispose to catheter malposition and kinking resulting in PD catheter malfunction.[3,4]

In the absence of a reliable noninvasive preoperative test to quantify and adequately assess the extent of intraperitoneal adhesions, laparoscopic assessment as part of the laparoscopic peritoneal dialysis (LPD) catheter placement provides the best tool for evaluating the extent of adhesions and whether a PD catheter placement should be attempted.

As a part of providing comprehensive care for the end-stage renal disease (ESRD) patients at our tertiary referral center, the vascular surgeons perform LPD catheter insertion. With the increased use of laparoscopic and endovascular procedures, the number of open gastrointestinal and vascular operations decreased by 30–70%, which requires the vascular surgeons to keep and maintain their laparoscopic skills.[5]

The purpose of this study is to evaluate the outcomes of LPD catheters placement in patients with prior abdominal surgery (PAS).

PATIENTS AND METHODS

The hospital's institutional review board (IRB) approved the study and the phone calls. The IRB did not require individual patient consent.

We retrospectively reviewed the charts of the patients who had LPD catheters placed between January 2014 and August 2016 with a follow-up till March 2017. Phone calls for all patients with unknown current catheter status were completed. We divided the patients into 2 groups, with and without previous abdominal surgery.

Data were collected via manual abstraction of each patient's electronic and paper chart. The data were stored in an Excel (Microsoft Corp, Redmond, Wash) database. The data included demographics and clinical characteristics including, but not limited to, age, sex, BMI, past medical history, past surgical history especially previous abdominal surgery, LPD catheter placement, complications, and revisions.

Revision-free catheter survival (RFCS) and revision-assisted catheter survival (RACS) at 1 and 2 years were assessed using Kaplan-Meier curves. A Fischer exact test was used for group comparisons. All statistical analyses were performed using the R Statistical Package (Vienna University, Vienna, Austria). Means were reported with standard error of the mean unless otherwise noted.

SURGICAL TECHNIQUE

After performing the history and physical examination, a thorough discussion with the patient about renal replacement options is carried out. If we agree on PD, we discuss the best site for catheter exit, right or left side, and if we should place it above or below the belt line (Fig. 1). The patient is examined in the supine and upright positions, and the exit site is marked preoperatively, with consideration for belt line. With an induction of general anesthesia, the appropriate antibiotic is given.

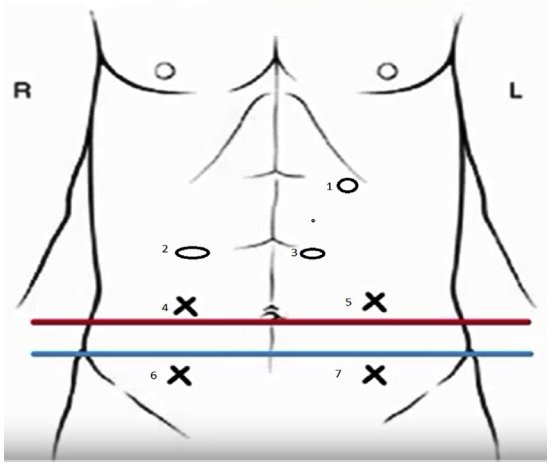

Fig. 1. Sites of ports and possible exit sites of PD catheter.

The procedure is started with placement of the first port below the left costal margin at the midclavicular line (site number, 1; Fig. 1), introducing the camera, and examining the whole abdomen. Pneumoperitoneum is induced using CO_2, and then under direct vision, the second port is placed at the level of the umbilicus in the midclavicular line (site number, 2; Fig. 1). A small incision is made about 2–3 cm lateral to the umbilicus (site number, 3; Fig. 1), ipsilateral to the side of the peritoneal dialysis catheter exit, and another small incision is made at the exit site.

Through the incision site number 3, a needle is inserted by making a small subcutaneous tunnel before entering the peritoneum to anchor the PD catheter and prevent it from moving away from the pelvis. A peel-away sheath is inserted over the wire, and sometimes it is helpful to advance the sheath by straitening the wire with the grasper in the pelvis while the assistant pulls on the wire outside the abdomen. The catheter is inserted through the sheath, and with the help of the grasper, the tip is placed in the pelvis. The catheter is taken from site number 3 to the exit site using a clamp or a metallic tunneler. The catheter is tested using 0.9% saline and is packed with heparin. Port-site fascia are closed if immediate PD use is anticipated, otherwise we do not because they are 5-mm ports.