Synchronous Laparoscopic Insertion of Peritoneal Dialysis Catheter and Cholecystectomy in Patients with End-Stage Renal Disease and Gallstones – Our Experience

In patients with end-stage renal disease who are candidates for peritoneal dialysis (PD) and have gallstones or gallbladder polyps, it is advised to perform synchronous insertion of PD catheter and cholecystectomy. With gallbladder removal at the time of peritoneal catheter insertion we can avoid infective complications, such as acute cholecystitis and possible PD failure. This article presents our experience with synchronous laparoscopic cholecystectomy and insertion of a PD catheter.

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Several guidelines recommend gallbladder removal before or at the time of peritoneal dialysis (PD) catheter insertion in patients who have gallstones or gallbladder polyps and are candidates for PD (1). Thus we can avoid infective complications connected with gallstones, such as acute calculous cholecystitis and possible PD failure. Along with PD catheter obstruction, infective complications are the most common reasons for PD failure and transfer to hemodialysis (2). With the development of minimally invasive surgery, laparoscopic insertion of the PD catheter has become a standard method for providing PD access in patients with end-stage renal failure in many institutions, and laparoscopy offers an option for synchronous gallbladder removal and PD catheter insertion (3).

In our institution, we have performed laparoscopic insertions of PD catheters for the past few years, and this article presents our experience with synchronous laparoscopic cholecystectomy and insertion of a PD catheter in patients with end-stage renal disease and gallstones.

PREOPERATIVE PLANNING AND SURGICAL TECHNIQUE

In our institution, laparoscopic insertion of the PD catheter has become a standard method for providing PD access in patients with end-stage renal disease who are candidates for PD. All procedures are performed by 1 abdominal surgeon. In patients with gallstones or other benign gallbladder pathology, synchronous laparoscopic cholecystectomy is performed. Prior to the operation, patients are admitted to the nephrology department, where they are prepared for surgery. The surgeon visits the patient at the nephrology department and discusses with him the operation and possible complications. The skin exit site of the PD catheter is chosen with the patient. The procedure is performed under general anesthesia. All patients receive perioperative antibiotic prophylaxis (Cefazolin 2 g intravenously). We use a 'cholecystecomy first and PD catheter insertion second' approach. The sterile operative field is prepared in a standard manner. For proper placement of the PD catheter, the coiled tip of the catheter is aligned with the upper border of the pubic symphysis and the positions of the deep cuff and subcutneous cuff are marked on the skin. The skin exit site of the PD catheter is also marked. We then perform laparoscopy and evaluation of abdominal cavity and pelvis for possible adhesions or any other pathology. The approach is through supraumbilical skin incision and creation of pneumoperitoneum with Veress needle. We insert an 11-mm trocar and camera into the abdominal cavity above the umbilicus. Then we insert an 11-mm trocar in the epigastrium under the xiphoid and 2 5-mm trocars under the right costal margin. After diagnostic laparosopy and evaluation of the peritoneal cavity, we perform the cholecystectomy and remove the gallbladder from the abdominal cavity. We are very careful, when dissecting the gallbladder from its bed, not to perforate the gallbladder and contaminate the abdomial cavity with bile and stones. Meticulous hemostasis is also performed in the gallbladder bed to prevent later development of intra-abdominal hematoma or abscess. The gallbladder is put in a laparoscopic specimen bag and removed from the abdomen through a supraumbilical incision. The abdominal drain is not inserted under the liver into the gallbladder bed.

When the cholecystectomy is complete, the camera is transferred to the epigastric trocar and attention is directed to performing the PD catheter insertion. Rectus sheath tunneling

is performed with a special trocar through a paramedian skin incision which is made at the position of the marked deep cuff. The trocar is introduced under a 45-degree angle through the abdominal wall, and the peritoneum is punctured under visual control to avoid injury of the epigastric artery and small bowel. In our institution, we use straight Tenckhoff catheters with 2 Dacron cuffs and a coiled tip. Through the trocar, the PD catheter is inserted into the abdominal cavity under visual guidance. With an endoscopic forceps, the coiled tip of the PD catheter is placed into the pelvis and the catheter is driven outwards at the previously marked skin exit site. The catheter is flushed with saline and checked to ensure the inflow and outflow are undisturbed. The working instruments and trocars are removed from the abdominal cavity. The fascia at the supraumbilical and epigastric trocar is sutured, and skin wounds are also sutured with intradermal resorbable sutures. With careful suturing of fascia at port sites, we can avoid later port-site hernias and dialysate fluid leak. After the surgery, the patient is admitted to the abdominal surgery department for a 24-hour observation and the next day back to the nephrology department. Abdominal lavage with a low volume of dialysate fluid is performed a few hours after surgery and every day thereafter. Patients usually start with PD 2 weeks after surgery, when the postoperative wounds are healed.

OUR EXPERIENCE

From October 2015 to December 2018, we performed 53 laparoscoic insertions of PD catheters. All procedures were performed by 1 abdominal surgeon. Eleven patients had simultaneous gallstones, and in those patients, laparoscopic cholecystectomy was performed at the time of PD catheter insertion. All patients had asymptomatic gallstones. Those 11 patients were operated between January 2016 and December 2018. There were 8 females and 3 males, median age was 55.5 (31 – 76) years at the time of surgery. Two patients had kidney transplantation previously. We surveyed early postoperative complications that could be connected with the cholecystectomy (bleeding, hematoma or abscess in the gallbladder bed, bile leakage) or with PD catheter insertion (early infection of the catheter tunnel, skin exit-site infection, early peritonitis, pericatheter leak, mechanical problems with PD catheter such as catheter obstruction or dislocation). A few hours after surgery, peritoneal lavage was performed in all patients with a low volume of dialysate fluid. All patients were free of any early perioperative or postoperative complications connected with the surgery. Two weeks after surgery, they started with PD. After discharge from hospital, they were regularly followed up by a nephrologist in their outpatient clinic. Until the present time, none of the late complications (infection of the catheter tunnel, skin exit-site infection, peritonitis, pericatheter leak, mechanical problems with the catheter [catheter tip migration, inflow and outflow obstruction], port site hernia) have been observed in any of the 11 patients.

DISCUSSION AND CONCLUSIONS

Laparoscopic surgery has been gaining in popularity for the past few years (4). Since 1987, laparoscopic cholecystectomy has become standard procedure for treatment of cholelithiasis and gallbladder inflammation (5). With the development of advanced laparoscopic procedures, laparoscopic surgery has also gained popularitiy in providing PD access in patients with end-stage renal failure who are candidates for PD (6). There are many advantages of laparoscopic cholecystectomy and laparoscopic insertion of PD catheter over an open procedure, and including: reduction in operative time, postoperative pain, postoperative pulmonary dysfunction, postoperative recovery time, less incisional hernias, and better cosmetic outcome. The concern of concomitant cholecystectomy and catheter insertion is the presence of potential bactibilia and contamination of the abdominal cavity during cholecystectomy in cases of gallbladder perforation with spilling of bile and stones, especially in patients with gallbladder and biliary tract disease and older patients who are prone to having bactibilia (7). We were therefore very careful not to perforate the gallbladder during dissection from its bed. The gallbladder was always put in a bag and extracted from the abdominal cavity without opening the bag. The meticulous hemostasis was performed in the gallbladder bed to prevent the formation of a hematoma or abscess. We were thus successful in preventing infective complications with our 'cholecystectomy first, catheter insertion second' approach.

There is still no consensus on the use of laparoscopy in patients receiving chronic ambulatory PD (CAPD), and there is no clear recommendation in the literature on how to manage perioperative dialysis. Our patients start with PD 2 weeks after surgery, when the postoperative wounds are healed. There are reported cases of successful laparoscopic cholecystectomy in patients on CAPD with early return to CAPD from 1 to 14 days after surgery (5,8). The concern of early return to CAPD is peritonitis and failure of CAPD, which was described in 1 report to be around 70% in patients after the laparoscopic procedure (4). For that reason, some authors recommend temporary cessation of PD for 2 weeks post-laparoscopic procedure, maintaining the patient on hemodialysis during this period (4). All of our 11 patients had asymptomatic gallstones. Some studies have found that patients without symptoms have about a 7% to 26% lifetime risk of developing them (9). Research now weighs against concomitant cholecystectomy with most abdominal surgeries for asymptomatic gallstones (10). The latest guidelines recommend gallbladder removal prior to, or at the time of, PD catheter insertion in patients who have gallstones and are candidates for PD (1). In our institution, we have adopted this policy because our transplant program insists on performing cholecystectomy in patients with asymptomatic gallstones and polyps prior to being listed. Laparoscopy can help in freeing adhesions prior to catheter insertion and confirms the proper position of the catheter tip. None of our 11 patients had intra-abdominal adhesions or any other pathology, so advanced laparoscopic

techniques were not neccessary. Synchronous procedures are more efficient and cost-effective, sparing the patient the possibility of having to undergo 2 or more operations.

Our experience with synchronous laparoscopic cholecystectomy and PD catheter insertion is very positive, since we have not observed any peri- or postoperative complications. For all patients who are candidates for PD and have gallstones, we recommend gallbladder removal at the time of PD catheter insertion. Studies show roughly 1 in 5 patients may have bactibilia, occasionally polymicrobial, and including anaerobes (7). Surgical judgement should determine the order in which synchronous procedures are performed, especially in patients who have symptomatic cholelithiasis.

DISCLOSURES

The author has no financial conflicts of interest to declare.

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