



## Update on Peritoneal Dialysis Access Surgery

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### Editorial

Peritoneal Dialysis (PD) has been a proven mode of renal replacement therapy for over 15 years and while its usage has risen globally, it has waxed and waned in the United States (US) with current statistics showing that only 10% of patients with ESRD are utilizing this form of dialysis [1]. This is surprising since PD offers many advantages to Hemodialysis (HD) including: improved patient autonomy and quality of life, preservation of residual renal function, survival benefit for first two years and lower costs [2-10]. Patient selection in the US appears to rely heavily on nephrologist recommendations, which may be based on their fellowship training, group practice patterns, personal bias and strength of their existing PD program. Absolute contraindications to PD include documented ultrafiltration failure of the peritoneal function, severe protein malnutrition and or proteinuria >10 g/day, active intraabdominal infection, loss of domaine/unrepairable abdominal wall hernia, and loss of peritoneal volume due to dense abdominal adhesions not amenable to laparoscopic lysis. There are also “barriers to PD” which can be overcome with the correct patient and nephrology team education such as old age, obesity and polycystic kidney disease [11].

Once a patient is deemed an appropriate candidate for PD, the Pre-Op Process includes medical evaluation and risk stratification with clearance for general anesthesia, education and abdominal marking and planning for catheter insertion and exit sites. In addition, the surgeon must note prior abdominal surgery and do a thorough examination for hernias. Prophylactic antibiotics should be used prior to laparoscopic insertion of PD catheter. A first generation cephalosporin is the drug of choice but vancomycin should also be considered at some institutions [12].

The optimal catheter choice remains a matter of debate as many configurations have been developed over the years in an attempt to decrease dysfunction, pain and infection. The catheter used most commonly today has two cuffs to minimize change of infection, a coiled intraperitoneal segment which can decrease pain on inflow and outflow and either a straight or curved (swan neck) segment between the two cuffs. Extended catheter systems allow the subcutaneous tunnel to extend to a pre-sternal or upper abdominal exit site. It has been recommended that each of these options should be at the surgeon’s disposal to keep the exit site away from the belt line. If the belt line is low, a straight segment allows a lateral tunnel and exit above the belt line, while a swan neck allows the exit site to be below the belt line when needed. Pre-sternal and upper abdominal exit sites may be preferred in patients who are obese have large pannus or have an ostomy.

The most popular Insertion options currently in use include Laparoscopic insertion, open insertion, and percutaneous fluoroscopic guided insertion. Several authors have reported on “advanced laparoscopic insertion” using rectus sheath tunnel, lysis of adhesions and omentopexy as the best way to decrease PD catheter dysfunction and increase catheter survival compared to other insertion techniques [13-15]. The technique uses standard laparoscopic equipment and general anesthesia. Access is preferably gained via right or left upper quadrant verses needle or optical viewing trocar. Supraumbilical access may increase the rate of hernia formation later. Before insufflation the insertion site is marked based on laying the catheter over the patient and lining the top of the pig tail to the superior aspect of the pubic tubercle. The “deep cuff is marked on the skin and this is the insertion point. It is recommended to use a 5 cm rectus sheath tunnel to keep the catheter directed toward the pelvis. This involves making an incision at the insertion point and using a sheath and dilator or 8 mm trocar to pierce the anterior fascia and enter the space just above the peritoneum. The tip is then tunneled under laparoscopic vision toward the pelvis for 5 cm and then the peritoneum is pierced. The catheter is fed through this device into the pelvis and the dilator is peeled away (if using a trocar the deep cuff is advanced to a position below the anterior fascia and the trocar removed). The cuff must be positioned below the anterior fascia to avoid dislodgement and pseudohernia formation. A simple hemostat may be used to accomplish this. The fascia is then closed with a stitch near the catheter. The exit site is chosen based on the previously marked belt

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line and is also based on a distance at least 3 cm away from the distal cuff. The catheter should be tested with 500 ml to 1000 ml of fluid to confirm excellent flow both in and out. It is also recommended that the transfer set be placed under sterile conditions, followed by occlusive dressing which is not removed for one week, until the patient sees the PD nurse. The patient is not allowed to shower or bath during this time [12].

Despite the advantages of the advanced laparoscopic insertion technique, it may not be applicable for all patients. Patients who are too high risk to undergo general anesthesia are best served by open insertion or ultrasound guided percutaneous insertion. The later technique is growing in popularity as it can be performed in radiology suite under light sedation, and very low hernia and complication rates. However, this technique may be limited in patients with history of prior abdominal surgery. Despite the operation performed, strict attention to detail following the best practices and a postoperative protocol will maintain the optimal function. This includes patient education and training from a dedicated peritoneal dialysis team to prevent infectious complications and laxatives to prevent constipation. The optimal timing of commencement of dialysis after catheter insertion has not been studied in randomized controlled trials. Based on level three and four evidence, the CARI guidelines suggest that “when possible, peritoneal dialysis should not be commenced until at least 2 weeks after the insertion of the dialysis catheters” [16]. The ISPD and European dialysis and transplant association-European renal association also suggest a 2 week healing time prior to starting peritoneal dialysis [17]. Several groups have advocated “urgent start” PD in patients who present in renal failure and want to avoid HD. The results are promising that PD may be initiated in <48 hr and still have a very low leak and complication rate [18].

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