Neobladder creation is still a conduit to peritoneal dialysis – Successful use of peritoneal dialysis after invasive bladder cancer

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Abstract
Peritoneal dialysis (PD) is as safe and more cost-effective than haemodialysis (HD). It also allows patients to undergo renal replacement therapy (RRT) from home. However, PD remains underutilised in many parts of the world. This is true in part because of many perceived relative contraindications to PD, including a history of prior major abdominal surgery. Prior major abdominal surgery is a concern for standard bedside or surgical catheter placement since these patients are at risk of having adhesions, which can complicate catheter placement. However, with laparoscopic advancements, prior major abdominal surgery is no longer even a relative contraindication to PD for skilled and experienced surgeons. We report the case of a male in his 70s with a history of cystoprostatectomy which was curative for a muscle invasive bladder carcinoma 5 years prior to his RRT. The patient had longstanding chronic kidney disease which worsened gradually. After receiving RRT education, the patient favoured PD. The catheter was placed despite the surgeon noting abdominal adhesions and the patient successfully underwent 12 months of PD which had a positive impact on his quality of life. He transferred to HD after contracting a complex PD-associated peritonitis. Thus, new research should be conducted to better understand the real impact of prior abdominal surgeries as a contraindication to PD, especially in centres where the surgeons have experience with advanced laparoscopy.

Keywords
Peritoneal dialysis, peritoneal dialysis after neobladder creation, peritoneal dialysis with prior abdominal surgery, relative contraindication to peritoneal dialysis

Introduction
In many renal programs, patients needing renal replacement therapy (RRT) can choose between haemodialysis (HD) or peritoneal dialysis (PD) while awaiting for a kidney transplant, if possible.¹ In the 1990s, PD was viewed by many as an inferior treatment than HD.² Nonetheless, during that same period, PD saw a tremendous improvement in the risk of death and the risk of transfer back to HD.² However, PD still remains relatively underused.³,⁴ With PD now having a similar or even lower risk of death than HD,⁵⁷ and being more cost-effective,⁶‑⁷ many jurisdictions actively encourage PD as the preferred dialysis modality.⁸ Despite these efforts, PD remains relatively underutilised in part because of perceived contraindications.⁵ One of the most frequent contraindication is a history of prior major abdominal surgery or multiple prior abdominal surgeries.⁵,⁹

Since abdominal surgeries are common, some have questioned the appropriateness of this relative contraindication.⁵,⁹ For skilled and experienced laparoscopic surgeons, prior major abdominal surgery is no longer even a relative contraindication to PD.⁵,⁹ In our dialysis program, we attempt laparoscopic PD catheter insertion and PD as a RRT modality in patients with prior abdominal surgeries if patients express a strong interest for it. Here we report the
clinical observations of a patient with prior complex pelvic surgery who was able to successfully undergo PD catheter placement.

Case description
This 76-year-old male who had a history of hypertension, dyslipidaemia and benign prostatic hypertrophy was followed for chronic kidney disease (CKD) secondary to a chronic glomerulonephritis. He was diagnosed with muscle invasive bladder carcinoma 5 years prior to initiation of RRT. At that time, he underwent radical cystoprostatectomy with extended node dissection and ileal neobladder creation which, in his case, was curative.

Over the subsequent years, his CKD progressed. The patient adamantly wanted to pursue a home modality, and therefore, a subcutaneously embedded PD catheter was inserted laparoscopically when his estimated GFR was 14 mL/min/1.73 m², as is common practice in our centre. The surgeon noted multiple adhesions but was able to find an appropriate area on the left side of the abdomen for the catheter.

Four months post catheter insertion, the patient complained of worsening fatigue and exhibited uremic symptoms with an estimated GFR of 8 mL/min/1.73 m² body surface area. His potassium was 5.2 mmol/L, his bicarbonate was 14 mmol/L, his calcium was 2.09 mmol/L and his phosphate was 1.95 mmol/L. In light of these findings, a decision was made to externalise his catheter and he was initiated on continuous cycling peritoneal dialysis (CCPD) with 2 L fills and 85% tidal volumes. He initially reported frequent low flow drain alarms. As the alarms persisted 2 months after initiation of RRT, he underwent a catheter manipulation under fluoroscopy revealing a right upper quadrant catheter position with occlusion of its distal part and side holes. The catheter was recanalised using multiple wires. The patient continued CCPD with 85% tidal volumes and achieved good clearance and good ultrafiltration. He noted occasional drain alarms at night which were rapidly corrected by rotating to his left side.

Four months after RRT initiation, he developed a slow to resolve coagulase-negative Staphylococcus peritonitis that was ultimately treated successfully with 21 days of intraperitoneal vancomycin, a slightly longer duration than the standard 14 day treatment at the discretion of the attending nephrologist. Twelve months after initiation of RRT, he presented to the hospital with abdominal pain and a cloudy effluent. He was diagnosed a highly resistant Enterobacter cloacae PD-associated peritonitis which initially responded to a 3-week course of intraperitoneal tobramycin but relapsed within a week of stopping antibiotics. At that time a decision was made to remove the PD catheter and transition to HD. No abdominal imaging was performed and his peritonitis resolved with catheter removal and a 3-week course of oral ciprofloxacin.

Discussion
Different factors contribute to PD utilisation. Patients choosing PD tend to have fewer comorbidities, be younger, more active, more autonomous and more educated compared to patients who choose HD. A longer pre-dialysis follow-up with a nephrologist also increases the likelihood that a patient will choose PD over HD.

Our patient was followed in a CKD clinic for more than a decade before RRT initiation, had few comorbidities other than hypertension, had the help of his wife and was himself autonomous and adamant on receiving home therapy. Therefore, other than prior extensive abdominal urological surgery, he was a good candidate for PD. It was then decided that PD would be favoured despite prior major abdominal surgery and the presence of a neobladder, which are relative contraindications for PD.

Major intra-abdominal surgery can be perceived as a relative contraindication to PD despite advances in PD catheter insertion. This may be in part due to a lack of awareness of successful outcomes reported in the literature, especially when it comes to laparoscopically inserted PD. Despite this, to date, there have been no reports of successful PD catheter insertion among adult patients with a radical pelvic resection surgery with urinary diversion.

While ileal conduits and neobladders are not specifically mentioned as a contraindication to laparoscopic PD catheter insertion by some groups, other sources do still view prior abdominal surgeries as a relative contraindication to PD.

Adhesions from previous surgeries can impact PD efficacy. However, our case highlights that PD can be successful in patients with a history of extensive urological surgery. An alternative to focusing on the presence of prior surgeries is to use laparoscopy to verify the peritoneal cavity’s adequacy for PD. In light of his history of urinary diversion surgery, our patient would have likely been excluded from pursuing PD by many, yet he successfully received CCPD for 12 months. His clinical course did not suggest that his gram-negative peritonitis was related to his previous abdominal surgery but in the absence of CT imaging we cannot completely exclude this possibility. Nephrologists should therefore be aware of the relative nature of most PD contraindications in order to increase PD availability. Greater access to PD would be favourable in many parts of the world, since it is as safe and effective as HD but is more cost-effective and requires less costly infrastructures. This case demonstrates the fact that patient’s preferences should have a significant impact when deciding which RRT modality is best suited, even if there appears to be certain obstacles to PD, such as prior abdominal surgery. Even one additional year of home therapy with PD can be very beneficial for the patient’s overall quality of life.
Conclusion

In summary, we report successful use of PD in a patient with extensive prior pelvic surgery and neobladder. This should help comfort clinicians and patients considering PD in similar situations. As surgical techniques evolve, a revision of what constitutes a relative contraindication to PD is necessary, especially as it pertains to prior major abdominal surgery where advanced laparoscopy is available. This in turn could allow treating nephrologists to propose a broader range of RRT options to patients.

Author contributions

AC wrote the first draft of the manuscript. All authors reviewed and edited the manuscript and approved the final version of the manuscript.

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Ethical approval

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Informed consent to participate

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