CASE REPORT

Urine producing peritoneal dialysis catheter

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SUMMARY

Insertion of a peritoneal dialysis (PD) catheter into the bladder is a rare complication of PD. Herein, we describe a case of an adult patient undergoing PD tube insertion who was found to have the catheter in the urinary bladder. He was treated with PD catheter removal, prophylactic antibiotics and repair of the bladder wall. This report gives a timely reminder of and the need to check for urinary bladder distension prior to PD catheter insertion surgery. Perforating injuries should be considered in patients with symptoms related to the urinary tract and free flow of fluid from the PD tube.

BACKGROUND

In the UK, about 400–800 persons per million population require renal replacement therapy. Peritoneal dialysis (PD) accounts for up to 30% in adults and 56% in children on renal replacement therapy.¹

Infection remains the achilles heel of PD with rates of 1 per 18 months per person. Non-infective complications such as mechanical complications are by far more common than surgical complications occurring during catheter insertion. Here, we report a case of urinary bladder perforation complicating PD catheter insertion.

Figure 1 Abdominal X-ray (AP view) showing the PD catheter low lying in the perineum. AP, anteroposterior; PD, peritoneal dialysis.

Figure 2 CT image of the abdomen, showing the PD catheter traversing the prostatic urethra to reach the penile urethra. PD, peritoneal dialysis.

We describe a male patient who underwent elective insertion of a PD catheter. We believe that bladder dilatation should be considered and checked for, especially in patients with diabetes to avoid inadvertent perforation of the bladder. This case highlights the risk factors and treatment options.

CASE PRESENTATION

A 66-year-old man with progressive chronic kidney disease (CKD) due to diabetic nephropathy was admitted electively for PD catheter insertion.

A Tenckhoff double-cuff pigtail catheter was inserted surgically via an infraumbilical approach and was uncomplicated except for the drainage of approximately 3 L of fluid which was thought to be ascites secondary to CKD-related fluid retention.

Over the subsequent days following PD catheter insertion, the patient complained of dysuria and urinary incontinence. He was treated for a presumed symptomatic urinary tract infection. Two weeks after the procedure, first attempt to use the PD catheter, as a normal practice, resulted in urethral drainage of PD fluid.

On examination of the patient, the PD catheter was palpable in the perineum.

INVESTIGATIONS

Abdominal X-ray ([figure 1](#)) revealed the PD catheter lying low in the perineum and subsequent CT scan ([figure 2](#)) showed that the PD catheter had

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migrated such that it was traversing the prostatic urethra and reaching the penile urethra.

TREATMENT

He underwent uncomplicated PD catheter removal, bladder repair and insertion of a urinary catheter to protect the repair. A new PD catheter was placed at a later date. This was correctly positioned and functional.

DISCUSSION

The UK has a significant proportion, approximately 19.1%, of patients undergoing PD as a form of renal replacement therapy compared with other western countries and globally where the average is 11%. Recurrent infections remain a major drawback during PD. Mechanical complications (around 1%) are more common than surgical complications and are mostly related to catheter function such as malposition of the tip of the catheter or its movement or kinking. Surgical complications are rare but need to be recognised as shown in the above report.

Surgical complications encountered during catheter insertion into the abdominal cavity arise due to the interaction between the methods/techniques of insertion, the patient-related factor and level of expertise. The expertise of the person who inserted the PD catheter in this case is a senior consultant grade with vast experience in placement of PD catheters both directly and laparoscopically with publication on this subject²

The conventional open surgical approach using mini laparotomy for catheter insertion is widely used. Other techniques such as laparoscopic, percutaneous and peritoneoscopic are less common but increasing in use. The former approach, open surgical approach, was used in this case.

The conventional approach is quicker to perform compared with the laparoscopic one (14.3 vs 21.9 min, $p < 0.0001$).³ In a meta-analysis, no advantage of one approach over the others was demonstrated with respect to complications.⁴

Early surgical complications are rare. They include internal organ perforation, bleeding and early infection. However, the most common is peritoneal leak and this is usually discovered after starting PD.

Internal organ perforation occurs during entry into the abdominal cavity or when advancing the catheter with the stylet into the abdomen. Bowel is the most common internal organ susceptible to perforation. It occurs in 1% of procedures.⁵ It presents in the first 48 hours after surgery with signs of peritonitis and requires urgent surgical intervention.

Perforation of the urinary bladder is however extremely rare. We found only 15 reported cases in the literature. It can occur if the bladder is not adequately emptied before the operation. This is either because of neurogenic bladder or chronic bladder outflow obstruction. In these cases, the bladder extends outside the pelvis into the lower abdomen, at the area of the surgical incision. Discovery is usually delayed, presenting with symptoms of bladder irritation and becomes more evident when dialysis is commenced. Various methods can be used to confirm the diagnosis. Urinalysis will be strongly positive for glucose. Cannulography will show contrast in the urinary bladder.⁶ Direct cystoscopy to visualise the catheter in the bladder has also been used.⁷

Similar to our patient, several of these patients were diabetic.^{8–10} Long-standing diabetes may cause autonomic

Learning points

- ▶ Careful preoperative assessment prior to peritoneal dialysis catheter insertion should be considered especially in those at a risk of bladder hypotonia or atonia.
- ▶ This complication may occur irrespective of the level clinical expertise.
- ▶ Simple measures such as direct questions about urinary urge, portable bedside bladder scans and prophylactic urethral catheterisation could be invaluable to preventing inadvertent perforation of the bladder.
- ▶ The drainage of a large amount of fluid post insertion should alert one to the possible insertion into the bladder.

neuropathy, which consequently causes hypotonia or atonia of the bladder. As the disease is slowly progressive patients might be asymptomatic. Other co-morbid conditions that could predispose to bladder hypotonia or atonia including spinal cord injuries, multiple sclerosis and stroke should be sought.

This case emphasises the need for careful preoperative assessment. Patients with diabetes should be questioned directly about subtle urinary symptoms. Prior to the operation, a post void ward-based bladder scan or transurethral catheter should be considered.

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