Case of the Month from the University of Amsterdam UMC, the Netherlands: ureteric injury by a Foley catheter, an unusual complication in pregnancy

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Case

A 34-year-old woman, multigravida, with no urological medical history, presented at 38 weeks of pregnancy with urinary retention during induced labour. Delivery was induced due to gestational diabetes. Her previous two pregnancies were delivered vaginally, without complications. A bladder Foley catheter was placed by the midwife, who reported that placement was difficult and insertion was met with some resistance. There was immediate efflux of 600 mL urine. Initially, the catheter was productive. However, during the subsequent hours, urinary production decreased. The patient had received epidural anaesthesia for pain relief but, despite this, she experienced urgency for micturition. The catheter was removed and a new Foley catheter was placed. This was again reported to be a challenging procedure, with notable deep insertion of the catheter. The patient underwent a caesarean section because of very slow progression of labour and a healthy baby was born. During surgery, a full bladder was observed and a urologist was consulted. Inspection of the urinary tract was challenging because of a very enlarged uterus in combination with the caesarean incision in the lower abdomen. Dorsally on the right side of the uterus, a round non-pulsating elastic lesion and a strand going distally were palpated. When the catheter balloon was deflated, the round lesion disappeared. Differential diagnosis included perforation of the bladder, with the catheter placed in the retroperitoneal space. Placement of the Foley catheter in the right ureter was considered, but rejected. The catheter was removed and a new one was placed with balloon intravesically. During the following hours, the patient experienced worsening abdominal pain and ultrasonography showed fluid abdominally and retroperitoneally. Serum haemoglobin was stable, decreasing the likelihood of haemorrhaging. Contrast CT of the abdomen was obtained, which showed a defect of 3 cm in the proximal right ureter with leakage of contrast fluid outside of the urinary system. A substantial amount of free fluid was present in the retroperitoneal space. No contrast leakage around the bladder was seen. These findings indicated that the catheter had been inserted into the right ureter and the insertion itself or the inflation of the balloon caused damage. Findings are shown in Fig. 1. This explains the symptoms of a feeling of full bladder and minimal urine production despite a catheter being in situ.

Discussion

As it is a very rare occurrence for a Foley catheter to be placed into the ureter, it is not the first diagnosis healthcare workers think of when urinary production decreases. Other reasons such as sepsis, shock, dehydration or a blocked

Fig. 1 Abdominal CT with i.v. contrast demonstrating proximal right ureter injury with extravasation of contrast.
catheter are diagnoses that are commonly first explored, especially as placement of a bladder catheter high up in the ureter must be painful for the patient. In our patient, epidural pain relief might have dampened this sensation. It is important that timely accurate diagnosis is made as complications such as hydronephrosis, ureteric rupture and infection can occur [1]. The occurrence of this complication in patients during labour is only described in two case reports in the scientific literature [2,3]. Notably, in both cases, there was also involvement of the right side. The reason for this remains unclear. Dilatation of the right urinary tract is seen in pregnancy and could be a risk factor for easier insertion into this system [2].

As it is such an uncommon occurrence there is no clear treatment course after a misplaced catheter is discovered. Removing the catheter by deflating the balloon and placing a new one intravesically is the obvious course of action. However, suspicion should stay high for iatrogenic ureteric injury. CT with intravenous contrast scan is a useful tool and, in many cases, the moment at which the diagnosis of ureteric injury is made.

In our patient, the catheter had already been repositioned successfully when a diagnosis of proximal ureter laceration was made on CT. Guidelines recommend that ureteric injury is best diagnosed immediately and that proximal lesions are surgically repaired with a uretero-ureterostomy. In cases where diagnosis is made after a significant amount of time, ureteric stenting is recommended but no clear preference is stated between percutaneous nephrostomy and retrograde JJ stent. An extended literary review from 2004 states that percutaneous nephrostomy is the safest option, with possible later attempt at antegrade placement of stent. Retrograde stenting was stated as typically unsuccessful (50–95%) [1].

In the present case, open surgical reconstruction with direct anastomosis was deemed unattractive due to delayed timing of accurate diagnosis and expected surgical technical difficulties due to an enlarged postpartum uterus. Furthermore, placement of nephrostomy was seen as a drastic approach with longer hospital admittance time, especially if antegrade placement of the stent were to be attempted. The literature also indicates that nephrostomy placement alone without ureteric stenting might lead to more morbidity, requiring further surgical intervention [4]. In both the earlier-mentioned reports of similar cases, a retrograde ureteric stent
was placed immediately after catheter removal and patients did not experience any long-term complications. A case series from Korea describes 11 patients with ureteric injury after gynaecological surgery with significantly delayed diagnosis, successfully treated with retrograde stent placement with optional use of ureteroscopy [5]. The options of immediately going back to surgery to attempt retrograde stent placement vs placement of nephrostomy were deliberated.

**Treatment course**

After counselling, the patient was brought back to the operating room, where transurethral cystoscopy was performed and no damage of the bladder was seen. The right ostium looked more swollen compared to the left ostium. Retrograde pyelography showed massive extravasation of contrast outside the proximal part of the right ureter, indicating ureteric damage (Fig. 2). No contrast was initially seen in the collecting system proximal to the lesion. We managed to place a polytetrafluoroethylene-nitinol guidewire with hydrophilic tip wire (Sensor; Boston Scientific, Marlborough, MA, USA) in the right urinary system, which was confirmed by contrast following the wire into the urinary system. A 7-F JJ catheter (Biosoft Duo double-loop ureteric stent; Coloplast NL, Amersfoort, the Netherlands) was inserted. A 16-F bladder catheter was then placed. There were no complications during the procedure or during postoperative recovery. Two weeks later, micturition cystography was performed to check for urinary reflux, and possible leakage, neither of which were observed, and the bladder catheter was removed. Six weeks postoperatively, retrograde pyelography was performed. This showed no leakage of contrast outside the urinary system (Fig. 3); however, there was narrowing of the proximal ureter, indicating possible stenosis. The JJ catheter was removed. Follow-up renography showed a minimal disproportion function distribution of 45% in the right kidney and normal (minimal slowed) drainage, indicating a good short-term outcome (Fig. 4). Further follow-up renography will be scheduled in 3 months to monitor long-term outcomes such as ureteric strictures causing delayed urinary drainage.
Conclusion

Iatrogenic ureter damage caused by ureteric catheterization with a Foley catheter is a rare occurrence, but can lead to severe short-term complications such as obstruction with hydronephrosis, acute kidney injury and ureteric rupture. If symptoms of flank pain, unproductive catheter and urgency for micturition occur, incorrect positioning of the catheter should be considered. In this case, the proximal right ureter was damaged, and this was diagnosed with contrast CT and retrograde pyelography. A ureteric JJ stent was placed retrograde for 6 weeks and a bladder catheter for 2 weeks. This led to successful short-term outcomes. Further follow-up will indicate whether long-term complications have occurred.

Conflict of Interest

None declared.

References

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