Hydronephrosis caused by herniation of ureter through psoas muscle fascia: Case report and review of literature

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ABSTRACT

The herniation of ureter is rare. A 59-year-old woman with hydronephrosis caused by herniation of ureter through psoas muscle fascia was observed. The patient referred to our clinic with four weeks’ history of left flank pain and fever. Computed tomography urography and antegrade combined with retrograde urography revealed tortuous and proximal dilated ureter and hydronephrosis on the left side. Herniation of ureter through psoas muscle fascia was confirmed in operation and laparoscopic ureteroplasty with end to end anastomosis was done. No obvious hydronephrosis or flank pain was observed in follow-up for one and a half year.

1. Introduction

The herniation of ureter is rare. A series of inguinal, scrotal, and femoral herniations of the ureter has been reported. Internal hernias of the ureter are fewer. A case of ureteral herniation into the psoas muscle fascia is found. To our knowledge, this is the first case for herniation of ureter through psoas muscle fascia.

2. Case presentation

A woman, aged 59, with BMI of 20.4 kg/m2, was admitted to Fujian Provincial Hospital in November 2020 with four weeks’ history of left flank pain, associated with fever. Four weeks ago, she went to a local hospital with left flank pain and fever. Color Doppler ultrasonography revealed dilated proximal ureter and hydronephrosis on the left side. The computed tomography (CT) scan of the abdomen showed dilated proximal ureter and hydronephrosis on the left side, which might be related to the stricture of the proximal ureter. The symptoms had been somewhat relieved by antibiotics. Then the patient was admitted to our hospital. Clinical examination revealed painful percussion of the left renal area. Subsequent investigations showed that the white blood cell count was normal and urinalysis showed no abnormal constituents. Her serum creatinine was normal. Computed tomography urography revealed tortuous and proximal dilated ureter and hydronephrosis on the left side (Fig. 1a, Fig. 1b). Then ultrasound guided percutaneous nephrostomy on the left side was performed. The drained urine contained a mild number of pus cells and yielded no organisms. Ten days later, antegrade combined with retrograde urography showed twist and stricture of the left ureter at the level of the upper border of the third lumbar vertebra, which might be ureteropelvic junction stenosis (Fig. 1c).

We intended to perform a transabdominal laparoscopic ureteroplasty on the left side. After conducting preoperative evaluations and informed consent, the patient was operated under general anesthesia in a right lateral position. The ureter was markedly dilated above the level of the upper border of the third lumbar vertebra and adherence to the left psoas muscle moderately. After separation with some difficulty, the left ureter was found partially protruding into the left psoas major muscle fascial hiatus with a small fossa lying on the psoas major muscle fascia (Fig. 1d). The proximal ureter at the stenotic adhesion was dilated and tortuous, and the distal ureter at the adhesion was normal. The calibre of the hernia sac was about 5mm. The left ureter was fully dissociated, and the ureter was incised longitudinally upward for 1.5 cm at the end of the dilated proximal ureter over the stenosis. There was no obvious stenosis in the upper and lower ureteral lumen. The ureter was cut obliquely, and the ureteral stricture was sent for pathological examination. After resection of the redundant portion of the ureter, the lowest position of the proximal end of the ureter was sutured to the lowest position of the arcuate distal end of the ureter with absorbable sutures. The posterior wall was reconstructed with interrupted sutures. A ureteral stent was put in the ureter by a guide wire and the end of the ureteral stent was confirmed by intravesical injection of methylene blue.

Abbreviations: CT, computed tomography; MRU, magnetic resonance urography.

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solution. Anterior wall was sutured continuously. Psoas muscle fascial hiatus was fixed with absorbable suture. Pathological examination showed urothelial hyperplasia, submucosal fibrous tissue hyperplasia, interstitial edema, and a small amount of chronic inflammatory cell infiltration. The nephrostomy tube was removed 10 days after the operation. There were no hospital postoperative complications. The ureteral stent was removed 3 months after the operation. The patient was visited and followed up every three months. The patient complaint no flank pain in 1.5-years follow-up. The magnetic resonance urography (MRU) in 1.5 years showed that the proximal ureter was mildly dilated but not twisted and no hydronephrosis was found (Fig. 2).

3. Discussion

Herniation of the ureter is a rare condition, which can cause ureteral obstruction. In 1880, LeRoux found a scrotal hernia of ureter and bladder, alongside of a sac containing intestines and omentum in a man on autopsy. In 1892, Reichel was the first to describe a case of ureteral hernia at operation. Dourmashkin searched the literature and tabulated a series of inguinal, scrotal, and femoral herniations of the ureter. Internal hernias of the ureter are even more exceptional. Reports have been published of ureteroscopy hernia, herniation between the psoas muscle and iliac vessels, and superior lumbar triangle herniation. The major clinical manifestation reported in the literature is obstructive uropathy, including hydroureter, hydronephrosis, flank pain, fever, and even pyonephrosis. The diagnosis can be made on intravenous pyelography, retrograde pyelography, antegrade pyelography and CT. Computed tomography urography is recommended in our opinion. The choice of treatment varies according to the clinical conditions and the primary choice is operation. Surgical options include excision of the hernia with reimplantation of the remaining ureter, reduction of ureter length, transabdominal or transgluteal surgical reduction of the hernia plus fixation of the ureter, and even nephro-ureterectomy.

A case of ureteral herniation into the Psoas Muscle Fascia is reported. As far as we could determine, this is the first such case to be reported in the literature. The psoas major muscle originates from the transverse processes of T12 and the lumbar vertebrae and extends inferiorly to merge with the iliac muscle at the L5-S2 level, becoming the iliopsoas muscle. In this case, the ureter herniated into the hiatus on the psoas muscle fascia at the origin of the psoas muscle, which might be congenital, and resulted in inflammation and stenosis of the ureter. The unusual twisted and dilated ureter on CT scan preoperatively could be a warning for the herniation of the ureter. Although we did not consider the possibility of ureteral hernia before surgery in this case, we sutured the hiatus on the psoas muscle fascia to prevent the reoccurrence of ureteral hernia.

![Fig. 1. The images before and during operation. (a) CT scans without contrast show the twisted ureter herniated into the psoas major muscle (red arrow). (b) Contrast material-enhanced CT scans show the twisted ureter herniated into the psoas major muscle (red arrow). (c) Antegrade and retrograde pyelography show the twisted and dilated proximal ureter. (d) The image during operation show the ureter herniates into the hiatus (red arrow) on the psoas muscle fascia and the proximal ureter over the stricture is dilated. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)](image1)

![Fig. 2. Coronal T2-weighted MR urography image in 1.5-year follow-up. The proximal ureter was mildly dilated and no hydronephrosis was found.](image2)
4. Conclusion

To our knowledge, this is the first case for herniation of ureter through psoas muscle fascia. Unusual tortuous and proximal dilated ureter and hydronephrosis in computed tomography urography or antegrade combined with retrograde urography might indicate this situation and the primary choice is operation.

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Declaration of competing interest

All of the authors declare that they have no competing interests.

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