Robotic assisted laparoscopic repair of a symptomatic ureterosciatic hernia

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Ureterosciatic hernias (USH) are a rare entity and to date there have been limited case reports detailing their presentation, diagnosis, and management. Until recently, repair of ureterosciatic hernias has been performed via open, endoscopic, or purely laparoscopic approaches. We present the second known published case of a robotic approach to the USH repair with detailed outline of the surgical technique accompanied by video recording from the operative procedure.

Key Words: hydronephrosis, ureter, sciatic foramen

Case report presentation

A 60-year-old Caucasian female presented to our emergency department with acute onset of left flank pain associated with nausea and emesis. The patient admitted to dull intermittent pain in the left side over the past several years, although this episode was the first to necessitate medical attention. Past medical and surgical histories were unremarkable. Her laboratory evaluation noted a normal white blood cell count and creatinine. Urinalysis was remarkable for microscopic hematuria with 5 RBC/HPF without stigmata of infection.

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A video clip is available online at www.canjurol.com

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Due to the flank pain associated with microscopic hematuria, a CT urogram was obtained which noted: 1) delayed nephrogram; 2) hydroureteronephrosis; and 3) tortuosity of ureter with herniation of the ureter into the sciatic foramen, Figure 1a-1c. Subsequent cystoscopy with left retrograde pyelogram confirmed abrupt lateral deviation of the ureter into the bony pelvis with contrast passing antegrade to this location under high pressure, Figure 2.

Based on the clinical presentation and radiographic data, a presumptive diagnosis of ureterosciatic hernia (USH) was made. Imaging and clinical information appeared concordant with other published information regarding this rare entity.[1] After discussion of various treatment options, we elected to proceed with a robotic-assisted laparoscopic repair. The patient was notified that ureteral reimplantation would potentially be necessary if there was question of viability of the herniated ureteral segment.

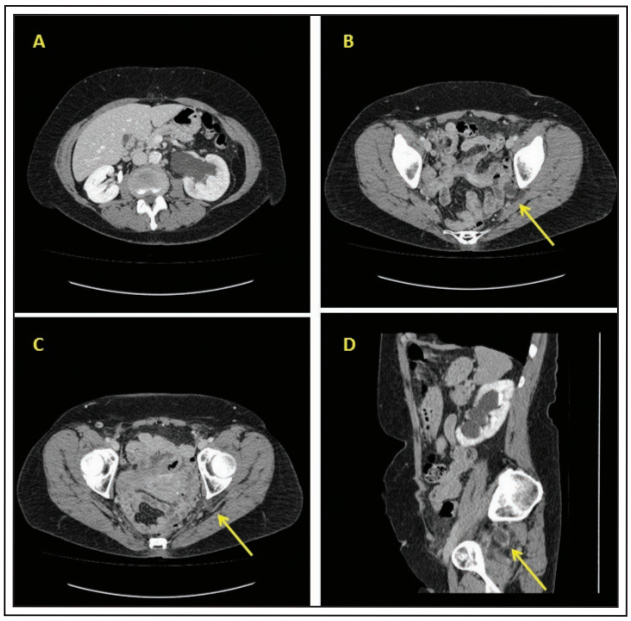

Figure 1. a) Axial cross section of left kidney noting moderate hydronephrosis; **b and c)** Axial cross section demonstrating ureter (yellow arrow) entering into sciatic foramen; **d)** Sagital cross section highlighting ureter (yellow arrow) in sciatic foramen.

Operative management

The patient was placed into the supine, low lithotomy, steep Trendelenburg position analogous to standard positioning for robotic assisted pelvic surgery. All pressure points were carefully padded. Once the patient was properly positioned, prepped, and draped, insufflation was achieved using the Veress needle technique. Trocar placement was similar to standard robotic pelvic surgery and included a 12 mm umbilical camera port, two robotic 8 mm ports positioned at the level of the umbilicus 10 cm to each side of the midline as well as a 5 mm assistant port superior and lateral to the camera port. The da Vinci Si Robotic System (Intuitive Surgical Inc., Sunnyvale, CA, USA) was then docked at a position between the legs.

The surgical procedure was then accomplished using the following 10 key steps also highlighted in the accompanying video.

1. Reflect the left colon medially to expose the iliac vessels and isolate the dilated ureter as it crosses anterior to the iliac vessels.
2. Encircle the ureter with a vessel loop to aid with medial traction via assistant port as dissection is carried into the deep pelvis.
3. Mobilize the ureter extensively to ensure adequate length in the event reimplantation is necessary. Maintain sufficient ureteral adventitia to prevent ischemic damage to the ureter.
4. Elevate the ipsilateral ovary and fallopian tube to get better access into the deep pelvis.
5. Continue the ureteral dissection down to the supra-piriformis space.
6. At this juncture, a distinction between the dilated proximal and decompressed distal ureter is noted. It is at this location in the pelvis that the ureter herniates into the supra-piriformis space which is the most common location for a USH, Figure 3. A surgical decision must be made between transection of the ureter with reimplantation versus continued ureterolysis. Given the appearance of healthy ureter, we chose to proceed with ureterolysis.
7. Dissect away the desmoplastic reaction and inflammatory attachments anchoring the ureter into the hernia. At this juncture, the ureter should release into the out of the supra-piriformis space.
8. The supra-piriformis space can be closed by re-approximating the cut peritoneal edges with suture or Hem-o-lok clips. This closure prevents subsequent herniation.
9. Perform flexible ureteroscopy to ensure ureteral viability particularly at the site of herniation and to rule out any intrinsic strictures proximal to the site of narrowing.
10. Place a temporary ureteral stent to promote antegrade drainage following extensive manipulation of the ureter.

Postoperative course

The patient was observed overnight and discharged home the following morning. The ureteral stent was removed several weeks post-surgery. Three months after the procedure, the patient underwent a diuretic renogram demonstrating prompt washout of the radiotracer. Renal ultrasound 6 months thereafter noted complete resolution of her hydronephrosis. Clinically, the patient's flank pain has completely resolved.

Discussion

Ureteral hernias are a rare entity and amongst them USH are the least common.[2] To date, there have been only a handful of case reports delineating their presentation, diagnosis, and subsequent treatment.[2-5] With advancements in laparoscopic surgery, there have been several descriptions of minimally invasive approaches to repair these hernias.[3] More recently, a robotic approach has been described.[4] To our knowledge, our case is only the second ever reported robotic assisted repair of a USH.

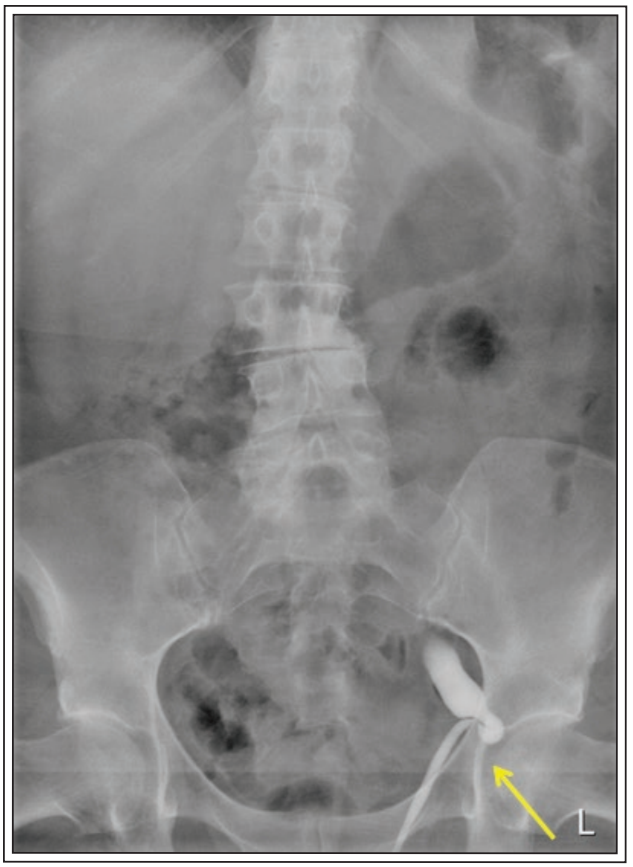

Figure 2. Left retrograde pyelogram noting lateral deviation of the ureter with abrupt caliber change proximal to sciatic foramen.

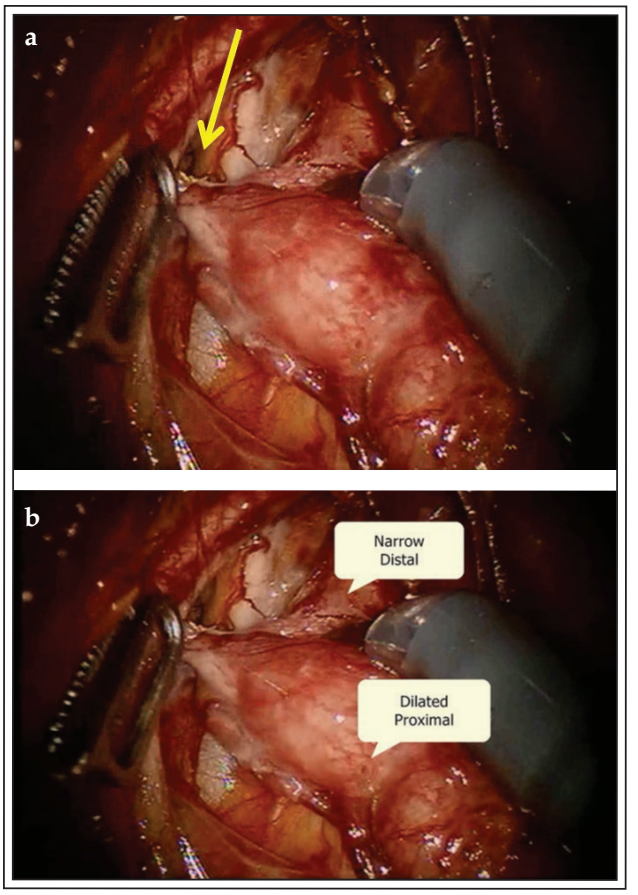

Figure 3. **a)** Ureter tracking down into the supra-piriformis space (yellow arrow); **b)** Transition point in ureter between dilated and decompressed ureter.

We believe our presentation is unique in that we demonstrate (with video guidance) 10 reproducible steps which aid in positioning, exposure, intraoperative execution and decision making. This will allow any surgeon experienced in robotic pelvic surgery to address this uncommon entity. Furthermore, our technique differs from the previously described robotic approach in that we use ureteroscopy to visualize the proximal ureter and to facilitate the placement of a retrograde ureteral stent. We acknowledge that ureteroscopy is not an absolute necessity in such a case although direct visualization does give greater confidence regarding the integrity and viability of the ureter. In contrast, the approach by Singh and colleagues involved creation of a ureterotomy for stent placement which theoretically places the patient at increased risk of stricture disease, urine leak, and fistulization.[4] We believe that incorporation of flexible ureteroscopy at the end of the case is crucial to ensure integrity and health of the ureter following hernia entrapment.

Conclusion

This case report highlights robotic assisted laparoscopic management of a symptomatic ureterosciatic hernia. The stepwise description should permit any robotic pelvic surgeon the adequate guide for successful surgical completion. □

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