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Letter

Robot-assisted extravesical ureteral reimplantation with ureteral tailoring and dismembering for complex obstructed megaureter

Dear Editor,

The advantages of robotic technology including improved dexterity and visualization are particularly evident in challenging reconstructive procedures of the lower urinary tract [1,2]. A recent literature review confirmed the feasibility and efficacy of robot-assisted ureteral reimplantation in case of complex anatomy or prior surgery [3]. Intra-corporeal ureteral tapering and dismembering are also feasible options using robot-assisted surgery [4].

We aimed to describe the technique of robot-assisted extravesical ureteral reimplantation with ureteral tailoring and dismembering for complex obstructed megaureter, using technical adaptations that are novel in the pediatric population. The study received appropriate institute review board approval (approval number: 20345NP) at Federico II University Hospital in Naples, Italy.

A 16-year-old boy came to our attention for symptomatic multiple stones (max size 27 mm×21 mm) in the left pre-vesical ureter, and obstructive left megaureter (13 mm in diameter). Anamnestic interview revealed a history of bilateral Grade 5 vesicoureteral reflux that was treated in another hospital with four endoscopic subureteric injections of Macroplastique® polydimethylsiloxane (Macroplastique®, Uroplasty, Inc., Minnetonka, MN, USA). The cause of the obstructed megaureter was iatrogenic ureteral stricture, secondary to repeated endoscopic subureteric injections. At time of our observation, the patient had a right nonfunctioning kidney and a left hypertrophic kidney with normal function and obstructed pattern on diuretic renogram. He also had a left double-J ureteral stent, previously positioned by adult urologists. The patient underwent ureteroscopy laser lithotripsy in our unit. At follow-



up, persistent symptomatic left megaureter (14 mm in diameter) and intramural concretions of the bulking agent within the intra-vesical ureteral segment were observed on ultrasonography. Five months following the ureteroscopy, the patient received robot-assisted extravesical ureteral reimplantation with ureteral tailoring and dismembering.

With regard to the operative technique, the patient was positioned supine in slight Trendelenburg and a Foley bladder catheter was inserted pre-operatively. Five trocars were placed: one 8-mm robotic camera port was placed transumbilically; three 8-mm robotic working ports were placed on the same line; and one 5-mm laparoscopic assistant port was placed at a 7-cm distance from the robotic ports. The left dilated ureter was identified and appeared enclosed by dense adhesions. The ureter was gently dissected either proximally or distally to the bladder entry. Despite the extensive dissection, the ureter was not enough mobilized to create an adequate anti-reflux tunnel. The bladder anterior wall was dissected from the pre-vesical space and the bladder was taken down towards the ureter. An additional fourth robotic arm was used to lift the bladder; the distal ureter was dismembered from the bladder; the lumen was inspected for presence of intraluminal stones, and it was ligated using 2–0 resorbable suture as more distally as possible to the bladder entry to avoid leaving a long ureteric stump. After completing the ureteral dismembering from the bladder, we visually confirmed that the ureter was not excessively large and did not need an extensive remodeling. The distal ureteral segment to be reimplanted was tailored removing the redundant tissue and was spatulated using scissors, to allow an adequate anastomosis. The detrusorotomy was performed using monopolar scissors to create flaps for ureteral tunneling. The ureteroneocystostomy was performed using 5–0 resorbable interrupted sutures ensuring that a 6 Fr double-J stent was inserted into the bladder before completion. The detrusor tunnel was closed over the ureter using three interrupted 3–0 resorbable sutures. A drain tube was placed into the pelvic space at the end of procedure. The trocars orifices were closed using resorbable sutures. The operative technique is described step-by-step in [Supplementary Video 1](#).

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Supplementary video related to this article can be found at <https://doi.org/10.1016/j.ajur.2022.01.008>

The operative time was 235 min and no intra-operative complications occurred. After surgery, the patient developed gross hematuria that resolved spontaneously at post-operative Day 3. The bladder catheter and the drain tube were removed on post-operative Day 3, and the patient was discharged on post-operative Day 4. The double-J stent was removed under short-duration anesthesia 3 months post-operatively. Post-operative ultrasonography was performed at 1, 3, and 6 months after the operation and showed improved left hydronephrosis (Fig. 1). Post-operative renal scan demonstrated improved drainage of the left kidney with a normal effective renal plasma flow (401 mL/min). To date, the patient is asymptomatic.

The robotic approach is versatile and provides immediate adaptations to overcome intra-operative challenges in case of complex ureteral reimplantation requiring tapering and dismembering [4,5]. Technical variations may facilitate excellent operative outcome in such difficult cases. As happened in our experience, if the ureter mobilization could not ensure an adequate length of the anti-reflux tunnel, a trick is to detach the bladder anterior wall from the pre-vesical space and mobilize the bladder. The ureteral tailoring should be completed before excision of the stenotic segment and re-anastomosis of the remaining ureter to the bladder. Another trick to ensure a dependent drainage and avoid stenosis of ureteral neo-hiatus is to spatulate the ureter before ureteroneocystostomy. The detrusorotomy should also be performed before this step of the procedure. It is also important to stabilize the bladder while performing the detrusorotomy. In our case, we preferred to place an additional fourth robotic port to introduce a grasper and stabilize the bladder.

Based upon our preliminary experience, we believe that robot-assisted approach is technically feasible and provide excellent outcome in the management of complex cases of obstructed megaureter. Further studies with larger series and long-term follow-up are needed to confirm the efficacy of the technique and its indications.

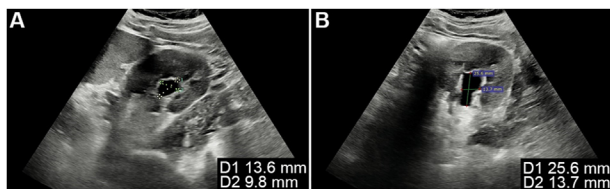


Figure 1 Left hydronephrosis improved significantly after surgery. (A) Post-operative ultrasonography; (B) Pre-operative ultrasonography.

Author contributions

Study concept and design: Ciro Esposito, Maria Escolino.
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Critical revision of the manuscript: Maria Escolino, Lorenzo Masieri, Ciro Esposito.

Conflicts of interest

The authors declare no conflict of interest.

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