Images in urology – Novel reconstruction using a cutaneous transureterostomy diversion during robot-assisted radical cystectomy in a patient with crossed fused renal ectopia

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Video available at *https://vimeo.com/manage/videos/1035306149*

KEY MESSAGES

- Robot-assisted intracorporeal cutaneous transureterostomy diversion without ureteral stent use is a natural extension of current extracorporeal cutaneous ureterostomy techniques, which is most appropriate in patients with chronically dilated ureter(s).
- This technique results in shorter operative time and avoids bowel complications after robot-assisted radical cystectomy.
- The maturation of the dilated distal ureter as urostomy results in excellent functional and cosmetic outcomes.

INTRODUCTION

Robot-assisted radical cystectomy (RARC) is becoming increasingly performed compared to open radical cystectomy (ORC) throughout the U.S. for definitive treatment of muscle-invasive (MIBC) and high-risk non-muscle-invasive bladder cancer.[1,2] Ileal conduit remains the most commonly used urinary diversion after RARC, which consists of approximately 88% of the cases.[1] Cutaneous ureterostomy following radical cystectomy remains an underused urinary diversion technique that is most commonly reserved for patients with poor surgical candidacy or a solitary renal unit.

Cutaneous ureterostomy is associated with a shorter intraoperative time and hospital length of stay, decreased blood loss, and fewer complications in elderly patients.[3] This technique avoids short-term complications of bowel surgery, such as ileus or anastomotic leak, and long-term complications, such as anastomotic stricture or metabolic abnormalities.[4,5] The most common complications of this technique are sepsis and ureteral obstruction from stenosis, which can usually be managed with temporary ureteral stents.[3,6] More contemporary series that have included both ORC and RARC patients have validated these findings.[6,7]

Herein, we demonstrate a novel robot-assisted intracorporeal cutaneous transureterostomy diversion during RARC in a patient with bilateral hydroureteronephrosis and left-to-right cross fused renal ectopia.

CASE REPORT

A 51-year-old female presented with a history of spina bifida with neurogenic bladder managed by clean intermittent catheterization, left-to-right crossed renal ectopia with fusion, who was diagnosed with cT4N1 high-grade urothelial carcinoma of the bladder with 1.5 x 1.1 cm right obturator lymphadenopathy on cross-sectional imaging. She completed NCT04223856, a trial for neoadjuvant enfortumab vedotin in combination with pembrolizumab for locally advanced and/or node-positive urothelial carcinoma.[8] Both kidneys were fused and located within the right side of the retroperitoneum (Figure 1). The right kidney had moderate hydronephrosis and hydroureter, while the inferior left kidney had severe hydronephrosis and hydroureter measuring up to 4 cm in diameter. Institutional ethics committee and informed patient consent were obtained to use video from this operation for educational purposes (Video available at: https://vimeo.com/1035306149).

The RARC was performed in the standard fashion with total anterior pelvic exenteration.[9] A super extended lymphadenectomy was also performed

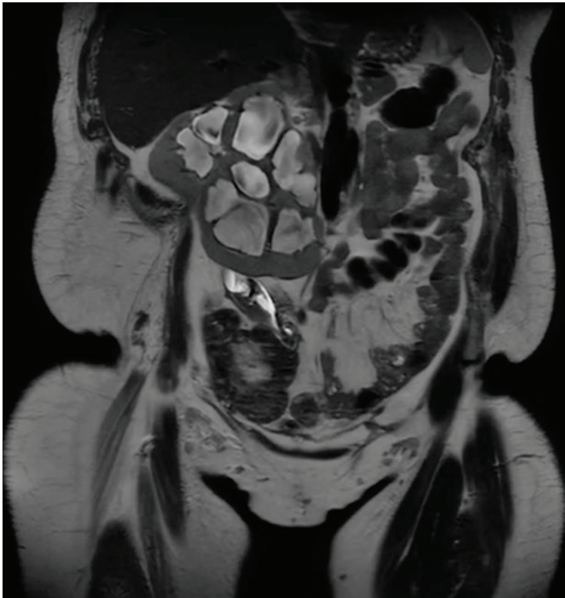

Figure 1. Preoperative magnetic resonance imaging demonstrating the left-to-right crossed renal ectopia with fusion.

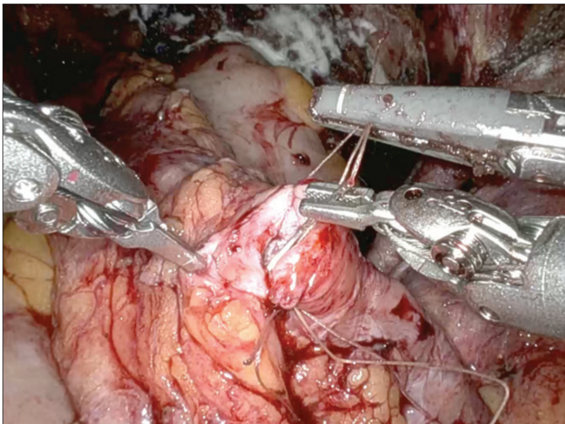

Figure 2. Right-to-left, end-to-side, transureteroureterostomy performed by running the posterior edges, followed by the anterior edges.

above the aortic bifurcation.

The urinary diversion was performed using an intracorporeal technique in the right lower quadrant. In this patient, the severely dilated left ureter traversed under the sigmoid mesentery and was almost adjacent to the moderately dilated right ureter within the right side of the retroperitoneum. Both ureters were fully mobilized from the level of the bladder to the proximal ureter using a combination of sharp and electrocautery dissection. Once there was adequate ureteral length and mobilization, the distal ureters were clipped and ligated. A right-to-left, end-to-side, transureteroureterostomy was performed by running the posterior edges,

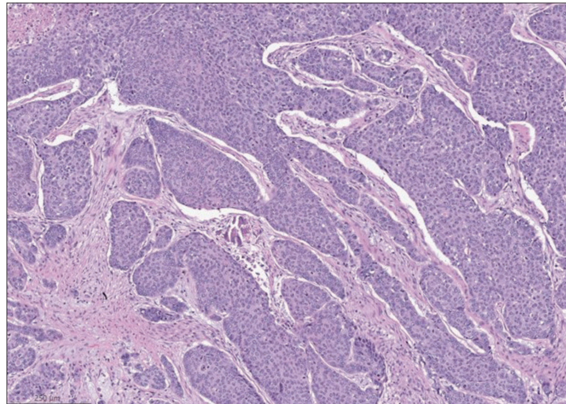

Figure 3. Hematoxylin and eosin stain of radical cystectomy specimen demonstrating high-grade urothelial carcinoma, with invasion into the muscularis propria.

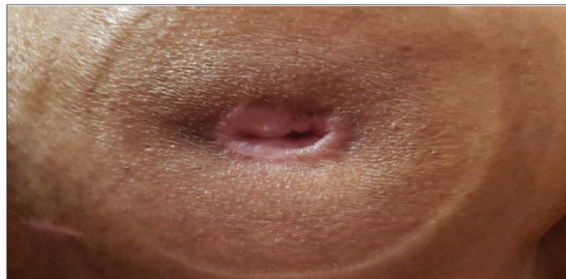

Figure 4. Postoperative view of the healed cutaneous ureterostomy.

followed by the anterior edges with 4-0 vicryl suture (Figure 2). No ureteral stents were used during the reconstruction. Once the transureteroureterostomy was completed, the left distal ureter was delivered to the right of the sigmoid mesentery, which is where the fused ectopic left kidney was situated (Figure 1), and then brought to the anterior abdominal wall and matured as a Bricker stoma without a stomal catheter.

Radical cystectomy specimen revealed ypT3b N0 high-grade urothelial carcinoma with squamous differentiation and negative surgical margins (Figure 3). A total of 54 lymph nodes were examined, which were all negative for tumor.

The patient had return of bowel function by postoperative day (POD) 1, tolerated a solid diet on POD 2, and was ready for discharge by POD 3. Ultimate discharge occurred on POD 9 due to insurance authorization for subacute rehab. She is currently doing well six months postoperatively, with no evidence of disease. There is no evidence of stricture at the transureteroureterostomy or cutaneous ureterostomy sites. She is satisfied with her stoma function without hernia, leakage from her appliance, or any skin excoriation (Figure 4).

DISCUSSION

Cutaneous ureterostomy remains an underused urinary diversion technique after radical cystectomy, which is usually reserved for poor surgical candidates or patients with a solitary renal unit. Despite advancements in surgical technique with the increased adoption of intracorporeal diversions, cutaneous ureterostomy diversion technique has undergone few modifications from its open description. We present a novel urinary diversion technique that can be used with a patient with hydroureteronephrosis to overcome the postoperative morbidity, as well as short-term and long-term complications associated with bowel diversions.

Stomal stenosis at the cutaneous ureterostomy site requiring a prolonged need for ureteral stents is a well-described complication of this technique. In a study comparing radical cystectomy patients with bilateral cutaneous ureterostomy using a single subumbilical stoma, two separate stomas, or ileal conduit, patients maintained ureteral stents for six months after cutaneous ureterostomy or three months after ileal conduit diversion.[10] This study found that the rate of successful first stent extubation was significantly higher for the single-stoma group, and that monthly ostomy-related medical expenses were significantly lower for this group compared to the other urinary diversions.[10]

Another recent study compared outcomes of Toyoda cutaneous ureterostomy with a modified single-stoma ureterostomy, with the routine maintenance of ureteral stents for three months in both cohorts.[11] This study found that the Toyoda group experienced a significantly higher rate of stoma retraction or stricture, urolithiasis, and acute pyelonephritis compared to the modified cutaneous ureterostomy group.[11] On multivariate analysis, the Toyoda technique and increasing body mass index were significantly associated with increased catheter-insertion rates.[11]

These contemporary studies suggest promising outcomes and decreased stomal stricture rates for single-stoma cutaneous ureterostomy after radical cystectomy.

CONCLUSIONS

The robot-assisted intracorporeal cutaneous transureterostomy diversion without ureteral stent use is a natural extension of current extracorporeal cutaneous ureterostomy techniques, which will avoid bowel complications after RARC in properly selected patients with chronically dilated ureter(s).

COMPETING INTERESTS: The authors do not report any competing personal or financial interests related to this work.

This paper has been peer reviewed.

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