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

Joshua S. Jue[1], Alvin C. Goh[2]
[1]Zucker School of Medicine at Hofstra/Northwell, Hempstead, NY, United States; [2]Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, NY, United States

**Cite as:** Jue JS, Goh AC. Images in urology – Novel reconstruction using a cutaneous transureterostomy diversion during robot-assisted radical cystectomy in a patient with crossed fused renal ectopia. *Can Urol Assoc J* 2024 August 30; Epub ahead of print. http://dx.doi.org/10.5489/cuaj.8815

Published online August 30, 2024

**Corresponding author:** Dr. Joshua S. Jue, Urology Service, Department of Surgery, Memorial Sloan Kettering Cancer Center, New York, NY, United States; juej@mskcc.org

***

**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 country for definitive treatment of muscle-invasive (MIBC) and high-risk non-muscle invasive bladder cancer.[1,2] Ileal conduit remains the most commonly utilized urinary diversion after RARC, which consists of approximately 88% of the cases.[1] Cutaneous ureterostomy following radical cystectomy remains an underutilized 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, 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 robot-assisted radical cystectomy in a patient with bilateral hydroureteronephrosis and left to right cross fused renal ectopia.

## METHODS

This is a case of a 51-year-old female 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 1.1cm 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 4cm in diameter. Institutional ethics committee and informed patient consent were obtained to use video from this operation for educational purposes (Supplemental Video).

The robot-assisted radical cystectomy was performed in the standard fashion with total anterior pelvic exenteration.[9] A super extended lymphadenectomy was also performed 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, followed by the anterior edges with 4-0 vicryl suture (Figure 2). No ureteral stents were utilized 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.

## RESULTS

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 1 and tolerated a solid diet on postoperative day 2, and was ready for discharge by postoperative day 3. Ultimate discharge occurred on postoperative day 9 due to insurance authorization for subacute rehab. She is currently doing well 6 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 underutilized 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 utilized with a patient with hydroureteronephrosis to overcome the postoperative morbidity, short-term complications, 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 6 months after cutaneous ureterostomy or 3 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 with Toyoda cutaneous ureterostomy to a modified single-stoma ureterostomy, with the routine maintenance of ureteral stents for 3 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 (BMI) 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 robot-assisted radical cystectomy in properly selected patients with chronically dilated ureter(s).

## REFERENCES

1. Elshabrawy A, Wang H, Dursun F, et al. Diffusion of robot-assisted radical cystectomy: Nationwide trends, predictors, and association with continent urinary diversion. *Arab J Urol*. 2022;20:159-167. https://doi.org/10.1080/2090598X.2022.2032562
2. Ray CH, Davaro F, Hamilton ZA, Raza J. Perioperative outcomes of open versus robot-assisted radical cystectomy in octogenarians: a population based analysis. *J Robot Surg*. 2023;17:1629-1635. https://doi.org/10.1007/s11701-023-01568-0
3. Longo N, Imbimbo C, Fusco F, et al. Complications and quality of life in elderly patients with several comorbidities undergoing cutaneous ureterostomy with single stoma or ileal conduit after radical cystectomy. *BJU Int*. 2016;118:521-6. https://doi.org/10.1111/bju.13462
4. Shimko MS, Tollefson MK, Umbreit EC, Farmer SA, Blute ML, Frank I. Long-term complications of conduit urinary diversion. *J Urol*. 2011;185:562-7. https://doi.org/10.1016/j.juro.2010.09.096
5. Hautmann RE, Abol-Enein H, Davidsson T, et al. ICUD-EAU International Consultation on Bladder Cancer 2012: Urinary diversion. *Eur Urol*. 2013;63:67-80. https://doi.org/10.1016/j.eururo.2012.08.050
6. Nabavizadeh R, Rodrigues Pessoa R, Dumbrava MG, et al. Cutaneous Ureterostomy Following Radical Cystectomy for Bladder Cancer: A Contemporary Series. *Urology*. 2023;181:162-6. https://doi.org/10.1016/j.urology.2023.08.018
7. Kadoriku F, Sasaki Y, Fukuta K, et al. A propensity score matching study on robot-assisted radical cystectomy for older patients: comparison of intracorporeal ileal conduit and cutaneous ureterostomy. *BMC Urol*. 2022;22:174. https://doi.org/10.1186/s12894-022-01123-3
8. Hoimes CJ, Flaig TW, Milowsky MI, et al. Enfortumab Vedotin Plus Pembrolizumab in Previously Untreated Advanced Urothelial Cancer. *J Clin Oncol*. 2023;41:22-31. https://doi.org/10.1200/JCO.22.01643
9. Truong H, Maxon V, Goh AC. Robotic Female Radical Cystectomy. *J Endourol*. 2021;35(S2):S106-15. https://doi.org/10.1089/end.2020.1190
10. Fu Z, Tian Z, Chen Y, et al. Analysis of the efficacy of a single subumbilical stoma for bilateral cutaneous ureterostomy after radical cystectomy. *Eur J Med Res*. 2023;28:273. https://doi.org/10.1186/s40001-023-01250-z
11. Li M, Fu X, Zu X, Chen J, Chen M. Modified Tubeless Ureterocutaneostomy in High-Risk Patients After Radical Cystectomy and its Long-Term Clinical Outcomes. *Technol Cancer Res Treat*. 2023;22:15330338231192906. https://doi.org/10.1177/15330338231192906

## FIGURES AND TABLES

**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.

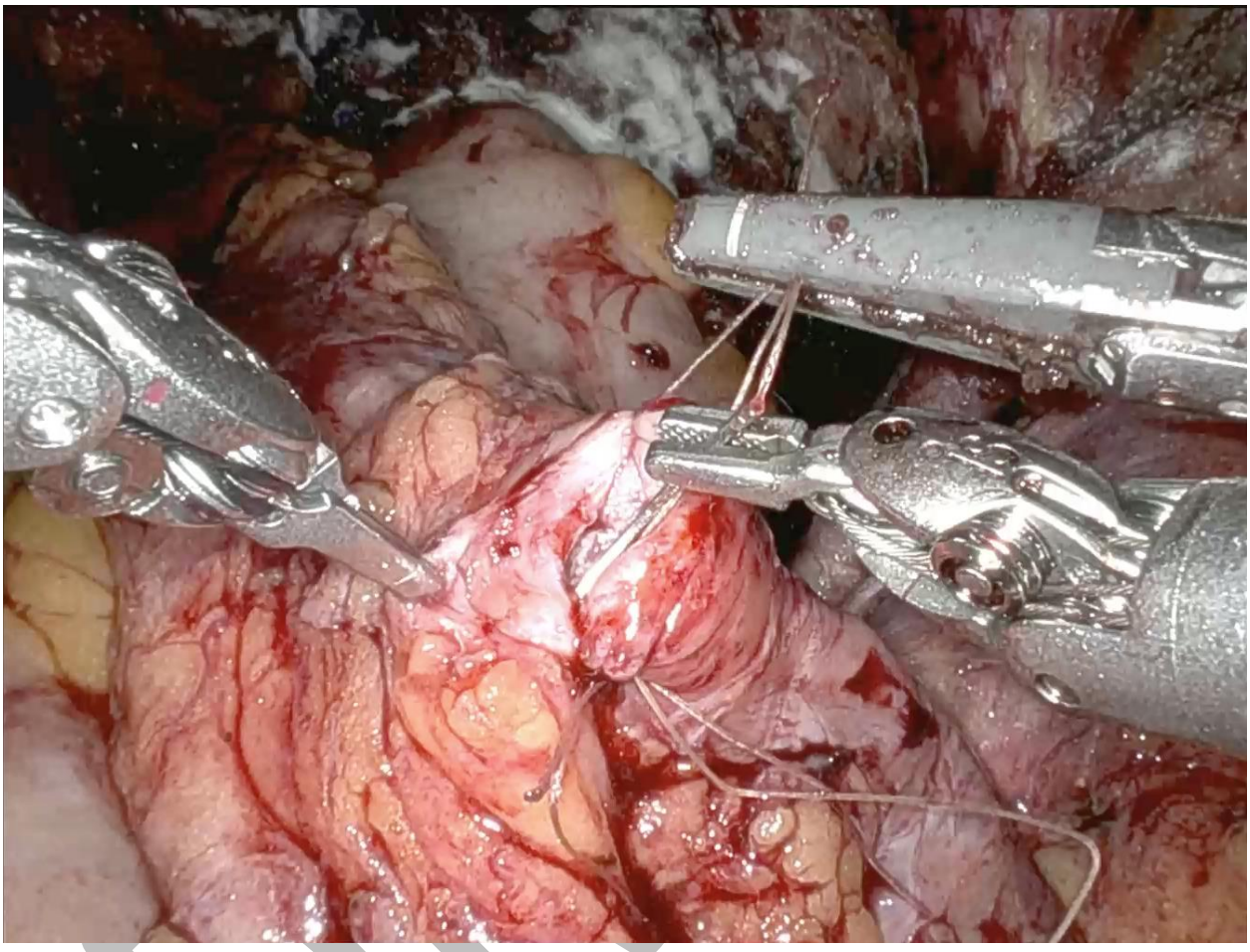

**Figure 3**. Hematoxylin and eosin stain of radical cystectomy specimen demonstrating high-grade urothelial carcinoma, with invasion into the muscularis propria.

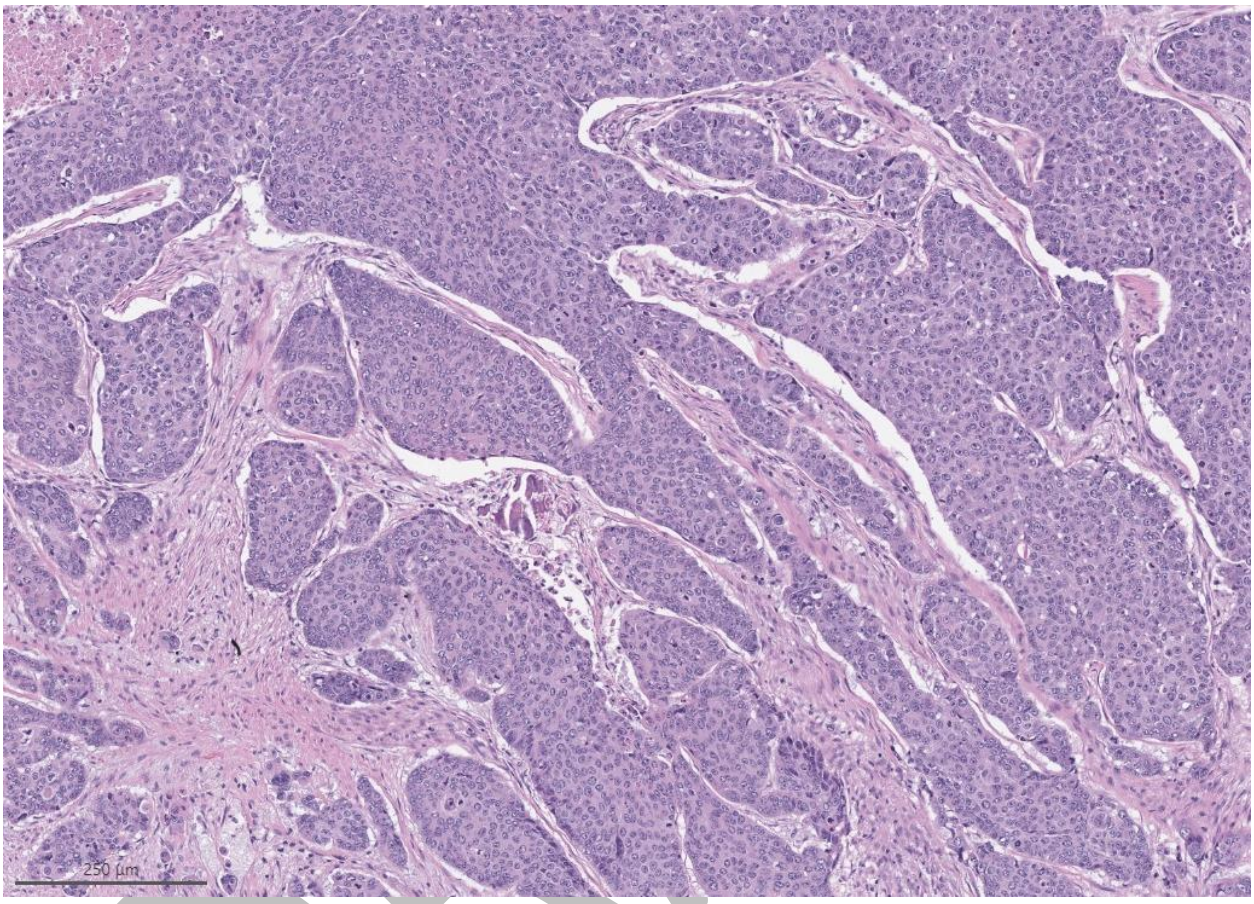

**Figure 4.** Postoperative view of the healed cutaneous ureterostomy.