Intentional Omission of Ureteral Stents During Robotic-assisted Intracorporeal Ureteroenteric Anastomosis: Is It Safe and Feasible?

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OBJECTIVE To describe the surgical technique we used to perform a stentless intracorporeal ureteroenteric anastomosis and to determine the outcomes in this initial series.

METHODS We performed a retrospective review of a prospective database of all patients undergoing robotic-assisted intracorporeal urinary diversion with stentless ureteroenteric anastomosis between March 2014 and July 2016. Diversions were performed at the time of either robotic-assisted laparoscopic cystectomy for bladder cancer or urinary diversion for other indications.

RESULTS A total of 10 patients underwent implantation of 20 ureters into the intestine via a robotic-assisted approach with intentional omission of stents. Median body mass index was 29.57 (first quartile 23.68, third quartile 34.69). Median American Society of Anesthesiologists score was 3 (range 2-3). Seven patients had intracorporeal ileal conduit reconstruction and 3 patients had an intracorporeal neobladder creation. There were no patients who developed a stricture of the ureter nor did any patient develop a leak at the ureteroenteric anastomosis. All patients had normal serum creatinine at least 4 weeks after surgery, and all patients had follow-up computed tomography of the kidneys, which were normal. The median follow-up was 8 months (first quartile = 3 months, third quartile = 17 months).

CONCLUSION Robotic intracorporeal urinary diversion with intentional omission of ureteral stents is a safe and feasible option when establishing continuity of the genitourinary and gastrointestinal tracts. UROLOGY ■■: ■■–■■, 2017. © 2017 Elsevier Inc.

Urologic reconstruction following bladder extirpative surgery has long been a challenging endeavor. The earliest attempt to divert urine from the ureters to the intestine was performed by Simon in 1851 when he directly reimplanted the ureters into the rectum.[1] Since then, almost every segment of the gastrointestinal tract has been used for urinary diversion.[2] However, because of electrolyte abnormalities, the use of many of these segments has fallen out of favor. The ileal conduit, which was first described by Seiffert and popularized by Bricker in the 1950s, subsequently became the gold standard.[3,4] Bricker also described the technique of performing an end-to-side anastomosis of the ureter to the ileum, and this technique remains in current use.

When laparoscopic surgery was introduced, the urology community rapidly adopted it, with the first laparoscopic cystectomy being performed in 1992.[5] This technique has been further refined with the development of the da Vinci Surgical System. As robotic surgery has gained popularity and with the evolution of the robotic procedural portfolio, urinary diversion performed using an intracorporeal approach is now possible, with varying techniques between institutions and surgeons. There are multiple centers that have published their technique and outcomes for intracorporeal neobladder.[6-12] However, the aforementioned institutions advocate for placement of urinary stents following construction of the ureteroenteric anastomosis. The aim of our article was to evaluate if intentional omission of ureteral stent is safe following reconstruction of the ureteroenteric anastomoses.

METHODS

We performed an institutional review board approved retrospective review of all consecutive patients undergoing robotic-assisted intracorporeal urinary diversion with stentless ureteroenteric anastomosis from March 2014 to July 2016. There were a total of 10 patients who underwent robotic-assisted intracorporeal urinary diversion by a single surgeon during this 2-year period. All patients

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undergoing robotic urinary diversion with ureteroenteric anastomoses at our center had stents omitted. The decision to omit stenting was made before surgery as per our protocol. Urinary diversions were done either at the time of cystectomy for bladder cancer or at the time of urinary diversion for other indications. No patients had ureteral dilation before the procedures. Data were reviewed using the Electronic Health Record (Epic Systems, Madison, WI). All patients underwent reconstruction of the neobladder or conduit using the da Vinci Si Surgical System (Intuitive Surgical, Sunnyvale, CA). Data were collected and maintained in a Microsoft Excel (Microsoft Corporation, Redmond, WA) spreadsheet format. The data were analyzed using Stata v14.0 (StataCorp LP, College Station, TX). Averages were reported as medians with first and third quartiles listed.

Surgical Technique

Port Placement. Each patient was placed supine with the lower extremities on spreader bars. A 6-port (with optional seventh port) transperitoneal approach is shown in Figure 1. A Veress needle was inserted into the left upper quadrant, and a saline drop test was performed. The peritoneal cavity was then insufflated. A 5-mm Ternamian EndoTIP trocar (Karl Storz Endoskope, Tuttlingen, Germany) was then placed in the right upper quadrant. A 12 mm Covidien Optiview camera port was placed in the supraumbilical region under direct vision. Two 8-mm robotic ports were then placed 10 cm from the midline and appropriately 18 cm from the pubic symphysis. A third 8-mm robotic port was then placed in the left lower quadrant. A 15-mm assistant port (Applied Medical, Rancho Santa Margarita, CA) was then placed in the left upper quadrant.

Bowel Isolation and Ureteroenteric Anastomosis. The ureter was identified at the level where it crosses the iliac vessels. The sigmoid colon was retracted medially using a dual blade atrial retractor to identify the ureter. The ureters were similarly dissected to the ureterovesical junction with careful attention to preserve the periureteral tissue and a narrow strip of parietal peritoneum (if possible) for adequate vascular supply. The ureters were clipped just before transecting the urethra and before selecting the bowel segment and performing the lymphadenectomy for patients undergoing cystectomy, and before selecting the bowel segment in patients not undergoing cystectomy. This was done for 2 reasons: (1) to permit mild dilation of the ureters, which facilitates anastomosis; and (2) to prevent overdilation, which in our view could decrease perfusion as a result of rising intraureteral pressure in the periureteral tissue and the muscular ureteral wall and mucosa, resulting in ischemia (which could last several hours if the ureters are clipped early) and an increase in the potential for ischemic stricture. The ureters were clipped as distally as is feasible with a large Hem-o-lok clip (Teleflex, Morrisville, NC) (Fig. 2A). Twenty centimeters (for ileal conduit) or 44 cm (for neobladder) of small bowel was selected approximately 20 cm from the ileocecal valve. A tunnel was created under the sigmoid mesentery, and the left ureter was passed beneath the mesentery when constructing an ileal conduit (Fig. 2B). The ureter was not tunneled for neobladder diversions. The ureters were then spatulated for 1.5 cm, and 2 enterotomies commensurate in size were made on the ileum to which the ureters were sewn (Fig. 2C and Fig. 3A). The ureteroenteric anastomosis as previously described by Bricker was performed using a 4-0 undyed Monocryl (poliglecaprone 25) suture on a 1/2 circle, tapered point TF needle (Ethicon Inc, Somerville, NJ).[13] The anastomosis was performed by placement of 2 running sutures (1 right and 1 left) that were anchored at either side of the apex of the spatulated ureter (Fig. 2D and Fig. 3B). The stitches were sutured in an outward to inward fashion on the side of the conduit and in an inward to outward fashion on the side of the ureter. The sutures were then tied together on the distal aspect of the anastomosis. The preserved strip of peritoneum was used to cover the anastomosis, which was then checked for a watertight closure. We did not perform an antireflux ureteroenteric anastomosis. We did not place double J or single J stents for any ureteroenteric anastomoses.

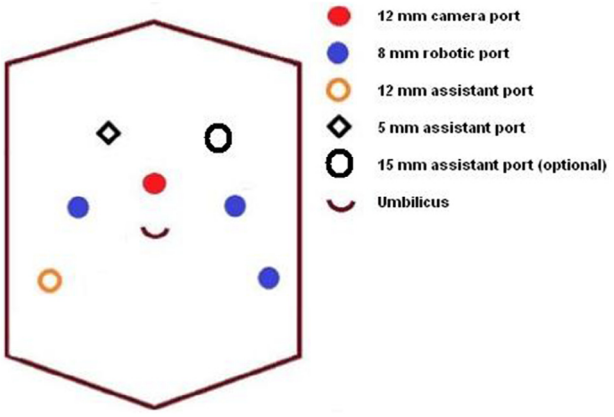

Figure 1. Port placement. (Color version available online.)

RESULTS

Between March 2014 and July 2016, a total of 10 consecutive patients underwent implantation of 20 ureters into the intestine via a robotic-assisted approach with intentional omission of stents. Patient demographics and intraoperative data are shown in Table 1. Median body mass index was 29.57 (first quartile: 23.68, third quartile: 34.69). Median American Society of Anesthesiologists score was 3 (range 2-3). Seven patients had an intracorporeal ileal conduit reconstruction and 3 patients had an intracorporeal neobladder creation. The median follow-up was 8 months (first quartile: 3 months, third quartile: 17 months).

There were no patients who developed a stricture of the ureter nor did any patient develop a leak at the ureteroenteric anastomosis. There were 2 perioperative complications (<30 days). One patient had a small bowel