Robotic heminephrectomy for benign indications: surgical technique and outcomes

Joseph J. Crivelli, Jeffrey A. Cadeddu, Alaina Garbens

Department of Urology, University of Texas Southwestern Medical Center, Dallas, TX, USA

Patients with benign renal anatomic anomalies, congenital or iatrogenic, can suffer from complications such as infection and pain, resulting in decreased quality of life. Robotic heminephrectomy is a minimally invasive surgical procedure that can be offered to select patients. In the largest reported case series, we describe our technique and operative outcomes for robotic upper and lower pole heminephrectomy for benign renal conditions.

We performed a retrospective chart review of all patients, 18 years or older, who underwent robotic upper or lower pole heminephrectomy for a benign indication between 2013 and 2019 by a single surgeon.

Case 1 summary: A 26-year-old woman presented with right flank pain and recurrent febrile urinary tract infections (UTI). A CT urogram was performed which demonstrated right-sided complete collecting system duplication with severe hydroureteronephrosis and obstruction of the upper pole moiety.

Case 2 summary: A 32-year-old woman presented with recurrent UTIs, refractory to antibiotic therapy. Voiding cystourethrogram and CT urogram found right-sided, Grade 3 vesicoureteral reflux (VUR) of the lower pole moiety, associated with complete right-sided collecting system duplication.

Positioning and exposure: The patient is placed in the modified flank position. After abdominal insufflation, a 12 mm camera port is placed at the level of the umbilicus and two 8 mm robotic ports are placed in the upper and lower abdomen. One or two 12 mm assistant ports are also placed. A 3 mm port for a liver retractor is utilized for right-sided cases. Gerota's fascia is incised inferior to the lower pole of the kidney, and the ureters are identified lateral to the gonadal vein.

Upper pole technique: The upper pole ureter is identified, mobilized, and transected inferior to the lower pole. After exposing the upper pole of the kidney, the renal artery is clamped using a laparoscopic bulldog and the heminephrectomy is performed by undermining the upper pole collecting system. Renorrhaphy is completed using 3-0 V-Loc™ sutures, the artery is unclamped, and hemostasis is confirmed. The upper pole ureter is dissected distally toward the true pelvis and transected. The ureter segment is removed and the distal stump left open.

Lower pole technique: A vessel loop encircles the lower pole ureter and it is skeletonized down to the common iliac vessels. Due to the patient's VUR, the ureter is clipped and divided both at the iliac vessels and inferior to the lower pole. The ureter segment is removed. Heminephrectomy and renorrhaphy is completed as above and 0 Vicryl compression sutures are used with Surgicel Nu-knit® bolsters for further hemostasis.

Of 12 total cases, 8 were upper pole and 4 were lower pole. Mean operative time was 183 minutes, mean estimated blood loss was 165 ml, and mean warm ischemia time was 23 minutes. Median length of hospital stay was 2 days. Postoperatively, there was one Clavien grade II complication and one Clavien grade IIIb complication.

In conclusion, robotic heminephrectomy is a safe, minimally invasive surgical technique that can be offered to patients suffering from complications of certain benign renal conditions.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

Corresponding author

Jeffrey A. Cadeddu

jeffrey.cadeddu@utsouthwestern.edu