Video Bank

Robot-assisted resection of ectopic kidney in children: An anatomical illustration


Summary

Introduction
Failure of kidney migration during embryonic life results in an ectopic kidney, with an incidence varying from 1 in 500 to 1 in 1200. Pelvic kidney can be a rare cause of recurrent urinary tract infection (UTI), warranting nephrectomy in some cases.

Material and methods
A 7-year-old girl with a history of recurrent UTIs and vaginal discharge was diagnosed with a dysplastic afunctional ectopic kidney located in the pelvis, with ureter draining into the cervix or vaginal wall.

Results
A robot-assisted approach was chosen, with side docking of the robot to allow concurrent vaginoscopic/hysteroscopic exploration. A uterus bicornis was found. The ectopic ureter was dissected toward its drainage in the vaginal wall, where it was sutured and resected. The dysplastic kidney and ureter were removed. Compared to pure laparoscopic approach, dissection deep into the pelvis toward the vaginal wall is aided by the robotic dexterity and facilitates complete resection of the structure, which avoids leaving a ureteric stump into the vaginal wall.

Conclusions
Robot-assisted surgery is a safe and effective option for resection of ectopic kidneys with ectopic ureter in children. Dissection up until the vaginal wall in children is aided by robotic dexterity, making this kind of surgery the ideal indication for robotic-assisted surgery.

Introduction
Failure of kidney migration during embryonic life results in an ectopic kidney, with an incidence varying from 1 in 500 to 1 in 1200. Pelvic kidney can be a rare cause of recurrent urinary tract infection (UTI), warranting nephrectomy in some cases, if the kidney is non-functional. Most cases of ectopic kidney might remain asymptomatic throughout life, and the clinical recognition is estimated to be only 1 in 500 to 1 in 1200 [1]. This video illustrates robotic resection of ectopic pediatric kidney.

Material & methods
A 7-year-old girl was referred to the study center with a history of recurrent UTI and occasional vaginal discharge. Previous investigations excluded vesicoureteral reflux and dysfunctional voiding. An abdominal ultrasound demonstrated a unique orthotopic kidney on the right-hand side, with 100% of function on DMSA scan. At the time of a UTI episode, ultrasound was repeated, looking for an ectopic kidney. Additional imaging was performed with a T2-weighted magnetic resonance imaging and showed a dysplastic ectopic kidney located in the pelvis, with ureter draining into the vaginal wall or in the cervix.

Results
The patient was positioned in a classical robot-adapted lithotomy position, with an indwelling bladder catheter. The camera trocar was placed in the umbilicus, and two additional 8-mm ports were inserted at the mid-clavicular line bilaterally, with an additional 5-mm port on the left-hand side. A side-docking position was adopted, thereby allowing further cystoscopic and vaginoscopic/hysteroscopic evaluation during the procedure. A uterus bicornis was found, with a normal vaginal opening for the age. After opening of the peritoneum
medially from the internal iliac vessel, the ectopic kidney was progressively dissected. The ectopic ureter was dissected toward its drainage in the vaginal wall, where it was sutured and resected. The dysplastic kidney and ureter were removed through the right iliac port. Dissection deep into the pelvis toward the vaginal wall is aided by the robotic dexterity and facilitates complete resection of the structure, which avoids leaving a ureteric stump into the vaginal wall.

The postoperative period was uncomplicated, and the child could be discharged on the first day after surgery. Console time was 55 min, and total surgical time was 70 min. Estimated blood loss was less than 5 mL.

**Discussion**

Laparoscopic nephrectomy has become the standard of care for removal of benign non-functional kidneys [2]. Many studies have demonstrated its safety in children, even in those weighing less than 10 kg [3]. Ectopic kidneys located in the pelvis, draining into the vagina in girls or into the urethra in boys, might be a surgical challenge in pure laparoscopy. The robotic platform offers a good dexterity in those cases, thereby allowing a complete resection which might be difficult to obtain in pure laparoscopy. The side-docking position permits concurrent cystoscopic and vaginoscopic/hysteroscopic exploration.

**Conclusions**

Robot-assisted surgery is a safe and effective option for resection of ectopic kidneys with ectopic ureter. Dissection up until the vaginal wall in children is aided by robotic dexterity, making deep pelvic surgery in children a good indication for robotic surgery.

**Author statements**

**Ethical approval**

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**Competing interests**

None declared.

**References**


**Appendix A. Supplementary data**

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jpurol.2018.10.018.

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