



Laparoscopic treatment of ureteropelvic junction obstruction in five pediatric cases of pelvic kidneys

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Summary

Objective

Ectopic kidney is a rare urologic condition and may be revealed by ureteropelvic junction obstruction (UPJO) in children, with pelvic kidney being the most common location. Our experience using a minimally invasive approach to treat UPJO by dismembered pyeloplasty led us to report five cases of UPJO with pelvic kidney operated on by transperitoneal laparoscopy, focusing on medium-term follow-up results and surgical technique.

Patients and methods

From 1999 to 2010, we reviewed all cases of UPJO managed in our center, a total of 391 patients. Among those, 125 patients were operated on via a minimal invasive approach, 104 by retroperitoneoscopy, and 21 by transperitoneal laparoscopy. Five patients presented ectopic pelvic kidney and were retrospectively reviewed. US-scan and uro-MRI were done preoperatively in all cases for anatomic and functional evaluation. Peri-operative data such as operative time, transfusion, and complications were reported. At last clinic, sonographic and functional evaluation was noted. Focusing on surgical technique, we reported the tips and tricks to successfully and easily perform the dismembered pyeloplasty: optimization of the trocars' location according to the kidney location and use of a transparietal stay stitch to stabilize the suture line of the pyeloplasty.

Results

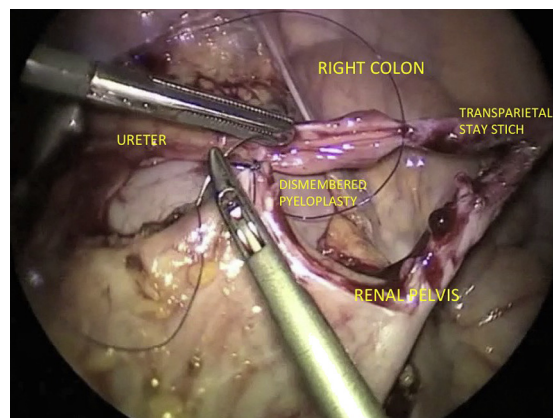
All five patients underwent dismembered pyeloplasty, at a mean age of 8 years and a mean weight of 23.4 kg. Mean operative time was 213 min (min–max: 180–245). One case of giant hydronephrosis and megacalycosis required conversion at the beginning of the learning curve. None of the patients required blood transfusion. Mean hospital stay was 2.4 days (range: 1–4). All the patients had an uneventful postoperative recovery and good postoperative functional results, with either stable or improved pelvic dilatation and renal function at a mean follow-up of 3.3 years (range: 2–5.6).

Discussion

This small series of five ectopic kidneys reflects the surgical challenge for the pediatric surgeon to perform reconstructive surgery on an abnormal anatomy. However, increasing experience in robotics in urologic pediatric surgery may lead to shortening of operative time and facilitate both dissection and suturing.

Conclusion

Dismembered pyeloplasty by transperitoneal laparoscopy is a feasible although technically demanding, safe and effective approach in the management of ureteropelvic junction obstruction in pelvic kidney in children.



Introduction

Ectopic kidney is a common congenital urologic abnormality with a reported incidence between 1 in 2200 and 1 in 3000 [1], with pelvic kidney being the most common location. The incidence of UPJO in pelvic kidneys is relatively high and estimated at 22–37% [2]. Open pyeloplasty has been the gold standard of surgical treatment of UPJO, including pelvic kidney. Literature on the subject is scarce in the adult and pediatric populations, but the surgical incision depends on the location of the ectopic kidney [3–5].

Advances in laparoscopic surgery have led to consideration of minimally invasive approach as the therapy of choice in both children and adults to treat UPJO, even associated with pelvic kidney. Only five pediatric cases of UPJO with pelvic kidney have been reported [6], and there are only few case reports in the adult literature of such a rare malformation [7–10].

The aim of our study is to describe our experience in dismembered pyeloplasty realized for UPJO in such a rare malformation using laparoscopy in children.

Patients and methods

Patients histories and diagnosis

From 1999 to 2010, 391 patients were operated on for ureteropelvic junction obstruction (UPJO) by the same pediatric surgical team. Among them, 125 patients were operated on via a minimal invasive approach, 104 by retroperitoneoscopy, and 21 by transperitoneal laparoscopy. Among these 21 patients, five cases presented ectopic pelvic kidney. The patient characteristics are displayed in Table 1.

All patients had a preoperative sonography and a uro-MRI for anatomic and functional evaluation of the pelvic kidney (Fig. 1). Additionally, preoperative renal scan was realized in three patients.

Surgical technique

Surgery was performed via a transperitoneal approach. The patient was placed in a supine position with a 30°

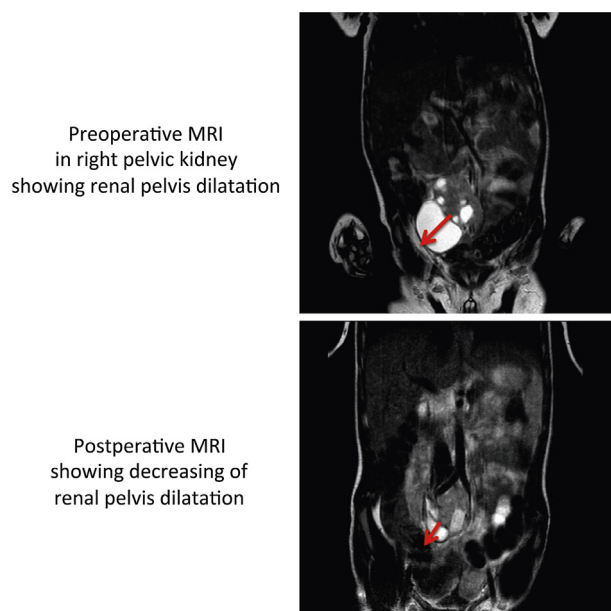


Figure 1 Top: Preoperative MRI in right pelvic kidney showing renal pelvis dilatation. Bottom: Postoperative MRI showing decreasing renal pelvis dilatation.

upward tilt to the left. Bladder catheter was placed preoperatively in all cases. Pneumoperitoneum was created through an open umbilical approach and insertion of a 5 mm, 30° camera port. Operative 3 mm ports were placed in the mid-clavicular line above and below the umbilicus. A fourth port was used in two cases to improve the exposure.

The distended renal pelvis could be seen bulging through the meso-sigmoid. A window was created after opening of the peritoneum to expose the pelvis and the UPJO (see Video S1). Tethering tissues around the pelvis and the UPJO were released to identify any polar crossing vessels responsible for UPJO. Small vessels were divided using bipolar electrocoagulation, with care taken not to section the ureteral blood supply. A stay stitch was placed at the junction, both helping to define the most dependent part of the pelvis, and sectioning it. The ureter was also

Table 1 Patient characteristics and postoperative results.

Patients	Age at surgery (years)	Weight (kg)	Sex	Prenatal diagnosis	Indication	Pelvis diameter on US-scan (mm)	Preoperative renal function on MRI (right/left)	Preoperative function on renal scan (right/left)	Post operative renal function on MRI (right/left)	Post operative function on renal scan (right/left)
#1	1.9	12	M	Yes, 23 WG	PN + IRF	25	61/39%	70/30%	65/35%	No
#2	12	30	M	No	Abdominal pain	40	52/48%	No	51/49%	No
#3	1	10	M	Yes, 24 WG	PN + IRF	35	63/37%	No	60/40%	No
#4	9	34	F	No	SPB + IRF	80	70/30%	75/25%	No	70/30%
#5	10	31	M	No	Abdominal pain	37	29/71%	31/69%	No	35/75%

WG, week of gestation; PN, prenatal diagnosis; IRF, impaired renal function on renal scan; SPB, screening for premature puberty.

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