Transperitoneal Laparoscopic Pyeloplasty for Pelvic Kidneys with Ureteropelvic Junction Obstruction in Children: Technique and Preliminary Outcomes

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ABSTRACT

Background: Laparoscopic pyeloplasty is rapidly becoming an acceptable procedure for ureteropelvic junction obstruction in the pediatric population. We present our experience with transperitoneal laparoscopic pyeloplasty for ureteropelvic junction obstruction in pelvic kidneys in pediatric patients.

Methods: A transperitoneal laparoscopic approach was used for performing a pyeloplasty in 4 patients, 7 months to 8 years of age (mean age, 3.14), with ureteropelvic junction obstruction in a pelvic kidney.

Results: Average operative time was 2.1 hours (range, 1.5 to 2.8). Mean hospital stay was 2.15 days (range, 1 to 7). No intraoperative complications were noted.

Conclusions: Transperitoneal laparoscopic pyeloplasty for pelvic kidneys is feasible in the pediatric population, and preliminary results appear to offer the same outcome as that seen in orthotopic kidneys.

Key Words: Kidney, Ureter, Laparoscopy, Child.

INTRODUCTION

Open pyeloplasty remains the gold standard for correcting ureteropelvic junction obstruction with a success rate between 90% to 98%.

Although endopyelotomy and retrograde dilation are alternative methods of managing ureteropelvic junction obstruction in children, the success of these 2 procedures is inferior to that reported for conventional dismembered pyeloplasty.

Laparoscopic pyeloplasty is rapidly becoming an acceptable procedure for ureteropelvic junction obstruction (UPJO) in the pediatric population. The advent of smaller instrumentation and more experience with intracorporeal suturing allows this well-accepted procedure in adults to be implemented in the pediatric population.

METHODS

Four children between 7 months to 8 years of age (mean, 3.14 years) underwent transperitoneal laparoscopic pyeloplasty for a UPJO in a pelvic kidney. All patients except the 7 month old presented with vague abdominal pain. The 7-month-old patient presented with antenatal diagnosed hydronephrosis, which worsened and was associated with parenchymal thinning of the pelvic kidney. Preoperatively, all patients had ultrasounds and diuretic radionuclide imaging (DRI) evaluations consistent with UPJO. This retrospective review was performed with IRB approval.

All patients underwent cystoscopic evaluation with retrograde ureteropyelogram (RGP) and stent placement before laparoscopic positioning (Figure 1). The transperitoneal laparoscopic approach previously described in the literature was implemented but slightly modified for the pelvic kidney. Three 3-mm ports were utilized. One was placed lateral to the contralateral rectus in the midclavicular line at the level of the umbilicus; another at the umbilicus to hold a 30-degree 3-mm laparoscope; and the remaining one near the midaxillary line lateral to the ipsilateral rectus 3cm medial and cephalad from the anterior superior iliac spine (Figure 2).

All 4 patients had an Anderson-Hines dismembered pyeloplasty. Three patients had a lower pole-crossing vessel,
and 1 patient had a stenotic proximal segment. All reaproximations were performed with 6–0 polyglactic acid sutures in an interrupted fashion. Twelve sutures were placed at the UPJ with or without renal pelvis tapering, which was performed with a running 6–0 polyglactic acid suture. All pyeloplasties were performed with a double pigtailed ureteral stent placed during cystoscopic evaluation at the onset of the procedure. The stent was removed 6 weeks after pyeloplasty in all patients.

Outcome measures included operative time, length of hospital stay, postoperative symptomatology, and resolution of obstruction by symptoms and ultrasonography, or DRI, or both. All the patients were followed with ultrasonography 2 months and then every 6 months after the procedure. DRI was performed at 6 months in all patients.

**RESULTS**

Average operative time was 2.1 hours (range, 1.5 to 2.8). Mean hospital stay was 2.15 days (range, 1 to 7). Mean time to return to normal activity was 2 weeks (range, 0.5 to 6). No intraoperative complications were noted.

Three patients were symptomatic with abdominal pain preoperatively. After surgical repair, all 3 patients (100%) were completely pain free at a mean follow-up of 12 months. All patients were evaluated 2 months postoperatively for an ultrasonographic evaluation revealing mild to moderate hydronephrosis. At a mean ultrasonographic follow-up of 11 months (range, 6 to 20), all 4 patients had resolution of the hydronephrosis. Postoperative DRI showed no evidence of obstruction in any of the patients.
DISCUSSION

We have a large armamentarium of minimally invasive procedures to correct ureteropelvic junction obstruction. Multiple surgical techniques for laparoscopic pyeloplasty have been described in the literature. The success rate of laparoscopic pyeloplasty is approaching that of conventional open pyeloplasty.7,10,12–16 Generally, the indications for laparoscopic pyeloplasty are identical to those of the open surgical approach, including failed previous retrograde or antegrade endopyelotomy.10–11 'Transperitoneal and retroperitoneal approaches are reported to have comparable outcomes.10,12–16

We retrospectively reviewed our laparoscopic pyeloplasty experience in patients with UPJO in pelvic kidneys. The transperitoneal approach would be the only access in cases involving pelvic kidneys. We were able to mobilize the ureter sufficiently that a Culp-Deweerd spiral, Scardino-Prince vertical flap, or a dismembered tubularized renal pelvic wall flap described by Gill et al7 were not necessary. Tapering of the renal pelvis was performed on 3 of the 4 children.

All patients had complete resolution of the UPJO. A larger series would obviously increase the power of our study. However, though the cohort is small, we feel that the same principles used in orthotopic laparoscopic pyeloplasty are easily recapitulated for the pelvic kidney.

CONCLUSION

Even with a small number of patients, our results seem to show that laparoscopic pyeloplasty is an option for treating UPJO in pelvic kidneys. We feel that the transperitoneal laparoscopic approach is feasible in this specific, complex, pediatric population.

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