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A novel technique of stenting for laparoscopic pyeloplasty in children

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Abstract *Purpose:* We introduce the novel technique of a percutaneous pyelo-ureterostomy stent for laparoscopic pyeloplasty in children, which overcomes the limitations of previously described stenting techniques.

Materials and methods: A Chiba needle is passed percutaneously across the anterior wall of the renal pelvis after completion of the anterior pyelo-ureteric anastomotic line. A guide wire is inserted through the trocar followed by an angiocatheter over the wire. The stent is passed through the angiocatheter, over the wire and across the wall of the renal pelvis. The wire is withdrawn and the stent distal tip is advanced to the mid-ureter. The posterior anastomotic line is then completed and the renal pelvis closed. The stent is capped on postoperative day 1 and removed in the office on postoperative day 10.

Results: Since 2007 we have used this approach for 14 laparoscopic pyeloplasties (5 right, 9 left) in children with a mean age of 8.8 years (range 5–17). Mean time of insertion was 9:55 min with no difficulties or perioperative complications noted.

Conclusion: The antegrade pyelo-ureteral stent is easily and quickly inserted percutaneously as well as removed in the office, thus obviating the need for a second anesthetic.

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Introduction

Since the first successful laparoscopic pyeloplasty was carried out in 1993 [1] and, shortly after, the first pediatric

case [2], this minimally invasive alternative has been demonstrating a comparable success rate to the open technique [3,4].

While the technique of laparoscopic pyeloplasty in children is well established, the search continues for the ideal method of stenting the repair, with a multitude of techniques reported. While the double J stent has been effective, it requires a second anesthetic for its removal in children. In addition, it is often difficult to pass the double J into the bladder in a percutaneous fashion [5,6].

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Herein, we report our novel technique of percutaneous pyelo-ureteric stenting for laparoscopic pyeloplasty in children, which overcomes the limitations of other techniques and is easy and quick to perform.

Materials and methods

This novel technique for stent insertion was applied to 14 consecutive laparoscopic pyeloplasties from March 2007 to June 2010. The children had a mean age of 8.8 ± 3.9 years (range 5–17), and there were eight males and six females. Five cases were on the right side and nine on the left. Clinical outcome measures were prospectively recorded, except for the time required for stent placement which was obtained by review of intraoperative video recording.

All children were operated upon by one surgeon with significant trainee participation. The same operative technique was used in all patients: an Anderson-Hynes dismembered pyeloplasty via transperitoneal approach. The patient was placed in semi-lateral position with the ipsilateral flank elevated to 45 degrees with lumbar flexion. The draping was extended laterally to expose the anterior axillary line. The surgeon and a single assistant proceeded to a three-port technique with 3–5-mm instrumentation. A fourth port was placed for retraction of the liver in one case and retraction of a malrotated kidney in one case. A percutaneous 3-0 silk suture was placed on the renal pelvis prior to the pelviotomy in order to stabilize the dismembered renal pelvis throughout the procedure.

Technique of stent insertion (see enclosed Video)

Once suturing of the anterior uretero-pelvic anastomosis was completed, an 18-gauge Chiba needle, 15 cm long (Cook, Bloomington, IN, USA), was passed percutaneously across the anterior wall of the renal pelvis (Fig. 1). It is

important to note that the needle entered the skin laterally at the anterior axillary line and at a level similar to the epigastric port (Fig. 2). After trocar removal, a 0.035-inch guide wire with a floppy tip was inserted through the needle sheath followed by sheath removal and advancement of a 14-gauge angiocatheter over the guide wire. The angiocatheter metal needle was removed and a modified 4.7-Fr SIPS Stent (Cook) was advanced over the guide wire and through the angiocatheter (Fig. 3). The stent was modified by removing the distal bladder coil, so that the distal tip of the stent ended at mid-ureter. The stent was advanced until the proximal coil was inside the lumen of the renal pelvis. Then, the guide wire was withdrawn and the coil of the stent was placed in the renal pelvis. Finally, the distal tip of the stent was advanced to the mid-ureter (Fig. 4). The remaining posterior suture line and pelviotomy were then closed. On occasion, when the renal pelvis was quite large and floppy, the stent was inserted through the remaining pelviotomy after completion of both the anterior and posterior suture lines, as shown in Figs. 1–4. The stent was secured in place as it emerged from the renal pelvis using a 5-0 chromic purse-string suture and at skin level with a 4-0 nylon suture. Via the stent, the collecting system was irrigated with saline to confirm a patent stent and watertight anastomosis. Finally, a Jackson-Pratt drain was inserted through the lateral port and placed on bulb suction while the stent was kept to straight drainage.

On postoperative day 1, the stent was capped and the Foley catheter removed. In the absence of flank pain, leakage and/or fever on postoperative day 2, the Jackson-Pratt drain was removed and the patient discharged home with the capped stent in place under an occlusive dressing. Patients were maintained on a prophylactic dose of trimethoprim-sulfamethoxazole and the stent removed in the office on postoperative day 10.

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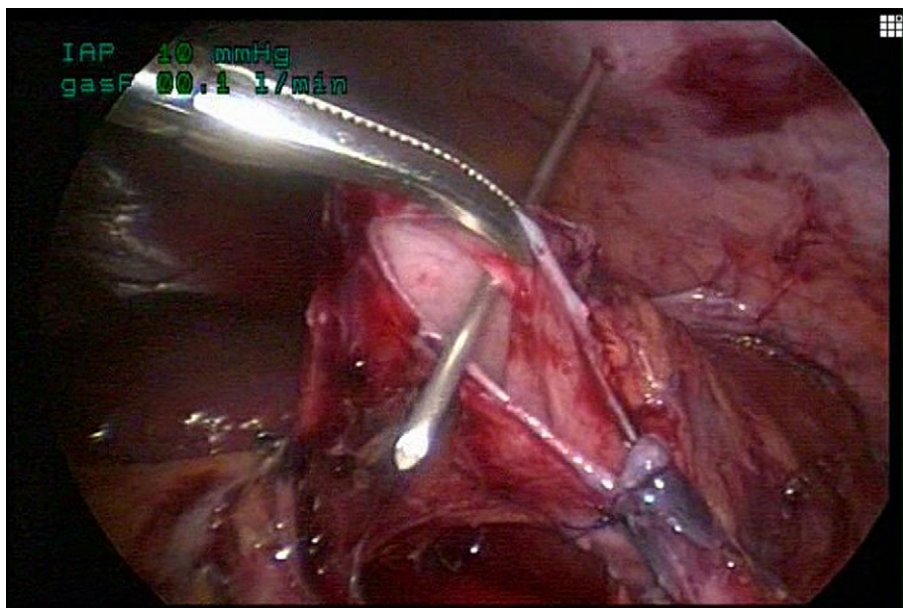


Figure 1 Chiba needle is passed percutaneously across the anterior wall of the renal pelvis.

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