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Early experience of using transumbilical multi-stab laparoscopic pyeloplasty for infants younger than 3 months

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Abstract *Objective:* Minimally invasive surgery is increasingly being adopted in pediatric urology practice. The aim of this study is to investigate the feasibility and the safety of transumbilical multi-stab laparoscopic pyeloplasty (TMLP) as a treatment for infants younger than 3 months with severe hydronephrosis.

Methods: We retrospectively reviewed 63 infants younger than 3 months with severe hydronephrosis who underwent TMLP from June 2010 to March 2013. The operative indications included: 1) prenatal diagnosis of hydronephrosis with anteroposterior renal pelvic diameter greater than 3 cm and Society of Fetal Urology (SFU) Grade 4 hydronephrosis; 2) ipsilateral differential renal function being less than 40%. Patients were followed up with physical examinations, ultrasound and radionuclide scans.

Results: The operations were successfully performed in all 63 patients. There was no conversion, no requirement of additional trocar placement and no intraoperative complication. The median age was 54 (47–87) days. The median operative time was 75 (53–118) minutes. The patients were followed up for 12 (6–36) months. The anastomoses were proved to be patent and the renal parenchymal thickness increased. The renal pelvic anteroposterior diameters were reduced and the renal functions were improved ($p < 0.01$). In addition, the scars were barely noticeable.

Conclusions: TMLP for infants younger than 3 months with severe hydronephrosis is feasible, safe and minimally invasive. The cosmetic results are excellent.

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Introduction

Prior to the prenatal ultrasound era, patients with hydronephrosis often presented with symptoms of infection or pain, for which surgical indications were straightforward. With the increasing popularity of prenatal ultrasound in prenatal examinations, more infants with asymptomatic hydronephrosis have been identified. Several studies [1–5] have reported that infants with SFU grade 4 hydronephrosis and ipsilateral differential renal function (DF) less than 40% should undergo surgical intervention to preserve renal function. Currently, laparoscopic pyeloplasty is becoming popular. However, transumbilical multi-stab laparoscopic pyeloplasty (TMLP), being an even less invasive treatment for infants younger than 3 months with severe hydronephrosis, has not been reported. The aim of this paper is to investigate the feasibility and the safety of TMLP as a treatment modality for infants younger than 3 months with severe hydronephrosis.

Material and methods

Patient data were collected retrospectively. Sixty-three infants younger than 3 months (54 males and 9 females) with SFU grade 4 hydronephrosis and less than 40% ipsilateral DF underwent TMLP from June 2010 to March 2013. Patient demographics are shown in Table 1. Forty-eight patients had left hydronephrosis, 13 had right hydronephrosis and two had bilateral hydronephrosis. Their median age was 54 (47–87) days. Initial diagnosis was made by prenatal ultrasound in all patients. Ultrasound was repeated a week after birth if the renal pelvic anteroposterior diameter was greater than 3 cm at 34 weeks of pregnancy. Radionuclide scan (MAG-3) was carried out at about 45 days when repeated ultrasound demonstrated persistence of renal pelvis dilation and SFU grade 4 hydronephrosis. If DF was more than 40%, the patients would be observed and have DF checked at regular intervals. Otherwise, magnetic resonance urography (MRU) was performed. If this demonstrated severe pelvocaliectasis and normal ureter, TMLP would be carried out.

Routine preoperative preparation and general anesthesia were carried out. Patients were placed in a supine position with 45° ~ 60° inclination and as close as possible to the edge of operating table toward the surgeon's side in the procedure. Before the operation, the patient's stomach was decompressed with nasogastric tube. Three 0.5-cm incisions were made along the umbilical ring, and then three 5-mm trocars were placed through the incision (Fig. 1). CO₂ pneumoperitoneum pressure was established at 6–8 mmHg. The pressure of end-tidal carbon dioxide was closely monitored during the operation and kept below 40 mmHg. For the newborns with severe pyelectasis where it was difficult to establish pneumoperitoneum, urine in renal pelvis was aspirated by a needle prior to trocars placement. Right hydronephrosis was treated with retrocolic laparoscopic pyeloplasty as previously described [6], and left hydronephrosis was managed with a transmesenteric approach (Fig. 2). The same three trocars were used for bilateral pyeloplasty. As all patients had severe

Table 1 Patients baseline characteristics (*n* = 63).

Variables	Number of patients
Total number	63
Male	54
Female	9
Antenatal diagnosis	63
Side	
Left	48
Right	13
Bilateral	2
Size of RPAD (cm) (preoperation)	
3.2; 3.3	Light contralateral side in two bilateral cases
3.1–4.0	37
4.1–5.0	22
>5.0	4
Size of RPAD (cm) (postoperation)	
<1.0	8 + 1
1.1–2.0	28 + 1
2.0–3.0	26
>3.0	1
GFR of preoperation	
<30	5
30–39	58
36; 39	Light contralateral side in two bilateral cases
GFR of postoperation	
<30	0
30–40	3
>40	60 + 2

GFR = glomerular filtration rate; RPAD = renal pelvic anteroposterior diameter.

hydronephrosis and pelvis anteroposterior diameter greater than 3 cm, reduction pyeloplasty was performed along the line about 2 cm away from the edge of renal parenchyma. The distance between the cutting edge and the calyceal were carefully controlled to avoid any damage to the calyces. After the excision of the redundant pelvis, a hitch stitch was used to suspend the upper pole of the pelvis in

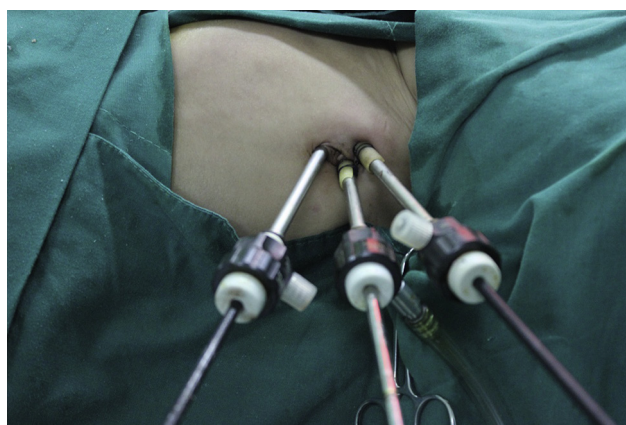


Figure 1 The position and the trocars placement.

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