



ORIGINAL ARTICLE

Hybrid procedure for pyeloplasty in infants and young children with ureteropelvic junction obstruction is a safe and effective alternative



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Summary *Background:* Ureteropelvic junction obstruction (UPJO) is a common congenital urinary tract anomaly causing hydronephrosis in children. Laparoscopic pyeloplasty has become a popular and effective method to treat UPJO both in children and adults, but seems controversial in neonates or infants.

Materials and methods: From January 2007 to May 2012, patients with UPJO aged <18 years undergoing operations at our institute were included in this study. By retrospectively reviewing medical charts, the demographic data, presentation, laterality, etiology, operative time, length of hospital stay, stents, drainage tubes, and postoperative complications were recorded. Surgical outcomes were evaluated based on renal sonography and Lasix diuretic renography.

Results: A total of 47 patients (40 boys and 7 girls) were enrolled initially, but seven patients who were complicated with other congenital anomalies of the urinary system or who underwent surgery at other hospitals were excluded. Among these 40 patients, 21 had open pyeloplasty (Group I), eight who were younger than 1 year old or weighed <10 kg had a hybrid procedure (Group II), and 19 had laparoscopic surgery (Group III). The mean age was younger in Groups I and II because the selected procedure was nonrandomized. The operative time and

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the duration of perianastomotic drainage were longer in Groups II and III. There was no significant difference with regard to successful resolution of UPJO among the three groups.

Conclusion: In infants or young children (<1 year old or weighing <10 kg) with UPJO, the hybrid procedure of pyeloplasty may be considered as a safe, effective, and less time-consuming alternative to laparoscopic surgery, and most importantly, confirms the security of the anastomosis.

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1. Introduction

Ureteropelvic junction obstruction (UPJO) is the most common congenital cause of obstructive uropathy in pediatrics, which leads to progressive dilatation of the renal collecting system.^{1–5} Treatments of UPJO consist of open pyeloplasty, procedures with laparoscopic approaches, and endourological methods.⁶ Dismembered pyeloplasty of Anderson–Hynes is the standard management of UPJO. The overall success rate of open pyeloplasty is between 90% and 100%, which can be confirmed by improvement of symptoms, improved hydronephrosis on ultrasound, and stabilization or improvement of renal function on a radionuclide scan.^{6–9} Endoscopic pyelotomy is a minimally invasive alternative, providing minimal pain, a short hospital stay and rapid recovery, but with lower success rates ranging from 70% to 89%, even in highly selected patients.^{8,10} With advances in minimally invasive surgical techniques, laparoscopic pyeloplasty has been performed in both adults and children for nearly 20 years, and was first described by Schuessler in 1993 (adults) and then by Peters in 1995 (children).^{4,5,11,12} Laparoscopic pyeloplasty has since been shown to be comparable to open pyeloplasty in success rates and operative time,^{9,11–13} and now has the advantages of decreased pain, improved cosmetics, short hospital stay, and early return to full activity.^{8,9,13}

We report our initial experience with all primary repairs of UPJO in children, and compared laparoscopic pyeloplasty to open pyeloplasty in the past 5 years. For infants and younger children with UPJO, a hybrid procedure of pyeloplasty was chosen to shorten the operative time and achieve secure anastomosis.

2. Materials and methods

From January 2007 to May 2012, patients with UPJO aged <18 years undergoing operations at our hospital were included. All patients underwent nonrandomly dismembered pyeloplasty of Anderson–Hynes, either by an open method, a hybrid procedure (for those aged <1 year or weighing <10 kg), or total laparoscopic pyeloplasty. For those treated with the open method (Group I), the patient was put in the lateral position with a flank incision, and traditional dismembered pyeloplasty was performed using interrupted 5-0 chromic catgut sutures (Ethicon, Inc., Johnson & Johnson Company, New Jersey, USA). For those with the transperitoneal laparoscopic approach, the patient was put in the supine position with legs apart. A 5-mm 30-degree telescope (Karl Storz Endoscopy, Taipei, Taiwan) was inserted via a transumbilical port, and two or three

work ports (5 mm) were made in the epigastrium and the lower abdomen in the midclavicular line with/without a third working port at the suprailiac site, as shown in Fig. 1A. For those treated with the hybrid procedure (Group II), the epigastric wound in the midclavicular line was enlarged to 2–3 cm in length to perform ureteropyeloplasty under direct vision after the obstruction site was clearly identified, as shown in Fig. 1B. In the total laparoscopic group (Group III), intracorporeal suturing was performed under video assistance (using interrupted 5-0 coated VICRYL™ (polyglactin 910) Sutures (Ethicon, Inc., Johnson & Johnson Company, New Jersey, USA)). Antegrade insertion of a double-J stent was performed in selected patients in Group I, but all patients in Groups II and III had double-J stenting. A perirenal drainage tube was placed in all patients.

The medical charts were reviewed. The demographic data, presentation, laterality, etiology, operative time, length of stay, stents, drainage tubes, postoperative fever, and major complications were recorded. The results were evaluated based on renal sonography and diuretic renography. Renal sonography and diuretic renography at 3 months after pyeloplasty showed improvement of renal dilatation and excretion in 18 patients. The patients were followed up at 3-month intervals using sonography. The collected data were analyzed by the χ^2 test and Kruskal–Wallis test.

3. Results

A total of 47 patients (40 boys and 7 girls) with UPJO were enrolled initially, but seven patients who were complicated with other congenital anomalies of the urinary system or who had undergone surgery at other hospitals were excluded. Among these 40 patients, 21 underwent open pyeloplasty (Group I), eight had a hybrid procedure (Group II), and 19 had laparoscopic surgery (Group III). The detailed data of the patients in the three groups are summarized in Table 1. Male patients and left-sided involvement predominated in the three groups, which is comparable with the incidence reported in the literature.¹⁴ The mean age at the time of operation was significantly younger in Groups I and II than in Group III ($p < 0.001$), which is attributed to the surgeon's decision. The disorder in Groups I and II was mostly detected by prenatal sonography. By contrast, patients in Group III mainly presented with abdominal or flank pain, probably because their mean age was older. The duration of follow-up in the three groups ranged from 1 month to 52 months.

The operative results of the patients in the three groups are summarized in Table 2. There were no statistically

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