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Surgical outcomes of laparoscopic dismembered pyeloplasty in children with giant hydronephrosis secondary to ureteropelvic junction obstruction

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Abstract *Objective:* Studies of surgical outcomes after reconstructive surgery for giant hydronephrosis (GH) secondary to ureteropelvic junction (UPJ) obstruction are limited. Over the past two decades, laparoscopic pyeloplasty has gradually replaced open repair in children in several centres. The objective of this study was to assess surgical outcomes of laparoscopic pyeloplasty in children with GH.
Materials and Methods: Children with unilateral primary UPJ obstruction and GH were prospectively included and underwent laparoscopic pyeloplasty. Postoperative ultrasonography was repeated at 3 and 12 months to assess renal parenchymal thickness, and similarly a renogram was repeated to assess improvement in differential renal function.
Results: During the study period 2005—2009, 53 children underwent laparoscopic dismembered pyeloplasty for UPJ obstruction. Of these, 8 children had GH caused by UPJ obstruction. The postoperative differential renal function improved in all of them. The postoperative improvement in renal parenchymal thickness at the end of 12 months was comparable to that of the non-GH group.
Conclusions: At 12 months, surgical outcomes after laparoscopic pyeloplasty for GH were satisfactory. Relief of obstruction allows adequate and comparable nephron sparing.

Introduction

The surgical management of a kidney with obstruction at the ureteropelvic junction (UPJ) has many variations with respect to approach, degree of invasiveness, and timing of surgery. The objectives of surgery remain the same, i.e. to relieve the obstruction and thus preserve or improve

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overall renal function, and to maintain normal development while lessening the morbidity to the patient but without compromising the surgical outcome. Pyeloplasties remain among the most rewarding surgeries that are performed for the relief of UPJ obstruction. Adherence to sound surgical principles, minimal handling of the ureter at the time of repair, and judicious use of internal stenting or nephrostomy tube drainage ensure a successful outcome [1]. Success is defined as improvement in hydronephrosis and stabilization or improvement in function on renal scan along with a decrease in washout time [1]. The reported success rate of open dismembered pyeloplasty ranges between 86% and 97% [2—4].

Tan [5] reported the first pediatric series of transperitoneal laparoscopic dismembered pyeloplasty in children aged 3 months to 15 years. Similarly, Yeung and colleagues [6] reported their initial experience with laparoscopic retroperitoneal dismembered pyeloplasty in 13 children, one of whom required open conversion .The mean operating time was 143 min (range 103—235 min). We too reported our initial experience of laparoscopic pyeloplasty in 16 children (age 5 months — 11 years) and concluded that improved outcome was noted in all at short-term follow-up [7]. In our series, age was not a criteria for exclusion; however, children with urinary tract infection and huge-capacity renal pelvis were excluded. Since then, our experience and skill in laparoscopy have improved, making it possible to perform laparoscopic pyeloplasty in children with huge or giant hydronephrosis (GH) secondary to UPJ obstruction. We performed this study to investigate the surgical outcomes of laparoscopic dismembered pyeloplasty for GH secondary to congenital UPJ obstruction in comparison to children without GH.

Materials and methods

Children presenting with hydronephrosis secondary to UPJ obstruction formed the study group. The diagnosis of UPJ obstruction was firmly established based on history, physical examination, renal sonography and scintigraphy. Children with unilateral primary UPJ obstruction with GH were prospectively included and planned for laparoscopic pyeloplasty (Fig. 1). Exclusion criteria included presence of active urinary tract infection and very poor renal function (split renal function $< 10\%$). The risks of the operation were fully explained to the parents of the children, and included postoperative infection, bleeding, failure of pyeloplasty, the need to convert to open surgery, damage to other viscera and adhesion formation.

The child was positioned in a lateral position and secured by placing a sand bag to support the back. The child was further stabilized by strapping the iliac crest to the operating table with an adhesive bandage. The first 5-mm port was inserted by open laparoscopy using a blunt Hasson cannula through the umbilical crease. The abdomen was inspected in detail so as to plan to insert the remaining two 3/5-mm instrument ports. An 18-gauge hypodermic needle was placed percutaneously into the dilated kidney to facilitate drainage/aspiration of the system. This permitted placement of the 3/5-mm instrument ports. Correct placement of these ports was critical to the ease of performing the anastomosis. Occasionally an extra 5-mm port was placed for retraction purposes. The renal pelvis was dissected free from the medial side. The UPJ and the proximal ureter were identified. The adventitia around the proximal ureter and UPJ was cleared. The ureter was dismembered with a small cuff of renal pelvis, leaving an open pyelotomy. Excess pelvis was trimmed adequately to reduce the size of the pelvis. The lateral wall of the ureter was opened longitudinally and spatulated for about 1.5—2 cm along its lateral margin. The UPJ and proximal ureter attached at this point to the spatulated ureter were then excised. The ureteropelvic anastomosis was performed with an 18-cm, 6/0 Vicryl suture on a 3/8 round body needle. The first suture was placed at the apex of the spatulated ureter from the outside-in, and then driven through the most dependent part of the pyelotomy. The posterior anastomosis was completed running up the length of the spatulated ureter and pelvis. A 0.025-in guide wire was then passed through the proximal ureter into the bladder. A 3-Fr multilength double pig-tail catheter was

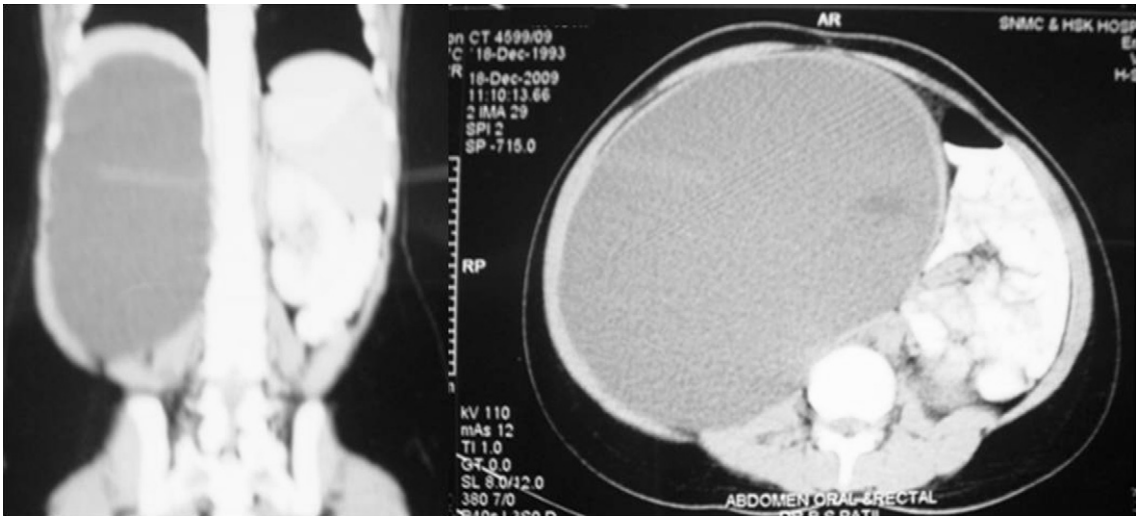

Figure 1 CT of abdomen showing right-side giant hydronephrosis with very thin renal parenchyma.