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ORIGINAL ARTICLE

Outcome of laparoscopic upper pole heminephroureterectomy in children: A two-centre experience

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Duplication;
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Retroperitoneoscopic;
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ABBREVIATIONS

DMSA, dimercaptosuccinic acid;
HN, heminephrectomy;
HNU, heminephroureterectomy;
US, ultrasonography

Abstract ***Objective:*** To report our multicentre experience and outcomes with laparoscopic transperitoneal and retroperitoneal upper pole heminephroureterectomy (HNU) in children with renal duplex systems and impaired upper pole.

Patients and methods: Laparoscopic HNU was performed in 22 children (15 girls, seven boys) with a mean age of 5.9 years. A retroperitoneal approach was used in 17 patients and a transperitoneal approach in the remaining five, between 2005 and 2010. Urinary tract infection was the initial presenting symptom in all children except for one with urinary retention caused by a large ureterocele. Voiding cystourethrography and renal scintigraphy revealed dual collecting systems on the right side in 11 and on the left in 11 cases. The upper pole collecting system was nonfunctioning in all cases. Postoperative ultrasonography was done at 1 and 3 months, with renal scintigraphy at 3 months, to check the remaining function of the lower moiety.

Results: Overall, the mean operation time was 152 min (144 min for retroperitoneal and 160 min for transperitoneal). Blood loss was 10–50 mL and there were no intraoperative complications. The mean (SD) hospitalisation and postoperative

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follow-up were 3.5 (1.25) days and 22 (9.83) months, respectively. Postoperative recovery was uneventful and at the 3-month follow-up renal scintigraphy revealed no parenchymal loss of the remaining renal moiety.

Conclusion: Laparoscopic HNU in children can be performed via transperitoneal or retroperitoneal approach, both with low morbidity and with the typical benefits of laparoscopic surgery.

Introduction

Laparoscopic procedures have increased generally in the last decade and also became more common in urology. However, laparoscopy in the paediatric age group is still less common with slower acquisition than that in adults. Growing evidence suggests that laparoscopic urological surgery can be safely performed in the paediatric population [1].

After the encouraging results of initial laparoscopic nephrectomy series, most operative procedures in paediatric urology can be safely performed via laparoscopic approaches. With enhanced surgical experience and improvements in technology the indication range of laparoscopic procedures expanded and advanced procedures like heminephroureterectomy (HNU) could be successfully attempted in children [2]. However, minimally invasive techniques have not expanded so widely in the paediatric surgical community for HNUs. The technique seems to remain confined to the hands of experienced teams, with a limited number of reports including relatively few cases [3].

Today, laparoscopic management of obstructing or refluxing upper pole with HNU, using a retroperitoneal or transperitoneal approach and incomplete or complete ureterectomy is not well established, with no consensus for management due to limited and heterogeneous laparoscopic series.

The present retrospective review aimed to assess our experience and evaluate the efficacy of transperitoneal or retroperitoneal laparoscopic management of non-functioning upper pole in two centres.

Patients and methods

In all, 15 girls and seven boys underwent laparoscopic upper pole HNU between 2005 and 2010, in the SLK Kliniken, Heilbronn, Germany (13 patients) and the Main University Hospital, Alexandria, Egypt (nine patients). Recurrent UTI was the first presenting symptom in all children except for one with urinary retention caused by a large ureterocele. A non-functioning upper pole with refluxing ureter was the underlying cause in 21 patients. Routine physical examination and blood samples showed normal findings. Voiding cystourethrography and dimercaptosuccinic acid (DMSA) renal scans identified dual collecting systems and advanced hydroureteronephrosis. All children underwent renal ultrasonography (US) with Doppler imaging and DMSA renal scan at 3 months postoperatively to evaluate the remaining moiety.

Surgical technique

Transperitoneal approach

A urethral catheter was placed preoperatively and the patient placed in a 45° lateral flank position with the ipsilateral side up and lumbar region slightly flexed. A transperitoneal three- or four-ports approach was initiated. A 5- or 10-mm camera with a 30° lens is placed in a para-umbilical position using a Veress needle and pneumoperitoneum was established with 10–12 mmHg pressure. Two ports (5 and 3 mm) were introduced under direct vision. The white line of Toldt was incised and the colon was reflected medially. Keeping in mind that there are duplicated vascular supplies, the dilated ureter was dissected and prepared caudally till the common iliac vessels cross and separated carefully from the normal ureter. Care was taken here to preserve the periureteric arterial supply of the normal ureter.

The dilated ureter of the upper pole was dissected cranially. The artery and vein supplying the upper pole were clipped and divided. The dysplastic parenchyma was transected depending on its thickness using standard bipolar diathermy or Gyrus plasma Trisector (Olympus, USA) and the divided cut parenchymal surface was covered and sealed with Tachosil® fibrin sealant (Baxter International Inc., Deerfield, IL, USA) if necessary. The dilated distal ureter was either clipped with Hem-o-Lok clips or ligated with a polypropylene suture loop (Prolene®, Ethicon Inc., Somerville, NJ, USA) close to the bladder. The ablated upper pole and ureter are removed through the right 10-mm trocar incision or placed in a lap-sac and removed through the optic trocar incision.

Retroperitoneal approach

The patient is placed in a lateral flank position with a pillow beneath the child to open the lumbar space; in all children a lateral retroperitoneal approach was