CASE REPORT

Retroperitoneoscopic pyeloplasty for the management of pelvic-ureteric junction obstruction in horseshoe kidney: our initial experience

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SUMMARY

Horseshoe kidney (HSK) is the most common congenital renal fusion anomaly with approximate incidence of 1:400 to 1:1000 births. Pelvic-ureteric junction obstruction (PUJO) occurs in 15–33% of patients in this population. Herein, we report our experience of management of PUJO in HSK by retroperitoneoscopic pyeloplasty.

BACKGROUND

Horseshoe kidney (HSK) is the most common congenital renal fusion anomaly with approximate incidence of 1:400 to 1:1000 births. Although, most horseshoe kidneys are asymptomatic, pelvic-ureteric junction obstruction (PUJO) occurs in 15–33% of patients in this population.¹ High incidence of PUJO is observed in relation to high insertion of ureter in the renal pelvis along with aberrant anatomic relation of the ureter to the isthmus and aberrant lower pole renal vessels. The success rate of open dismembered pyeloplasty is less in anomalous kidneys (55–80% vs 90%).^{1–2} Laparoscopic pyeloplasty in HSK has also been reported with variable success rate ranging from 66% to 100%.^{3–4} Twenty-four cases of PUJO in HSK managed by transperitoneal laparoscopic pyeloplasty has been reported in literature.^{3–5} Our manuscript is unique in the sense that we have performed retroperitoneoscopic pyeloplasty without transection of isthmus using three-port technique.

CASE PRESENTATION

Case 1: An 18-year-old man presented with recurrent right flank pain, dull in nature for past 1 year. His renal function tests and urinalysis were normal.

INVESTIGATIONS

Ultrasound abdomen showed severe hydronephrotic right kidney with normal left kidney (figure 1A). Intravenous urogram (IVU) showed HSK with grossly dilated right pelvicalyceal system suggestive of right PUJO (figure 1B). Diethylenetriaminepentaacetic acid (DTPA) scan revealed obstructed drainage on right side. Contrast-enhanced CT scan kidney, ureter and bladder (KUB) revealed dilated right pelvicalyceal system with no aberrant renal vessel at lower pole.

TREATMENT

Patient was operated under general anaesthesia. Cystoscopy and ureteric catheterisation was performed at the beginning and 16F (French) Foley catheter was inserted. Standard flank position was used. Retroperitoneal space for laparoscopy was created using indigenous balloon dilation method⁶ and procedure performed by three-port technique (figure 2). The pelvic-ureteric junction (PUJ) was dissected and freed from the surrounding tissue; redundant renal pelvis was excised along with aperistaltic PUJ segment. The proximal end of transected ureter was spatulated and pelvi-ureteric anastomosis was performed over 6F double J stent (inserted in antegrade manner) with 4-0 polyglactin

Figure 1 (A): Ultrasound abdomen showing right-sided severe hydronephrosis, non-visualization of ureter (white arrow). (B): Intravenous urogram showing horse shoe kidney with grossly dilated right pelvicalyceal system and normal left sided pelvicalyceal system (white arrow).

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Figure 2 Right-sided laparoscopic pyeloplasty-classical retroperitoneal approach with three-port technique.

suture in continuous fashion. Soft silastic tube was inserted as drain.

OUTCOME AND FOLLOW-UP

Postoperative course was uneventful. Foley catheter was removed on postoperative day 2. Patient was discharged on postoperative day 3 after drain removal. Double J stent was removed after 6 weeks. The patient was followed at 3 months with ultrasound KUB and IVU (figure 3A, B), 6 months post operatively and semiannually thereafter for 2 years. At each follow-up, clinical examination and ultrasonography was performed. DTPA scan was performed at 6 months post operatively. Patient experienced resolution of hydronephrosis; non-obstructed dependant drainage of the pelvicalyceal system was observed at last follow-up.

DISCUSSION

The treatment modalities for PUJ obstruction is shifting from open to minimally invasive approach such as antegrade or retrograde endopyelotomy and laparoscopic pyeloplasty (transperitoneal and retroperitoneal). Minimally invasive approach is preferable because of short convalescence period, less postoperative pain and better cosmesis. The technical difficulty in this group of patients is due to aberrant lower pole vessels, renal isthmus and unfamiliar anatomy of the kidney. With the use of latest

preoperative imaging, anatomy can be understood better prior to surgery.

Janetschek *et al*,⁷ were the first to report pyeloplasty in HSK through transperitoneal route. In transperitoneal route, the peritoneal cavity is traversed and there may be complication like infection due to contamination of peritoneal cavity due to leakage of urine. Colonic reflection and bowel manipulation may cause bowel-related complications. Transperitoneal route allows large working space for intracorporeal suturing and instrument handling. Review of literature shows that most cases of pyeloplasty in HSK have been performed by transperitoneal route. It was after the construction of balloon trocar by Gaur *et al*⁸ which marked the beginning of new era of the retroperitoneoscopy. There are reports in literature where retroperitoneoscopic approach had been used includes: nephrolithiasis, ureterolithiasis (failing extracorporeal shock wave lithotripsy or endoscopic litholapaxy), nephroptosis, renal cysts, organ-saving operations following renal tumours staged T1-2, nephrectomy, radical nephrectomy, nephroureteroectomy, extraperitoneal lymphadenectomy, nephrectomy in a living donor, adrenalectomy.⁹⁻¹¹

Laparoscopic pyeloplasty has excellent results, considered as the procedure of choice for the management of PUJO in orthotopic normal kidneys as crossing vessels can be dealt without difficulty and transposition can be performed.^{3 12} Laparoscopic pyeloplasty in HSK has also been reported with variable success rate ranging from 66% to 100%.^{3 4}

Wang *et al*,¹³ reported their experience with retroperitoneal laparoscopic pyeloplasty for the management of PUJO in patients with HSK using four-port approach along with the transection of isthmus, while in our case we used only three ports and completed without transaction of isthmus.

Christopher *et al*¹⁴ did not observed any problem with the smaller working space in retroperitoneoscopy approach as compared with transperitoneal approach. This is because of sufficient retroperitoneum could be achieved while creating retroperitoneal space using manual and balloon dilation in an appropriate manner with minimal risk of complications. McDougall *et al*¹⁵ reported that retroperitoneoscopy is not associated with higher absorption of carbon dioxide compared to the transperitoneal laparoscopy.

We feel that retroperitoneoscopic approach is more suitable for horseshoe anomaly because of relatively low lying position of the kidneys. In lateral decubitus (kidney position) pelvis and PUJ face anteriorly and are relatively lower in position. Hence,

Figure 3 (A): Follow-up renal ultrasound at 3 months showing resolution of hydronephrosis (white arrow). (B): Follow-up IVU showing resolution of hydronephrosis with dependent PUJ (white arrow). IVU, intravenous urogram; PUJ, pelvi-ureteric junction.

dissection and reconstruction can be performed comfortably without much manipulation of the camera and working instruments. In case of crossing vessel, the reconstructed PUJ should be transposed anterior to the crossing vessel.

Learning points

- ▶ Classical retroperitoneoscopic dismembered pyeloplasty with three ports technique is viable and feasible option in the hands of experienced surgeon for the management of primary pelvi-ureteric junction obstruction in horseshoe kidney.
- ▶ Absence of bowel handling and minimal possibility of peritoneal contamination is advantageous in this technique.
- ▶ In retroperitoneoscopy, there is limited working space for instrument handling and intracorporeal suturing, but this shortcoming can be overcome with experience in laparoscopic surgery.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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