

Laparoscopic Pyeloplasty and RIRS for Pelvic Ureteric Junction Obstruction and Renal Calculus in Horseshoe Kidney: Our Experience in Two Cases

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Abstract

Horseshoe kidney is the commonest fusion anomaly of the genitourinary tract with a prevalence of 1/400 - 1/1000. It is characterized by renal malrotation, variable blood supply, high insertion of the ureter, and a propensity to form an ureteropelvic junction (UPJ) obstruction in up to one-third of cases. Here in we report our experience in two cases where in the first case, a child with bilateral PUJO, right sided laparoscopic pyeloplasty was done and in the second case, an adult where in left laparoscopic pyeloplasty was done for left PUJO along with Right Retrograde Intrarenal Surgery (RIRS) for right renal calculus.

Keywords: PUJ Obstruction; Horseshoe Kidney; Laparoscopy

Introduction

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 in comparison to the non-anomalous kidneys (55 - 80% vs 90%) [2]. Laparoscopic pyeloplasty in HSK has also been reported with variable success rate ranging from 66% to 100% [3,4]. Since the first case report in 1996 [5], fewer than 30 cumulative cases have been reported in the literature, with the largest individual case series consisting of 5 patients [6]. These sparse reports may reflect the relative rarity of horseshoe UPJ obstruction but may also relate to a perceived increase in surgical difficulty due to unfamiliar and variable anatomy. Here in we report our experience in two cases where in the first case, a child with bilateral PUJO, right sided laparoscopic pyeloplasty was done and in the second case, an adult where in left laparoscopic pyeloplasty was done with left PUJO along with Right Retrograde Intrarenal Surgery (RIRS) for right renal calculus.

Case Report 1

A 13 year old female child presented to our OPD services with on and off right sided abdominal pain since 1 month duration. Routine blood investigations were done, all within normal limits. Complete Urine Examination (CUE) was within normal limits (WNL). Ultrasound (USG) Abdomen showed bilateral hydronephrosis with horseshoe kidney. CT Urogram showed bilateral PUJO (R>L) with horseshoe kidney (Figure 1a and 1b). DTPA was done which showed decreased renal function on the right side (Figure 1c). Hence right sided Laparoscopic pyeloplasty was planned. Semilateral decubitus position given after GA. 12fr SRC inserted. 10 mm umbilical port placed

for telescope. Two “5” mm ports placed in the right midclavicular line in the abdomen for working elements. Peritoneum reflected at the white line of tolt. Right ureter is identified and hooked. Renal pelvis is dissected out. Right renal vein is seen crossing the right renal PUJ (Figure 1d), which is the cause for PUJO. The renal vein has two branches, one draining the upper pole and the other small branch draining the lower pole. Decision of Dismembered pyeloplasty planned, where in the ureter joining at the pelvis is ligated. A new opening on the dilated pelvis is created (Figure 1e), so that the newly created anastomosis is not compressed by the crossing renal vein. Ureter spatulation done laterally. Anastomosis of PUJO started posteriorly by 4-0 vicryl (Figure 1f). 5fr 26 cm DJ stent placed over the teremo glide wire (Figure 1g). Anterior layer of PUJO approximated by 4-0 vicryl (Figure 1h). 18fr drain placed and fixed. Port closure done. Post-operative was uneventful. SRC removed on POD5. Right DJ removed after 4weeks. Child is doing well.

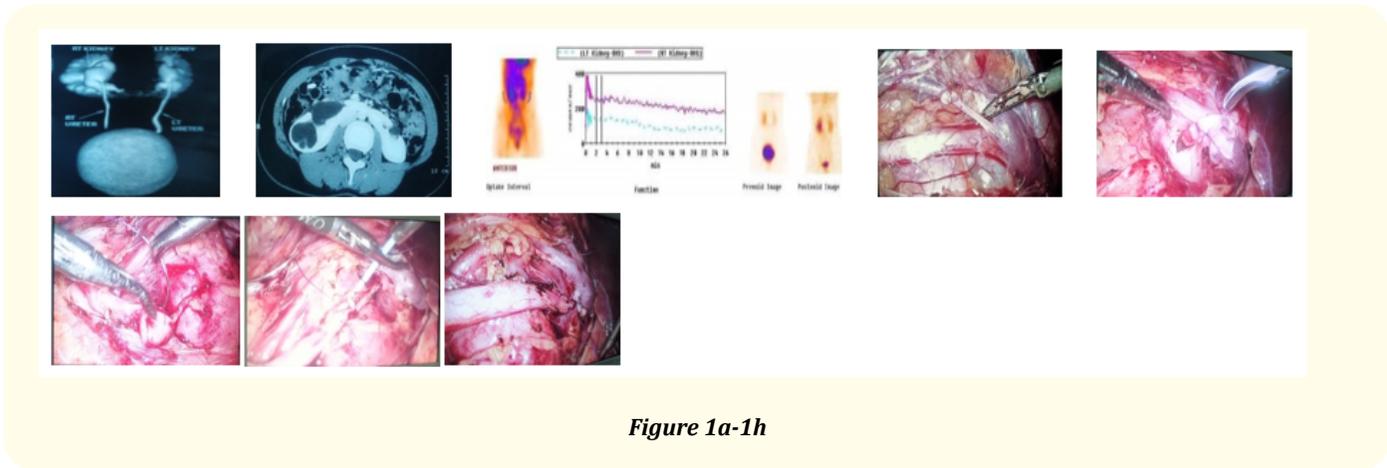


Figure 1a-1h

Case Report 2

A 45 year old male presented to our opd services with complaints of abdominal pain since 3 - 4 months duration with dysuria. His past history reveals bilateral PCNL 10 years back. Routine blood investigations and complete urine examinations (CUE) were done which showed few pus cells in CUE. USG showed right renal calculus with left dilated renal pelvis with hydronephrosis and horseshoe kidney (HSK). CT Urogram showed HSK with left PUJO, anterior and laterally placed pelvis with right renal pelvic calculus (Figure 2a and 2b). DTPA scan done, which reveals significant obstructive drainage pattern on left side (Figure 2c). After GA, Cystoscopy with bilateral retrograde pyelogram (RGP) done, reveals jet sign on the left side (Figure 2d). Right DJ stenting done. 16fr SRC inserted. 10 mm umbilical port placed for telescope. Two “5” mm ports placed in the left midclavicular line in the abdomen for working elements. Peritoneum reflected at the white line of tolt. Left ureter is identified and hooked. Left renal pelvis is dissected out, which is facing anteriorly and laterally, is a very unique presentation. Accessory left renal artery for lower pole seen crossing the left renal PUJ, which is the cause for PUJO (Figure 2e). Decision of Dismembered pyeloplasty planned, where in the pelvis is dismembered (Figure 2f). Left ureter is spatulated laterally. Anastomosis of PUJO started posteriorly by 4-0 vicryl. 5fr 26 cm DJ stent placed over the teremo glide wire (Figure 2g). Anterior layer of PUJO approximated by 4-0 vicryl. The reconstructed PUJ is transposed anterior to the crossing vessel (Figure 2h). 20fr drain placed and fixed. Port closure done. Post-operative was uneventful. SRC removed on POD5. After 4 weeks, right RIRS was done successfully by 30 watts Quanta Laser with Flex-S2 Ureteroscope and right DJ Stent placed (Figure 3a-3g). Post-operative was uneventful. Both the DJ stents were removed after 2 weeks. Patient is doing well in follow-up period.

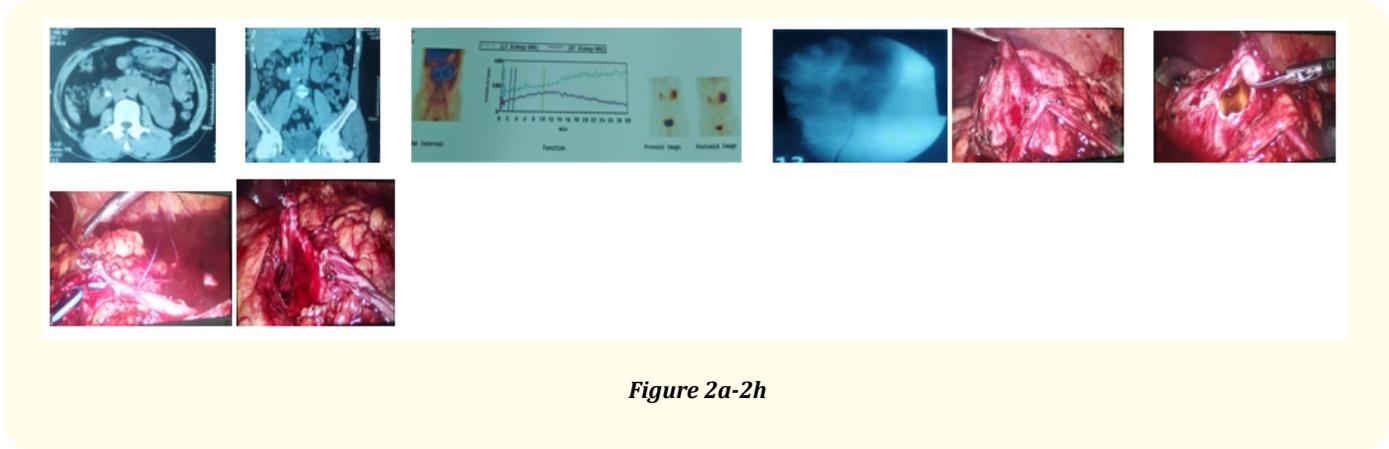


Figure 2a-2h

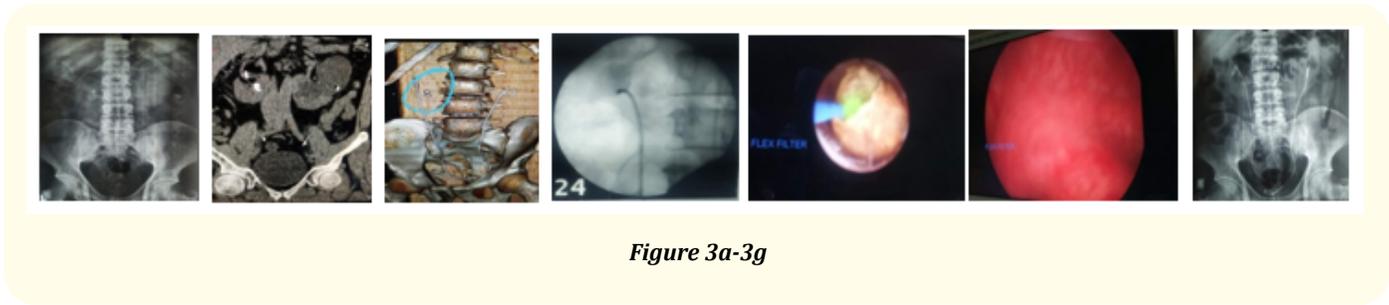


Figure 3a-3g

Discussion

Horseshoe kidney is the result of a developmental defect occurring between 4th and 8th weeks of embryogenesis. As the kidney develops, the inferior poles fuse and its ascent is arrested by the inferior mesenteric artery. The kidneys are fused by an isthmus, which can be a band of fibrous tissue or a thick rim of functional renal tissue. Clinical findings are those of infection, calculi, obstruction or tumor due to anomalous position of pelvis and ureters. As the most common complication of the horseshoe kidney necessitating surgical intervention, urolithiasis has an incidence of 20 - 60% and UPJ obstruction occurs at an incidence of 15 - 33% [7].

The largest series to date on pyeloplasty for horseshoe UPJ obstruction report outcomes for open Foley Y-V plasty and they generally lack reporting of both radiologic and clinical follow up which is now standard [8]. Nevertheless, open surgery success rates in horseshoe kidneys were less favorable than in orthotopic kidneys, ranging from 55 to 80% [8,9] compared to over 90% respectively [10,11].

Although 78% is inferior to the greater than 90% success rate for MIS pyeloplasty in orthotopic kidney [12,13] the MIS approach offers the same advantages for both anatomical variants: an equivalent success rate to the open approach but with shorter convalescence. In orthotopic kidneys, MIS pyeloplasty has emerged as the 'gold standard' treatment for UPJ obstruction, leading to the evolution of robotic and LESS applications over the past decade [14-16]. These approaches will likely become more utilized for horseshoe UPJO into the future.

Conclusion

Many studies show MIS pyeloplasty and RIRS in horse shoe kidneys require a lot of expertise and long term studies are needed for a long term follow up in these cases. In both of our cases the uniqueness of the anatomy intra operatively causing PUJO and its management

along with management of renal calculus by RIRS, has been done successfully. Surgeons experience is a first priority to manage in such difficult situations.

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