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Case Report

Pelvi-ureteric junction obstruction in a case of horseshoe kidneys with lower pole crossing vessels:a rare case and its management

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ABSTRACT

Pelvi-ureteric junction obstruction is one of the most common urological conditions found in children. Horseshoe kidneys are a predisposing factor and to find a vascular anomaly causing the obstruction is rare. A 2-year-old girl with two episodes of culture-positive febrile urinary tract infections (UTI), was found to have right sided hydronephrosis. Renal scan revealed decreased functioning of right kidney with scars. A contrast CT scan showed a horseshoe kidney with pelvi-ureteric junction obstruction on right side with dilatation of renal pelvis. During laparoscopic pyeloplasty, lower pole crossing vessels were detected, not reported on CT scan. A dismembered pyeloplasty with transposition of uretero-pelvic anastomosis anterior to lower pole vessels was done. Anomalous vasculature of kidney should be kept in mind during surgery in such cases. A dismembered pyeloplasty along with transposition of anastomosis is necessary to prevent recurrence.

Key words: Horseshoe kidneys, Pelvi-ureteric junction obstruction, Crossing vessels, Laparoscopic pyeloplasty

INTRODUCTION

Pelvi-ureteric junction is one of the most common congenital urological anomalies found in children.[1] Horseshoe kidneys are relatively rare and generally asymptomatic. Due to the anomalous anatomy, they are predisposed to pelvi-ureteric junction obstruction (PUJO).[2] Lower pole crossing vessels is a rare cause of PUJO, but its occurrence along with horseshoe kidney with symptoms is rare. Here we describe such a symptomatic case of a 2-year-old girl.

CASE REPORT

A 2-year-old girl was admitted in a small hospital in Mumbai in January 2023 with fever and urinary tract infection. Urine examination showed 12-15 pus cells with urine culture showing no growth. An ultrasound of abdomen revealed hydronephrosis of right kidney with antero-posterior diameter of renal pelvis 21 mm suggestive of possible pelvi-ureteric junction obstruction. An EC (ethylene dicysteine) renogram showed a split function of 38% on right side with progressive excretion of tracer through dilated pelvi-calyceal system. A DMSA (dimercaptosuccinic acid) renogram suggested a decreased cortical uptake (30%) with photopenic defects in upper and lower pole of renal cortex.

The patient was not started on any chemoprophylaxis and was asked to follow up by the treating physician if another episode of urinary tract infection occurs. The patient had similar complaints of fever with dysuria in February 2024, with urine examination showing 90 pus cells/hpf and urine culture revealing Escherichia coli (>1,00,000 CFU/ml). A repeat renal scan (DMSA) showed reduced cortical uptake (10%) with faint tracer localization along the isthmus suggestive of horseshoe kidney. A contrast CT scan was done for anatomical

evaluation which revealed horseshoe kidneys with a smaller right kidney and reduced cortical thickness and reduced uptake in right kidney with dilated extra-renal pelvis (Figure 1).

At this point, the patient came to our institute was posted for laparoscopic transperitoneal right pyeloplasty. During the surgery, vessels (both artery as well as vein) of lower pole of kidney of right side were visualized crossing and compressing the right pelvi-ureteric junction (Figure 2). This finding was not reported in the CT scan. A dismembered pyeloplasty was done by transposing the ureter and renal pelvis anterior to the crossing vessels, excising the narrowed pelvi-ureteric junction and anastomosing the ureter and pelvis (Figure 3). The anastomosis was done using 5-0 polyglactin (round body) after inserting a double J stent. A 10 Fr infant feeding tube was kept as an intra-abdominal drain. The Foley's catheter and drain were removed on post-operative day 3 and patient was discharged. Double J stent was removed after 4 weeks. Follow up ultrasound of renal system shows no residual hydronephrosis after 6 months.

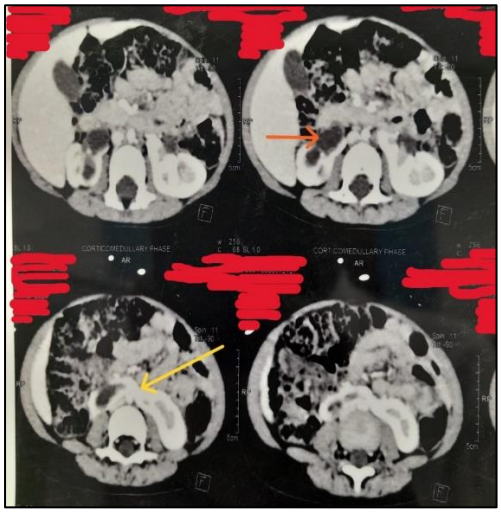

Figure 1: Contrast CT showing isthmus of horseshoe kidney (yellow arrow) and dilated extrarenal pelvis on right side (orange arrow).

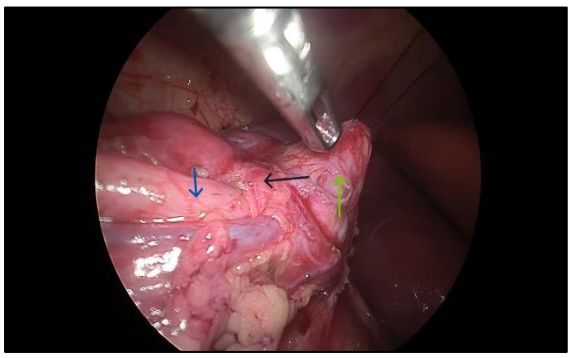

Figure 2: Dilated renal pelvis (green arrow), lower pole crossing vessels (black arrow) and ureter (blue arrow).

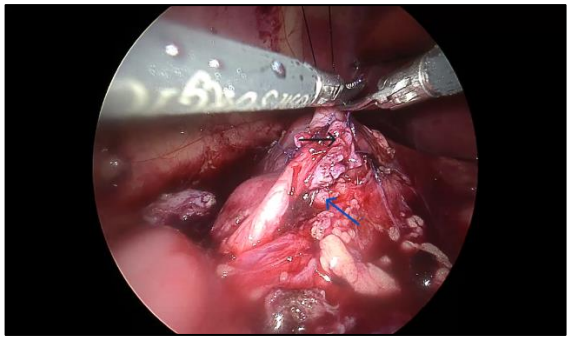

Figure 3: Uretero-pelvic anastomosis (black arrow) and crossing vessels behind anastomosis (blue arrow).

Histopathology of excised pelvi-ureteric junction shows mild inflammation and muscle hypertrophy and fibrosis of muscularis propria consistent with chronic obstruction.

DISCUSSION

Incidence of pelvi-ureteric junction obstruction is 1 in 1000-2000 live births, making it the commonest disease causing paediatric hydronephrosis1. PUJ obstruction was first described by Dietl in 18643. PUJO can either be primary or secondary. Primary cases are generally congenital due to anomalies of ureteral insertion or muscular hypertrophy at PUJ or abnormal vascular anatomy. Secondary causes are generally due to fibrosis caused by repeated UTIs or previous surgery.

Horseshoe kidneys are the most common fusion anomaly of the kidney with an incidence of 1 in 500 individuals.[2] Most horseshoe kidney patients are asymptomatic with only a minority of them experiencing abdominal pain or urinary tract infections.[4] Horseshoe kidneys differ from normal kidneys in 3 ways- location, orientation and vasculature.[5] The ascent of horseshoe kidneys is limited by the inferior mesenteric artery at L3 level making the location lower than normal kidneys. The isthmus limits the normal medial rotation of the kidneys, making them more anteriorly rotated (malrotated). This also results in the ureter having to pass over the isthmus or anterior surface of the kidneys, causing drainage problems and urinary stasis.[6,7]

Horseshoe kidneys are prone to anomalies of vascular supply, both arterial and venous.[7-9] The number of arteries and veins supplying each kidney can vary according to position of the kidney. In spite of the varied vascular supply, the intra-renal vascular pattern remains normal, hence inadvertent ligation of any of the accessory vessels can result in segmental ischemia due to poor collateral supply10. Although the exact incidence of crossing vessels (CV) in normal population is not known, studies have shown it to be between 39% to 65%.[11,12] Whether the presence of CV is the cause of obstruction at PUJ or just an associated finding (with an intrinsic obstruction already present), is still a debate with many studies for and against both theories.[13-15] Lower pole

crossing vessels causing PUJO in the presence of horseshoe kidneys has been detected in approximately 30% to 60% in various studies but they have mostly been in the older age group. Our patient had horseshoe kidneys with right PUJO due to lower pole crossing vessels and presented with urinary tract infections, which is rare in this age group.[16,17]

Laparoscopic dismembered pyeloplasty was done for our patient with transposition of the uretero-pelvic anastomosis anterior to the lower pole crossing vessels. Other procedure also includes vascular hitch, but we preferred a dismembered pyeloplasty as it also addresses any intrinsic cause of PUJ obstruction at the same time and decreases chances of recurrent PUJO.

CONCLUSION

Anomalies in vascular supply of the kidney should be kept in mind during surgery in cases of horseshoe kidneys. They may not always be reported on contrast CT. It is necessary to do a dismembered pyeloplasty and transpose the anastomosis anterior to the crossing vessels to prevent recurrence due to compression.

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