

Case Report

Ureteropelvic junction obstruction does not spare even the ectopic kidney

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ABSTRACT

Robotic pyeloplasty for ureteropelvic junction obstruction is widely being done, but for anomalous kidneys, it is a bit challenging due to abnormal anatomy. The ectopic kidney lies outside renal fossa so the operative challenges it poses are a malrotation kidney, associated vascular anomalies, and short ureter complicating not only access but also the reconstruction. We present a case of right ectopic kidney with gross hydronephrosis due to pelvic ureteric junction obstruction. We further discuss the surgical challenges faced during its management and further outcome.

Keywords: Ureteropelvic junction obstruction, Ectopic kidney, Anomalous kidney, Robotic dismembered pyeloplasty, DJ stent insertion

INTRODUCTION

Failure of migration of the kidney to the renal fossa leads to an ectopic kidney, which can be affected by multiple pathologies, pelvi-ureteric Junction obstruction being one of them. Robotic pyeloplasty for Pelviureteric junction obstruction is widely being done, but for anomalous kidneys, it is a bit challenging due to abnormal anatomy as an ectopic kidney lies outside the renal fossa and the direction of the ureter needs special attention to prevent injury.¹ We present a case of 9 years old female child who presented with complaints of suprapubic bulge and pain in her lower abdomen.

CASE REPORT

A 7-year-old female presented in OPD with suprapubic pain and a lump from the last 6 months. The pain was insidious in onset mild in intensity which was continuously present and not relieved even after micturition. No diurnal variation, no postural changes, not associated with any aggravating or relieving factors. The lump was gradually increasing in size and it was not

relieved even after passing urine. No history of any hematuria, urinary tract infections, vomiting, anorexia etc. On examination, a cystic, smooth surface with regular margins lump of about 5×5 cm could be palpated in the suprapubic region. Ultrasonography of whole abdomen was done which revealed an ectopic right kidney in the right iliac fossa with gross hydronephrosis. Computed tomography of KUB had an ectopic, malrotated kidney in the right iliac fossa with gross hydronephrosis with the possibility of pelvi-ureteric junction obstruction (Figure 1).

DTPA scan showed that the left kidney had preserved parenchymal function and clearance. The right kidney was ectopically placed in the pelvis with severely impaired and delayed renal parenchymal function (Figure 2). After counselling the parents, she was planned for surgery. Robotic Right dismembered pyeloplasty with DJ stent insertion with a perinephric drain insertion was done under GA. The port placement was different as we were to work in the pelvis (Figure 3). The right kidney with a grossly dilated pelvis was seen in the pelvis with the hilum facing towards the anterior abdominal wall. On further exploration the ureter was identified, there were

no crossing vessels over it. There was narrowing seen at the pelvi-ureteric junction; after dismembering the excess pelvis the distal patency of the ureter was checked and then a wide, dependent anastomosis was done over 3 Fr DJ stent (Figure 4). A pelvic drain was inserted. There was no output from the drain and was removed on POD-1. The catheter was removed on POD-2 and the patient was discharged as the course was uneventful. The DJ stent was removed cystoscopically after 6 weeks of surgery. Since then, she has been doing well on regular follow-ups.

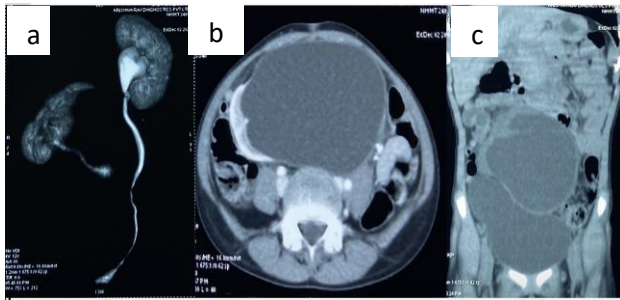


Figure 1: (a) CT Urograph 3-D reconstruction; showing right ectopic kidney in right iliac fossa (b) axial section (white arrow) and (c) coronal section (black arrow) of CECT abdomen showing grossly dilated right pelvis.

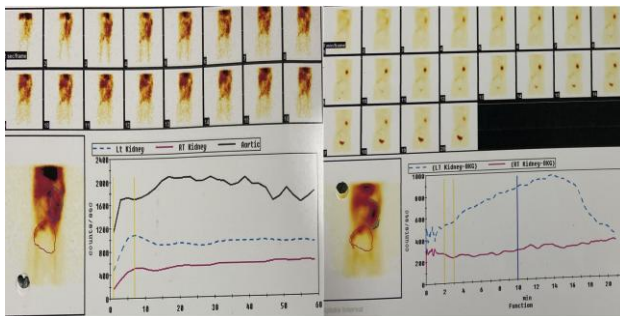


Figure 2: DTPA scan showing good uptake by both kidneys but almost no drainage on right side giving a plateau curve.



Figure 3: Port placement sites, green arrow-substernal camera port, black arrows-Bilateral subcostal ports in mid clavicular line, working ports.

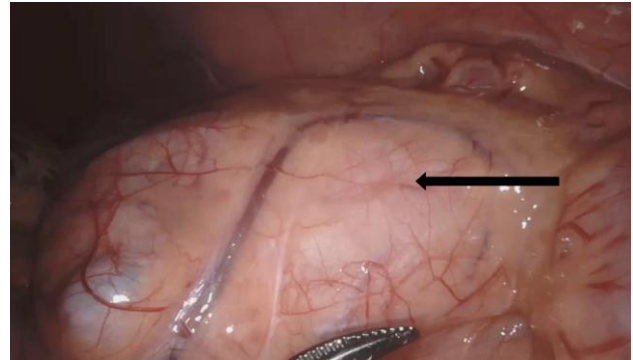


Figure 4: Grossly dilated pelvis occupying almost whole pelvis (black arrow).

DISCUSSION

Since time unknown open pyeloplasty has been the answer for pelvi-ureteric junction. But as the advances in surgery minimally invasive surgery; both laparoscopic and robotic surgeries are being done successfully.¹ The precision of robotic systems allows for meticulous dissection and reconstruction thus contributing to favourable outcomes.² Abnormal renal anatomy in ectopic kidneys, particularly when associated with pathologies like pelvi-ureteric junction obstruction (PUJO), presents a significant surgical challenge.³ The management of ectopic kidney PUJO poses unique challenges due to the atypical location and vascular anatomy of the kidney. The ectopic position of the kidney often necessitates tailored port placement and strategic planning.

Preoperative imaging, including CT angiography or MRI, is crucial for mapping the anatomical landscape.⁴ Ectopic kidneys frequently have aberrant blood vessels. Robotic systems enable precise dissection around these vessels, reducing the risk of intraoperative bleeding and ensuring adequate vascular supply to the kidney. Added benefits are that it enhances surgeon ergonomics and provides superior dexterity, allowing for effective management of ectopic kidneys, which are often positioned deep within the pelvis or lower abdomen. Smaller incisions lead to reduced postoperative pain, shorter hospital stays, and quicker recovery times.

The cosmetic outcomes are also superior, which is particularly beneficial in paediatric and young adult populations. The 3D high-definition visualization provided by robotic systems allows for better identification of anatomical structures and precise manipulation of tissues, reducing the risk of inadvertent injury. The articulated instruments of the robotic system facilitate complex suturing and reconstruction essential for successful pyeloplasty. Comparative studies between robotic, laparoscopic, and open pyeloplasty for ectopic kidney PUJO highlight the superiority of the robotic approach in terms of operative time, blood loss, and postoperative recovery. Robotic surgery consistently

shows lower complication rates and higher patient satisfaction.⁵ While the setup time for robotic surgery may be longer, the actual dissection and reconstruction phases are often more efficient due to enhanced precision and control. It is associated with minimal blood loss and fewer intraoperative complications.⁶

The ability to perform meticulous dissection and precise suturing minimizes the risk of injury to adjacent structures. Patients undergoing robotic pyeloplasty have faster recovery, with a quicker return to normal activities and lower rates of prolonged pain or discomfort.^{7,9} Continuous refinement of robotic systems, including enhanced imaging integration and improved instrument dexterity, will likely enhance surgical outcomes further.

Expanding training programs and surgical experience with robotic systems will improve proficiency and broaden the availability of robotic pyeloplasty, making it the standard of care for complex cases like ectopic kidney PUJO. Further long-term studies and multicenter trials are needed to validate the sustained efficacy and safety.^{8,10}

CONCLUSION

Robotic pyeloplasty is a significant advancement in managing PUJO in ectopic kidneys, offering high success rates, reduced morbidity, and faster recovery. Its precision and minimally invasive approach are well-suited to address the anatomical complexities of ectopic kidneys. The technique is increasingly preferred in contemporary urological practice due to its adaptability and effectiveness. Technical modifications are essential, as the ureter's direction varies with the kidney's position. Ongoing research and technological innovations will continue to enhance its role in PUJO management.

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