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Laparoscopic transmesocolic pyelolithotomy and pyeloplasty in an ectopic pelvic kidney: Case report and review of literature

Jaisukh Kalathia [a,*], Arvind Valiya [b], Giriraj Vala [a], Kaushal Patel [c], Kuldeep Aggarwal [a]

[a] Department of Urology and Kidney Transplantation, Fortune Urology Clinic, India
[b] Department of Urology and Kidney Transplantation, Valiya Urology Hospital, India
[c] Department of Urology and Kidney Transplantation, Nephron Kidney Hospital, India

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ABSTRACT

Renal ectopia is a developmental anomaly with pelvic kidney being the commonest location (55%). The incidence of uretero-pelvis junction (UPJ) obstruction, nephrolithiasis, and reflux are higher in ectopic kidneys than their counterparts. We herein report a case of left ectopic pelvic kidney with large stone associated with UPJ narrowing managed successfully simultaneously with laparoscopic transmesocolic pyelolithotomy and pyeloplasty in a 45-year female. This is the largest stone reported in the literature in an ectopic pelvic kidney managed successfully with favorable outcome.

Introduction

Ectopic pelvic kidney, a rare developmental anomaly that is thought to occur with incidence ranging from 1 in 2200 to 1 in 3000. Because of the kidney malrotation, abnormal position of renal pelvis and ureteral insertion there is increase chances of urine stagnation ultimately leading to nephrolithiasis. Though, various approaches for large stone extraction from ectopic pelvic kidney have been explored via open, percutaneous nephrolithotomy (laparoscopic or ultrasonography guided puncture) and laparoscopic pyelolithotomy but these are technically challenging. Hereby, we report a case of left ectopic pelvic kidney with large stone and pelvi-ureteric junction narrowing managed by transmesocolic laparoscopic pyelolithotomy and pyeloplasty concomitantly. As per literature, we believe this is the largest stone reported and extracted successfully from an ectopic pelvic kidney.

Case report

A-45-year old women presented with lower abdominal pain for the past 4–5 years. On investigation, X-ray KUB (Kidney-Ureter-Bladder) showed a big radiopaque stone (6.3 cm × 4.1 cm) in pelvis slightly towards right side of sacral promontory [Fig. 1]. USG (ultrasonography) confirmed left ectopic pelvic kidney with a stone in pelvis with mild hydronephrosis. The CT-Urography revealed left ectopic kidney having an anteriorly directed pelvis with a large stone and delayed excretion [Fig. 2- a, b]. Intraoperatively, in lithotomy position left ureteric orifice was cannulated and retrograde pyelography done which confirmed pelvi-ureteric junction (PUJ) narrowing [Fig. 2- c, d]. Subsequently, the patient was placed in supine position for laparoscopic pyelolithotomy and pyeloplasty.

The pneumoperitoneum was created using Veress needle. A, 12 mm laparoscopic trocar was inserted 2 cm above umbilicus and 30-degree Trendelenburg position was given. Three 5 mm secondary trocars were inserted, two in the right and left iliac fossa and third one on left side as assistant port. The small bowels were swiped anteriorly and the stone was palpated through the mesocolon of large bowel covering the ectopic kidney in pelvis. Mesocolon overlying the pelvis was gently incised exposing the pelvis as much as possible for the retrieval of the large stone. A large under vision pyelotomy incision over the stone was made extending to PUJ. Because of the size, the stone couldn't be held with instruments so it was gently rotated with suction cannula from posterior wall and then extracted [Fig. 3].

The narrowed PUJ was mobilized and was transected followed by inferior spatulation to have unobstructed drainage post pyeloplasty. A 5 Fr DJ (double 'J' stent) was placed and ureter and pelvis were anastomosed with Vicryl 4-0 suture followed by continuous closure of pyelotomy incision. Mesocolon was closed interruptedly with suture and a drain was inserted through 5 mm trocar. The stone was bagged and

* Corresponding author.
E-mail addresses: jaisukh2010@yahoo.com (J. Kalathia), drarvind1481@gmail.com (A. Valiya), girirajvala83@gmail.com (G. Vala), drkslpatel@gmail.com (K. Patel), drkuldeepaggarwal@gmail.com (K. Aggarwal).

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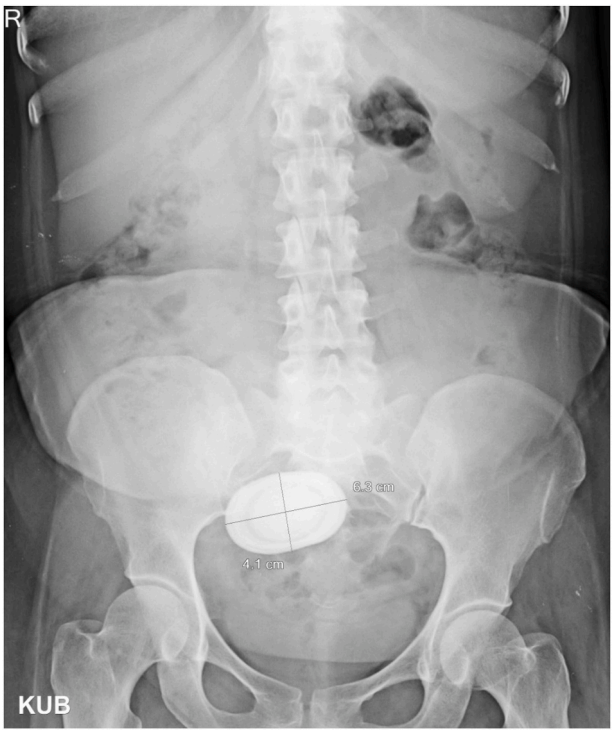

Fig. 1. X-ray KUB (kidney ureter bladder) showing a big radiopaque stone in pelvis.

removed through a left lower abdominal incison.

Discussion

The ectopic kidney (or "renal ectopia") is a congenital anomaly that is thought to occur in about 1 out of 900 births as a result of arrested migration.[1] These may be *simple ectopia* (ectopic on its own side) or *crossed ectopia* (across the midline fused or unfused to contralateral kidney) with the most common location in pelvis opposite sacrum below the bifurcation of aorta. It may be associated with malformations of other systems including skeletal, genito-urinary, cardiovascular and gastrointestinal tract.[2] Usually, these patients with ectopic kidney are asymptomatic and diagnosed incidentally with radiological investigations done for other reasons.

Stasis of urine in an ectopic kidney occurring due to kidney malrotation, abnormal position of pelvis and high insertion of ureter predispose to increase chances of stone formation than their counterparts. Recurrent urinary tract infection secondary to kinking and tortuosity of the ureter is often encountered in these patients. The reported PUJ-obstruction in ectopic kidney is between 22% and 37% which also needs to be corrected to prevent obstruction of urine flow as seen intraoperatively in our case.

Shockwave lithotripsy (SWL) or flexible ureteroscopy can be used in dealing small stones in an ectopic kidney while the larger stones may require open, percutaneous or laparoscopic approach. Choosing any of these treatment modalities largely depends on the stone size, stone density and kidney position. In this minimally invasive era, majority of stones in ectopic kidney can be dealt successfully with endoscopic procedures therefore open surgery has no role to play because of the

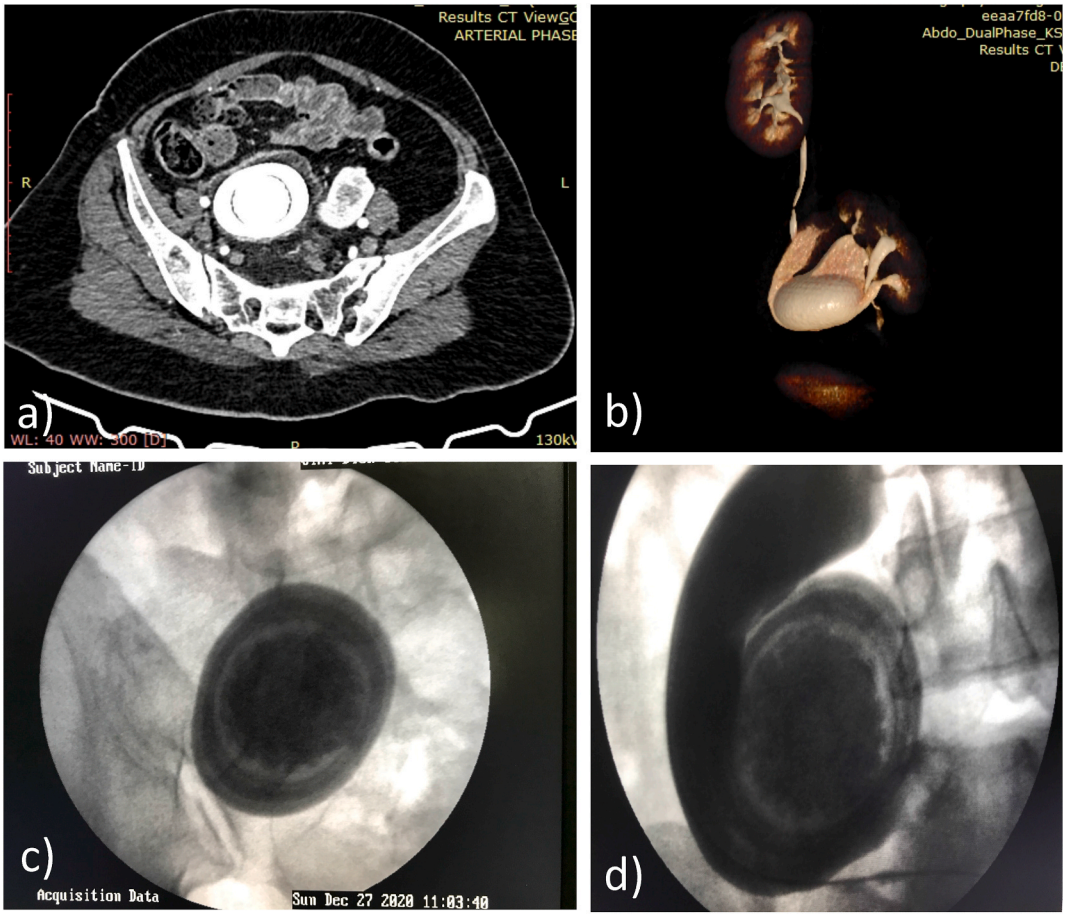

Fig. 2. a & b) CT-Urography showing left ectopic kidney with a large stone and delayed excretion c & d) Intraoperatively, C-arm image showing stone and retrograde pyelography.

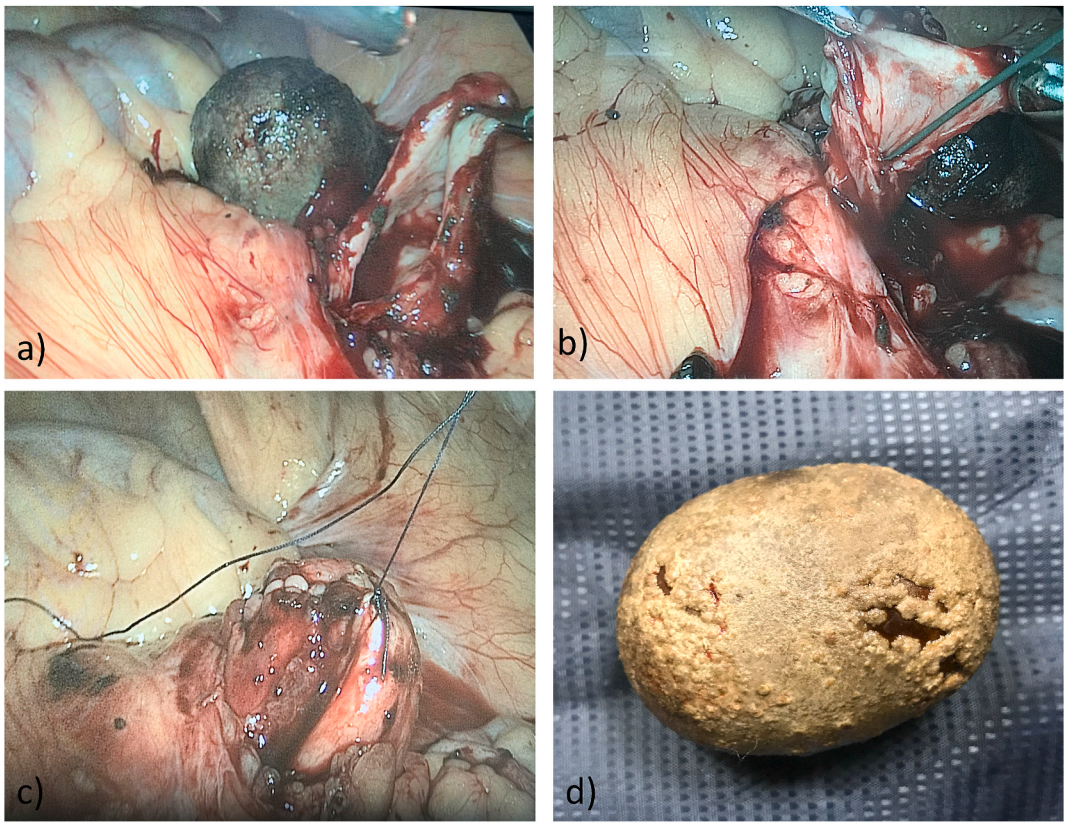

Fig. 3. a) Transmesocolic pyelotomy and stone extracted b) Transected ureter inferiorly spatulated c) pelvis sutured continuously d) extracted stone.

associated morbidity. Nowadays, PCNL (laparoscopic or ultrasonography guided puncture) or laparoscopic pyelolithomy are well accepted treatment modalities in managing stones in ectopic pelvic kidney with each having their own advantages. Otano et al. reported largest series on USG-guided puncture for PCNL in ectopic pelvic kidney in 26 patients with successful outcomes. It is safe and effective approach when performed in experienced hands.[3] Subsequently, PCNL with laparoscopic guidance for attaining safe access to the pelvic-caliceal system is used to prevent inadvertent injury to viscera when approached directly via transperitoneal route.

Laparoscopic pyelolithomy is effective modality for treating renal stone in ectopic pelvic kidney.[4] It would be an ideal approach for extracting large stone with laterally or anteriorly directed pelvis associated PUJO as seen in our case. Gupta et al. found in their series of 6 patients with ectopic pelvic kidney that laparoscopic approach is safe and suitable in nephrectomy, pyeloplasty and pyelolithotomy.[5] In our case, in same operative session through transmesocolic approach both pyelolithotomy and pyeloplasty were executed minimizing postoperative morbidity. Transmesocolic approach with careful dissection is a viable option in ectopic pelvic kidney.

Conclusion

Laparoscopic pyelolithotomy and pyeloplasty concomitantly for large a stone associated with PUJO in an ectopic pelvic kidney is safe and effective and should be standard of care for in these patients.

Author's contribution

Kalathia Jaisukh: Manuscript writing, Project development.
Arvind Valiya: Project development.
Giriraj Vala: Manuscript writing.
Patel Kaushal: Data collection, Manuscript writing.
Kuldeep Agrawal: Data collection.

Research involving Human Participants and/or animals

Human Participants.

Informed consent

Yes.

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Declaration of competing interest

None.

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