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Case Report

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ABSTRACT

Renal cell carcinoma (RCC) in pelvic kidney (PK) is very rare. Using computed tomography, we detected a 60x46 mm solid mass in right PK of a forty-seven-year-old man. Laparoscopic radical nephrectomy (LRN) was done. No complications occurred and patient was discharged after 36 hours. Pathology revealed multicystic RCC. During the two year follow-up period, no local recurrence or metastasis was observed. LRN for a PK mass has been reported rarely in literature. It can be safely performed in centres experienced in laparoscopy after delineating the vascular anatomy and surrounding structures with adequate pre-operative screening.

KEY WORDS: Computed tomography angiography, laparoscopy, pelvic kidney, renal cell carcinoma

INTRODUCTION

The development of pelvic kidney (PK) is contingent on the non-completion of anatomic ascent of the kidney in the sixth to ninth weeks of the gestation period, and its incidence is 1 in 2000–3000[1]. Masses in PKs are extremely rare, with an incidence estimated at 1 in 22000000[2]. Most cases of PK with renal mass have been managed with open radical nephrectomy. We present a case in which we performed laparoscopic radical nephrectomy (LRN) for a mass in the pelvic right kidney.

CASE REPORT

We reported a forty-seven-year-old male patient with a right pelvic kidney mass. The patient has attended the internal diseases polyclinic with diarrhoea and weight loss. The mass was detected by abdominal ultrasound (USD). In computed tomography (CT), there was a 60 x 46mm exophytic mass in the upper pole which was heterogeneous (Fig. 1A, 1B, 1C). We evaluated the kidney's vascular anatomy, position and dimensions of mass and pathological lymph nodes by performing triphasic abdominal computed tomography angiography (CTA). Three renal arteries and three renal veins were observed. First artery originated from mid-section of abdominal aorta and continued to tumour location. Second artery originated from right anterolateral aspect of the bifurcation of distal abdominal aorta. This artery reached the renal hilus. Third artery originated from the proximal right common iliac artery and supplied the posterior surface of the kidney (Fig. 2A). First vein originated from inferior vena cava (IVC) and drained the upper pole of right kidney. Second vein orignated from left anterior wall of IVC and drained the mid pole of right kidney. Third vein originated from anterior surface of left common iliac vein and drained the lower pole and hilum of right kidney (Fig. 2B).

Surgical Technique

Once patient was under anaesthesia, we moved him into a modified left lateral position at 45-degree angle. We entered peritoneal cavity from right side of umbilicus with Veress needle and inflated the abdominal cavity with CO_2 gas at 12 mm Hg. We placed three trocars in abdominal wall. The camera trocar was positioned in the same place as the Veress needle, trocar for right was placed on right hand side about 5 cm laterally from the umbilicus and trocar for left hand was placed about 3 cm above symphysis pubis (Fig 3). Thirty degree telescope was used (Karl Storz, Tuttlingen, Germany).

Using the transperitoneal approach, right Toldt line was incised and caecum and ascending colon were dissected. We identified and dissected the three arteries, three veins, and ureter of PK. We used XL size Hem-o-lock clips (Hem-o-lock, Weck Closure Systems, Research Triangle Park, NC, USA) and 45 mm laparoscopic linear stapler (EndoGIA, Ethicon, Cincinnati, OH, USA) to clamp and cut vascular structures and ureter. We extracted the specimen from 3cm vertical incision between right hand trocar and subcostal area. A drainage catheter was placed. Operation time was 145 minutes, bleeding was 30 cc and no intraoperative or postoperative complication. We removed the catheter after 24 hours and the patient was discharged after 36 hours. Pathology revealed multicystic renal cell carcinoma. No recurrence was detected in follow-up of the patient on the 3rd, 6th, 12th, 18th and 24th months.

DISCUSSION

Laparoscopic surgery (LS) provides shorter hospitalization, less requirement for analgesia and better cosmetic appearance[3]. As surgeons have increased their laparoscopic experience, they have started to perform laparoscopic surgery in compelling cases who have anatomical variations[1]. LS for PK is different from standard surgery. To prevent a limited working area, camera port and ports for other working trocars should not be close to each other. As transperitoneal approach provides better working area for PK than the retroperitoneal approach, it should be preferred initially. For interventions to right PK, dissecting caecum and ascending colon from the Toldt line without opening the perirenal tissues allows retroperitoneal area to be reached and the main vascular structures in the iliac region to be revealed. We reached kidney safely by transperitoneal approach guided by the preoperative CTA, which revealed neighboring and vascular structures.

LRN for RCC in PK has been rarely reported[1,4,5]. There are only a few reports of minimally invasive surgical approaches on tumors in PKs[6-10]. Gill *et al* and Chung *et al* performed LRN for PK mass (4.8 cm and 2.6 cm, respectively)[9,10]. They reported that LRN for PK mass is safe and efficacious. Ellen *et al* performed robotic partial nephrectomy on a mass of 2 cm in a PK and they stated that robotic surgery is ideal for this kind of cases[7]. Goel *et al* reported a case of mass in a PK evaluated by preoperative CTA, for which they successfully completed transperitoneal LRN

surgery[6]. The current study also found preoperative CTA was useful and transperitoneal LRN was possible in these cases.

LS of a PK must be performed with care[1]. In order to reduce risks, the patient's renal vascular structure and its relationship with neighbor organs must be delineated by preoperative CTA or magnetic resonance imaging (MRI) angiography. Pre-operative detailed screening provides major benefits for this kind of surgeries, as it allows the establishment of dissection plan and enables tissue and vascular structures to be identified more easily during dissection. Accurate placement of trocar ports is an important part of procedure with regards to ease of dissection during LS. In PK surgery, there is no standardized way of placing trocars. This should be performed entirely according to anatomic position of kidney and mass. Preoperative CT or MRI angiography methods are vital for this reason also[4,6,11,12].

CONCLUSION

LRN for a PK mass has been reported rarely in literature. Surgery for a PK is difficult due to anatomical and vascular variations. However transperitoneal LRN can be performed safely in experienced centres provided that vascular anatomy and surrounding structures are delineated with adequate preoperative screening methods.

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REFERENCES

1. Cinman NM, Okeke Z, Smith AD. Pelvic kidney: associated diseases and treatment. Journal of endourology. 2007;21:836-842.

2. Grotas AB, Phillips JL. Renal mass in solitary, crossed, ectopic pelvic kidney. Urology. 2009;73:1223-1224.

3. Balci M, Tuncel A, Guzel O, et al. Evaluation of the complications in transperitoneal laparoscopic renal and adrenal surgery with Clavien-Dindo classification. Turk J Urol. 2016;42:70-73.

4. Mahmoudnejad N, Danesh A, Abdi H. Renal cell carcinoma in presacral pelvic kidney. J Pak Med Assoc. 2009;59:482-483.

5. Ayyathurai R, Joshi S, Pan D, Ciancio G, Manoharan M. V404 RADICAL NEPHRECTOMY FOR RENAL CELL CARCINOMA IN A MALROTATED FUSED ECTOPIC PELVIC KIDNEY. The Journal of Urology. 2012;187:e165.

6. Goel A, Ahuja M, Chaudhary S, Dalela D, Bhandari M. Absence of Gerota's fascia in pelvic ectopic kidney: implications in laparoscopic radical nephrectomy. Urology. 2006;68:1121 e1121-1122.

7. Ellen J, Narayan V, Nelsen C, Su L-M. V11-07 ROBOTIC PARTIAL NEPHRECTOMY IN A PELVIC KIDNEY MASS: SURMOUNTING ANATOMIC CHALLENGES. The Journal of Urology. 2014;191:e952.

8. Keehn A, Ghavamian R. V11-06 ROBOTIC ASSISTED PARTIAL NEPHRECTOMY IN A PELVIC KIDNEY. The Journal of Urology. 2014;191:e952.

9. Gill J, Kimuli M, Joyce A, Cartledge J. Laparoscopic Nephrectomy for Renal Cell Carcinoma in a Pelvic Kidney. Journal of Endourology Part B, Videourology 2014;28.2.

10. Chung BI, Liao JC. Laparoscopic radical nephrectomy in a pelvic ectopic kidney: keys to success. JSLS. 2010;14:126-129.

11. Izadpanahi MH, Kabiri M, Mazdak H, Nouri-Mahdavi K, Khorrami MH. Preoperative evaluation of pelvic kidney renal cell carcinoma with 64-slice CT and 3D-CT angiography. Advanced biomedical research. 2014;3:250.

12. Terrone C, Destefanis P, Fiori C, Savio D, Fontana D. Renal cell cancer in presacral ectopic kidney: preoperative diagnostic imaging compared to surgical findings. Urol Int. 2004;72:174-175.

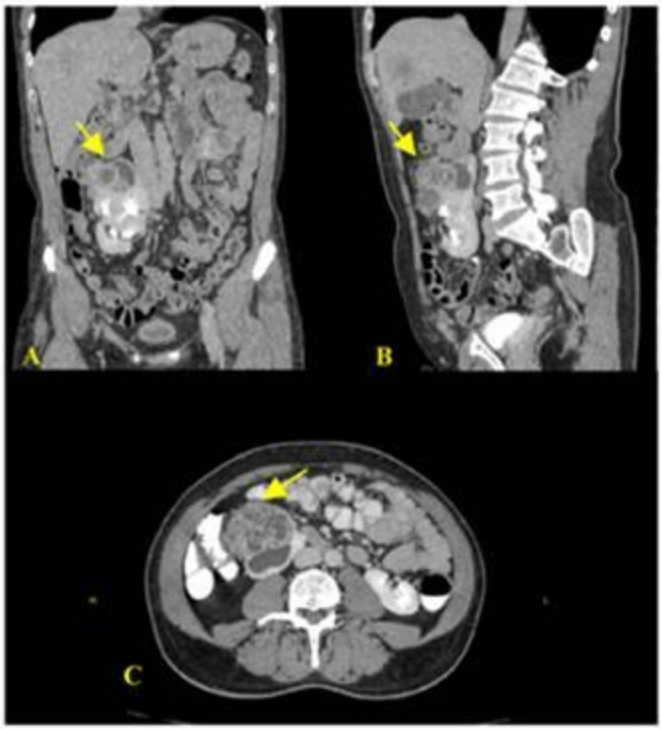

Figure 1. Abdominal CT (Yellow arrows demonstrate renal mass) **A**. Frontal plane of imaging. **B.** Saggital plane of imaging **C.** Transverse plane of imaging.

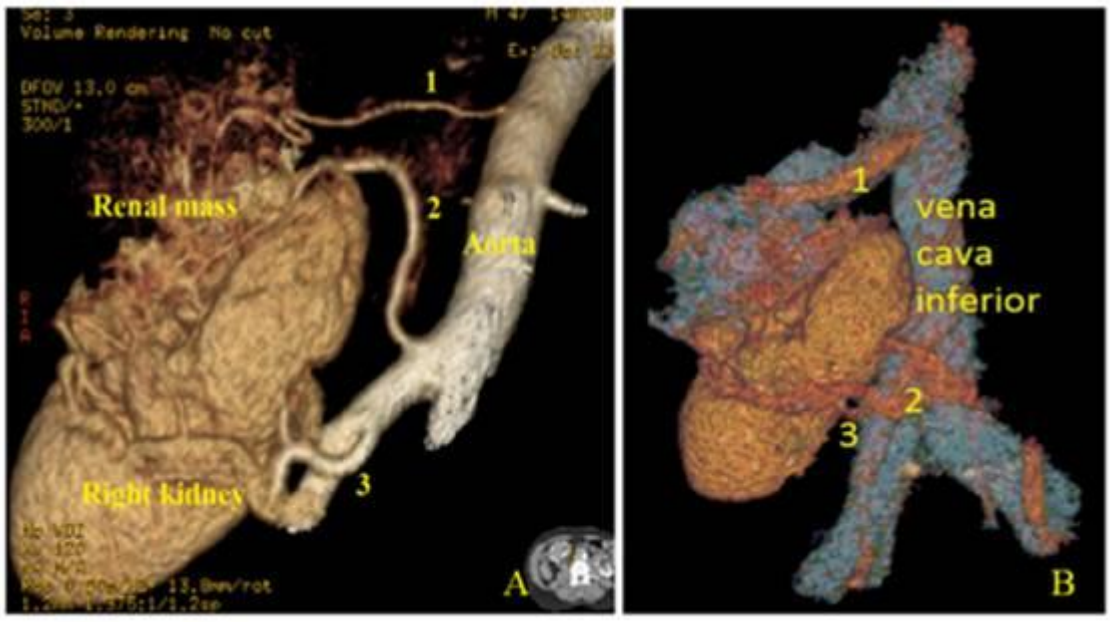

Figure 2. Computed tomography angiography imaging. (3D reconstruction) **A.** Demonstrating the association between arteries and pelvic kidney. **B.** Demonstrating the association between veins and pelvic kidney.

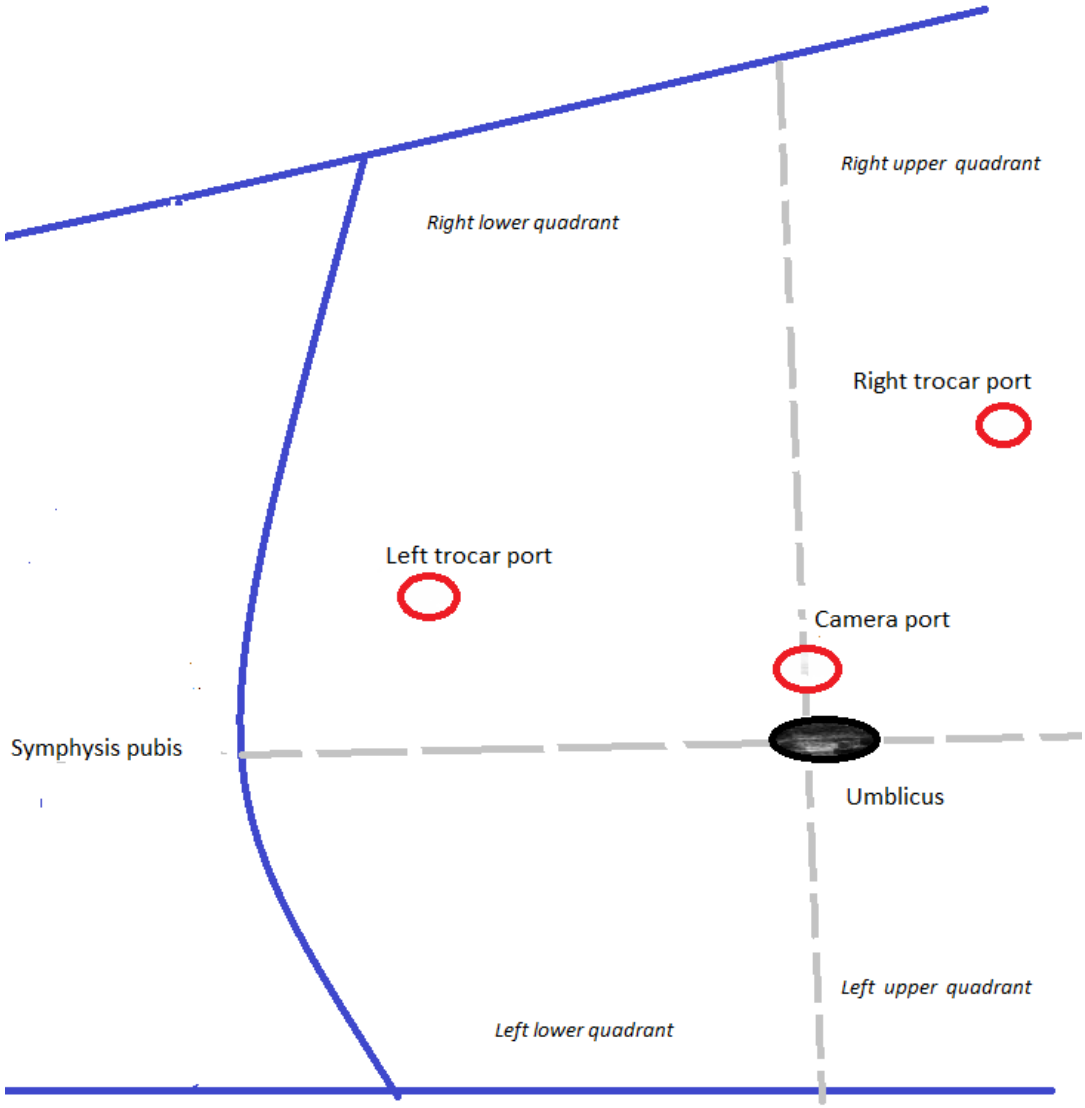

Figure 3. Schematization of trocar insertion sites.