KJU
Korean Journal of Urology

www.kjurology.org
http://dx.doi.org/10.4111/kju.2011.52.11.795

Case Report

Retroperitoneoscopic Partial Nephrectomy in a Horseshoe Kidney

Yong Seung Lee, Ho Song Yu, Myung Up Kim, Ho Sung Jang, Dae Hun Lee, Chan Dong Yeom, Jong Ho Hwang[1], Won Sik Ham

Department of Urology and Urological Science Institute, Yonsei University College of Medicine, [1]Department of Urology, Sahmyook Medical Center, Seoul, Korea

A 21-year-old woman with a 4 cm enhancing cystic renal mass in the left moiety of a horseshoe kidney was treated through a retroperitoneal laparoscopic approach. The tumor was excised completely with cold scissors, and renal parenchyma suturing with a surgical bolster was done with Vicryl 2-0 sutures. Choosing the proper approach according to the location of the lesion and the surgeon's experience with both approaches are of importance in laparoscopic surgery in horseshoe kidney cases. A preoperative kidney computed tomography angiography was helpful for understanding the complex renal vasculature.

Key Words: *Kidney; Laparoscopy; Nephrectomy*

Article History:
received 2 May, 2011
accepted 23 May, 2011

Corresponding Author:
Won Sik Ham
Department of Urology, Urological Science Institute, Yonsei University College of Medicine, 134, Sinchon-dong, Seodaemun-gu, Seoul 120-752, Korea
TEL: +82-2-2228-2313
FAX: +82-2-312-2538
E-mail: uroham@yuhs.ac

We are grateful to Mr. Dong-Su Jang for the illustration.

Horseshoe kidney is one of the most common congenital kidney fusion anomalies. However, there have been only two published case reports of laparoscopic partial nephrectomy in a horseshoe kidney [1,2]. Here we report on our case, in which we used a retroperitoneoscopic approach for tumor excision in a horseshoe kidney. To our knowledge, this is the first report of laparoscopic partial nephrectomy in a horseshoe kidney in an Asian country.

CASE REPORT

A 21-year-old woman was referred to our tertiary hospital presenting with a 4 cm cystic renal mass in a horseshoe kidney on ultrasonography. The mass was found during evaluation after a few episodes of hematuria. Computed tomography (CT) kidney angiography was performed, which revealed a cystic mass with calcification in the posterior aspect of the lower pole of the left moiety. The angiography also showed a small artery arising from the left common iliac artery feeding the isthmus (Fig. 1).

Under general anesthesia, the patient was placed in the flank position with her ipsilateral side up. A 15 mm skin incision was made 2 cm below the 12th rib tip. After blunting dissection with the index finger, the retroperitoneal space was opened by using a balloon dilator (preperitoneal distention balloon [PDB] balloon; Tyco Healthcare, Harrisburg, PA, USA). After balloon dilation, the PDB system was exchanged for a 12 mm trocar (Endopath Xcel, Ethicon, Endo-Surgery Inc., Cincinnati, OH, USA) as a camera port (Fig. 2). One 5 mm port (Endopath Xcel, Ethicon, USA) was placed at the posterior axillary line, at the angle between the 12th rib and spinous musculature, and the other 5 mm port was inserted at the anterior axillary line in the middle between the iliac crest and the 11th rib tip. The left renal vessels and ureter were identified and dissected. Opening the Gerota's fascia exposed the isthmus. The renal mass was located in the left moiety lower pole (Fig. 3). The small artery arising from the left iliac artery feeding the isthmus was found and ligated. A 10 MHz ultrasound probe (B-K Medical, Herlev, Denmark) was used to define the margins of resection. After marking the capsule with a 5 to 10 mm margin circumferentially by use of a hook electrode, a 10 mm telescope was exchanged for a 5 mm telescope. Instead of adding more ports, a 5 mm telescope was used through one of the previous 5 mm ports to minimize the size of the postoperative scar. Then, laparoscopic bulldog clamps passed the 12 mm trocar and independently clamped the renal artery and vein. The protruding renal mass was com-

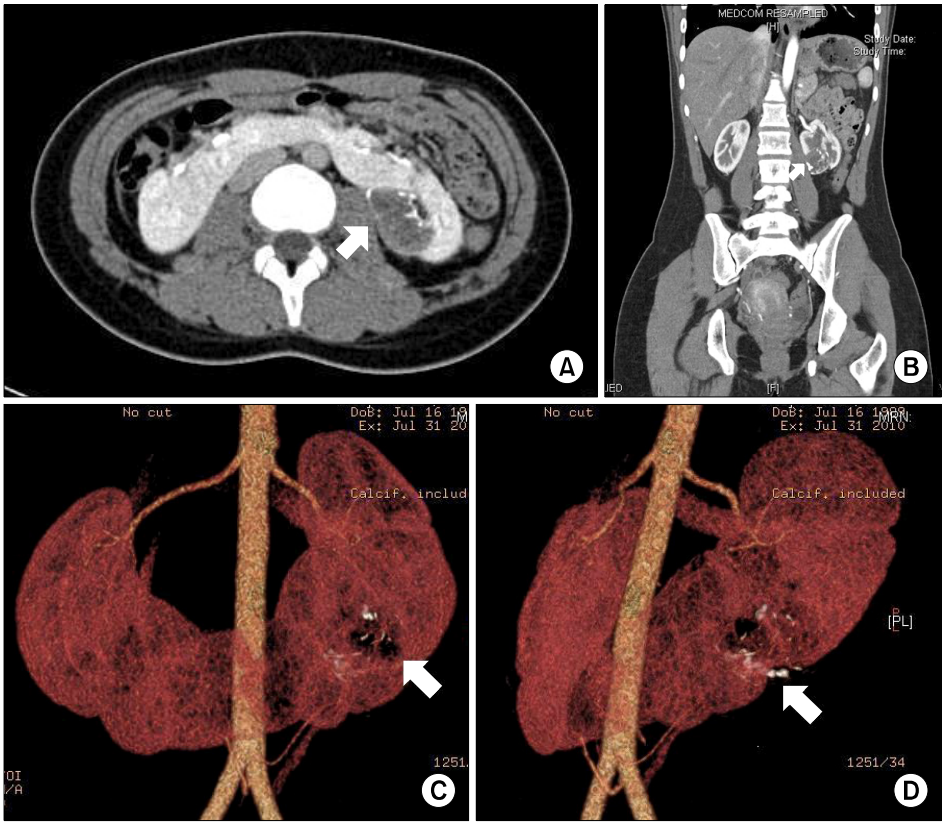

FIG. 1. Horseshoe kidney with 4 cm cystic mass in the posterior aspect of the left moiety (A, B) with a small artery arising from the left common iliac artery feeding the isthmus in computed tomography angiography (C, D).

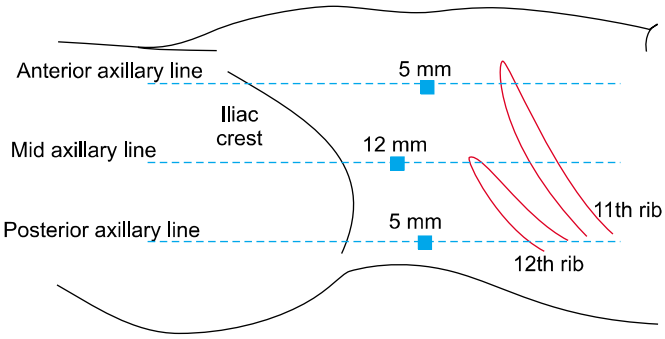

FIG. 2. The position of port placement in retroperitoneoscopic partial nephrectomy.

pletely resected by use of laparoscopic scissors. The resected renal parenchyme was sutured with surgical bolsters using 2-0 Vicryl, and fibrin sealant fixation (Tissucol, Baxter, Vienna, Austria) was applied to the surface of the suture site. After the clamped left renal artery and vein were released, bleeding sites were controlled by using Surgicel (Johnson & Johnson, Somerville, NJ, USA), TachoComb (Nycomed, Zurich, Switzerland), and fibrin sealant fixation. The specimen was extracted by using an Endo Catch bag (Tyco Health Care). It was extracted with extension of the fascia and muscle layer without extending the skin incision. Frozen sections confirmed a negative margin.

The operation time was 186 minutes and the warm ischemia time was 28 minutes. The estimated blood loss was 490 ml. The hospital stay was only days and the postoperative course was uneventful. The pathologic evaluation revealed metanephric adenoma with pericapsular ossification. No perfusion decrease was observed in the left kidney on a CT scan performed 5 months after the operation (Fig. 4).

DISCUSSION

Horseshoe kidney is a well-known congenital anomaly. However, its unique anatomy, such as the complex vasculature, low fixed location, anterior renal pelvis, and presence of isthmus, should be considered when deciding whether to perform laparoscopic surgery.

There have been a few reports of laparoscopic surgery in a horseshoe kidney, especially in cases of nephrectomy, heminephrectomy, and pyeloplasty [3-7]. However, to our knowledge, there have been only two reports of laparoscopic partial nephrectomy performed in a horseshoe kidney. The first report was on the excision of a 2 cm cystic mass located posterolaterally in the middle of the right moiety by use of a retroperitoneal approach [1]. The second was an excision of a 2 cm solid mass in the right isthmus of a horseshoe kidney by use of a transperitoneal approach [2]. Because the unique anatomical structure of a horseshoe kidney can create limitations to kidney mobilization, a different approach was recommended depending on the location of the renal mass by Molina and Gill [1]. Tsivian et al also suggested a transperitoneal approach in anterior, an-

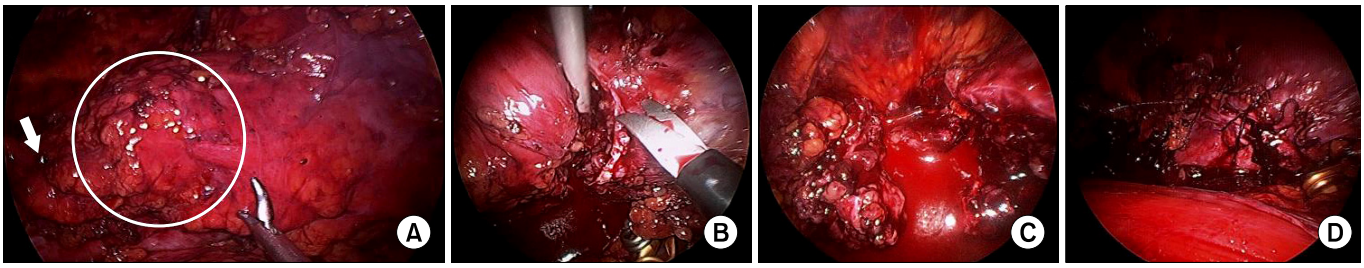

FIG. 3. Tumor site (white circle) located on the left moiety adjacent to the isthmus (white arrow) (A), excision of tumor (B), tumor excision site (C), and sutured excision site (D).

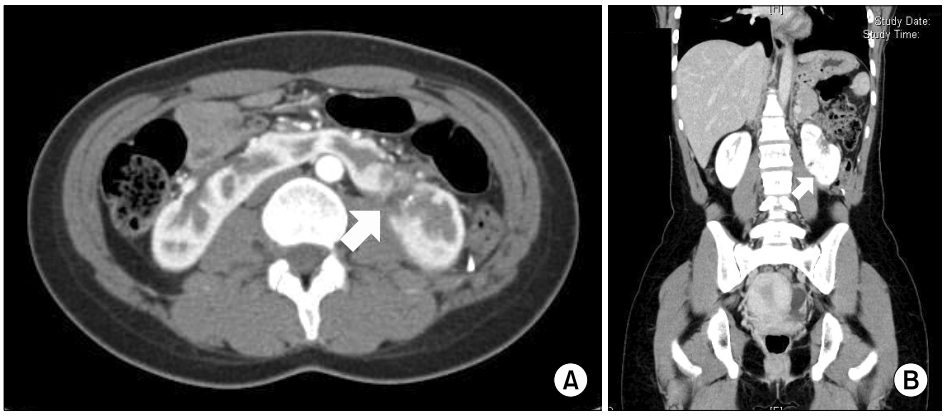

FIG. 4. No perfusion decrease was observed in the left kidney on a computed tomography scan 5 months after the operation (A, B).

terolateral, and isthmic locations but a retroperitoneal approach in posterior and posterolateral lesions [2]. In our case, the renal mass was located in the posterior aspect of the lower pole of the left moiety. Therefore, we decided on a retroperitoneal approach that would give us less mobilization of the kidney and direct access to the mass despite a small working space. From our experience, we knew that the proper choice of approach would be one of the most important factors in such horseshoe kidney cases and that the laparoscopic surgeon should be experienced with both approaches in order to be able to choose the proper approach on the basis of tumor location.

Precise preoperative knowledge of the number and location and any extrarenal anomaly is another important factor in laparoscopic surgery for horseshoe kidney cases. Molina and Gill recommended a three-dimensional CT scan and conventional arteriography if needed [1]. In our case, we performed kidney CT angiography, which revealed a small artery arising from the left iliac artery feeding the isthmus. Kidney CT angiography could be a possible substitution for conventional arteriography in horseshoe kidney surgery.

Conflicts of Interest

The authors have nothing to disclose.

REFERENCES

1. Molina WR, Gill IS. Laparoscopic partial nephrectomy in a horseshoe kidney. J Endourol 2003;17:905-6.
2. Tsivian A, Shtricker A, Benjamin S, Sidi AA. Laparoscopic partial nephrectomy for tumour excision in a horseshoe kidney. Eur Urol 2007;51:1132-3.
3. Kitamura H, Tanaka T, Miyamoto D, Inomata H, Hatakeyama J. Retroperitoneoscopic nephrectomy of a horseshoe kidney with renal-cell carcinoma. J Endourol 2003;17:907-8.
4. Modi P, Goel R, Dodia S. Case report: laparoscopic pyeloplasty with pyelolithotomy in crossed fused ectopia. J Endourol 2006;20:191-3.
5. Nadler RB, Thaxton CS, Kim SC. Hand-assisted laparoscopic pyeloplasty and isthmectomy in a patient with a horseshoe kidney. J Endourol 2003;17:909-10.
6. Bhayani SB, Andriole GL. Pure laparoscopic radical heminephrectomy and partial isthmusectomy for renal cell carcinoma in a horseshoe kidney: case report and technical considerations. Urology 2005;66:880.
7. Araki M, Link BA, Galati V, Wong C. Case report: hand-assisted laparoscopic radical heminephrectomy for renal-cell carcinoma in a horseshoe kidney. J Endourol 2007;21:1485-7.