Clinical Case Report

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Retroperitoneoscopic nephrectomy for a horseshoe kidney with hydronephrosis and inflammation

A case report

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Abstract

Rationale: A horseshoe kidney is the most common congenital fusion abnormality in the kidney, occurring in approximately 1 in 400 live births. Several complications including renal malignancies, ureteropelvic junction obstruction, urolithiasis, vesicoureteral reflux, and hydronephrosis can occur in this patient population.

Patient concerns: A 28-year-old woman was admitted to hospital because of chronic left low back pain. Microscopic hematuria was not seen. Computed tomography showed the horseshoe kidney and left hydronephrosis.

Diagnoses: On the basis of these findings and clinical manifestations, the final diagnosis was the horseshoe kidney with left renal hydronephrosis and inflammation.

Interventions: A retroperitoneoscopic nephrectomy on the left kidney was performed.

Outcomes: Histopathological examination of the specimen confirmed massive dilatation of the pelvicaliceal system and chronic pyelonephritic inflammation. The patient was discharged on the 7th postoperative day with no complications and no back pain. She remained well at 3 months with normal activity and good cosmetic result.

Lessons: Retroperitoneoscopic nephrectomy can be a safe and minimally invasive surgery for horseshoe kidney treatment.

Abbreviations: CT = computed tomography, HGB = hemoglobin, PLT = platelets, WBC = white blood cell.

Keywords: horseshoe kidney, hydronephrosis, inflammation, nephrectomy

1. Introduction

A horseshoe kidney is the most common congenital fusion abnormality in the kidney, occurring in approximately 1 in 400 live births.[1] Several complications including renal malignancies, ureteropelvic junction obstruction, urolithiasis, vesicoureteral reflux, and hydronephrosis can occur in this patient population.[2] However, a horseshoe kidney associated with both hydronephrosis and inflammation is rare.

It has been reported that laparoscopic surgery has been effective for patients with horseshoe kidneys.[3,4] Laparoscopic surgery may be performed via a transperitoneal or a retroperitoneal approach.[5] However, only 5 cases with retroperitoneoscopic nephrectomy have been reported till now.[6–10] We report a woman who underwent retroperitoneoscopic nephrectomy for a horseshoe kidney with severe hydronephrosis and inflammation.

2. Case presentation

A 28-year-old woman had a complaint of lower left back pain for 1 week. Physical examination revealed a percussion pain on the left kidney. Her routine hemogram, urine and blood biochemical analyses were within normal ranges. Computed tomography (CT) showed the horseshoe kidney and left hydronephrosis (Fig. 1). Renal parenchyma of the left kidney was not seen. No renal stones were found. Retrograde pyelography revealed that the cause of hydronephrosis was left ureter obstruction. An intravenous urogram revealed a horseshoe kidney with poor excretion on the left side. Retrograde pyelography revealed the ureteral obstruction happened at the L4 level, where the ureter crossed anteriorly over the isthmus.

Retroperitoneoscopic nephrectomy on the left kidney was performed. The patient was placed in a right lateral position, and 3 ports were placed. A 2-cm lateral incision was made in the posterior axillary line at the level of 2 cm below the left 12th rib. Self-made airbag was placed and 700 mL of air was insufflated to secure the surgical space. After 5 minutes, the airbag was removed, a 10-mm trocar was inserted in the middle axillary line at the level of the umbilicus, and a 5-mm trocar in the anterior axillary line at the level of 2 cm below the left 10th rib. At last, a 10-mm trocar was inserted in the first incision. The camera port was placed in the second incision. The retroperitoneum was insufflated with carbon dioxide to a pressure of 15 mmHg. The

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Figure 1. Computed tomography demonstrates the hydronephrotic left moiety with a very thin cortex (arrow) of the horseshoe kidney.

renal arteries and veins were clipped with Hem-o-lok clip and then carefully dissected. About 600 mL of milky pus from the left kidney was drained. The isthmus was incised by using a Harmonic scalpel for the resection of the left kidney (Fig. 2). No bleeding was noted from the transected isthmus. The left ureter was identified and traced distally. No solid elements suspicious for malignancy were identified intraoperatively. The operation time lasted 300 minutes, and blood loss was estimated to be about 100 mL. The resected kidney had a renal pelvic enlargement, renal cortical thinning, and no renal parenchym. Histopathological examination of the specimen confirmed massive dilatation of the pelvicaliceal system and chronic pyelonephritis. The patient was discharged on the 7th postoperative day with no complications and no back pain. She remained well at 3 months with normal activity and good cosmetic result.

Written informed consent was obtained from the patient for publication of this case report.

3. Discussion

In this index case, the patient had congenital anomaly of a horseshoe kidney with the inferior poles fused by parenchyma.

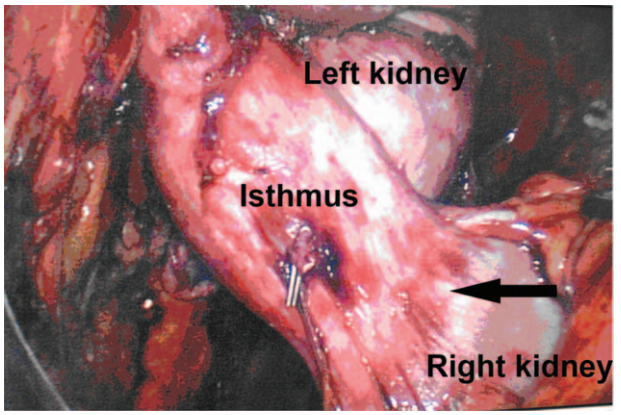

Figure 2. Division of the isthmus. The isthmus (arrow) was divided by harmonic scalpel.

Hydronephrosis in a horseshoe kidney occurs more frequently because of high insertion of the ureter into the renal pelvis, abnormal ureteral course anterior to the isthmus, and anomalous blood supply to the kidney.[11] In this case, retrograde pyelography showed the ureteral obstruction happened at the L4 level, where the ureter crossed anteriorly over the isthmus; thus, the isthmus compressed the left upper may lead to hydronephrosis, and then inflammation.

With advances in minimally invasive surgery, the open surgical technique has been duplicated laparoscopically. However, the unique anatomic features of horseshoe kidneys, such as highly variable vasculature, abnormal kidney position, limited mobilization of the fused kidney, and the isthmus, and possible associated anomalies, can make laparoscopic nephrectomy for a horseshoe kidney technically challenging. Our case and the previous case reports suggest that the retroperitoneoscopic nephrectomy is a feasible method to identify important structures after detailed preoperative radiological evaluation. The advantages in retroperitoneoscopy are consequences of direct approach to the retroperitoneum, the risk of interference secondary to intraperitoneal structures, such as bowel and pancreatic injuries, is reduced, and postoperative adhesion can be avoided.[7] Moreover, if the hydronephrosis in a horseshoe kidney with infected contents is poorly controlled, by avoiding the peritoneal cavity, the risk of postoperative peritonitis is decreased. Postoperative bleeding and urinary leakage are contained in the limited cavity of the retroperitoneum.

So, the disadvantages of a limited workspace can become an asset when dealing with postoperative complications. However, the anatomy, abnormal vasculature, and the variations of vascular supply add complexity to this surgery. Thus, detailed preoperative radiological evaluation of these anatomical factors and proper surgical planning are essential. CT, magnetic resonance imaging, and angiographic studies are useful preoperative studies. Another important point is the division of the isthmus during the operation, which is essential to normalize the course of the ureters and to prevent potential development of Rovsing syndrome.[12]

Therefore, if appropriate preoperative imaging is carried out and the procedure is conducted in a careful manner, retroperitoneoscopic nephrectomy can be a safe, effective, and minimally invasive operation for the treatment of horseshoe kidneys. Moreover, retroperitoneal robot-assisted laparoscopy is now developed and is being evaluated.

Author contributions

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