LAPAROSCOPIC RADICAL NEPHRECTOMY IN ACDK-ASSOCIATED RENAL CELL CARCINOMA ACCOMPANIED BY DUPLICATED IVC : A CASE REPORT

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A 59-year-old male patent who had undergone chronic dialysis for 13 years presented with gross hematuria. Radiological examinations showed a cystic renal tumor in the left kidney, multiple renal cysts due to acquired cystic disease of the kidney (ACDK), and a duplicated inferior vena cava (IVC). Although we suspected that the branches of the left IVC might be anormalous with regard to number and location, we could not obtain information about the left renal vein by 3-dimensional computed tomography because of the decreased blood flow in the end-stage kidney. Laparoscopic radical nephrectomy was performed using a transperitoneal approach. We first identified the left IVC and then exposed its surface widely so that we could identify the veins draining into it. We identified and divided two renal veins and also identified an adrenal vein and a gonadal vein draining directly into the left IVC. The enlarged kidney with multiple renal cysts was removed in a purely laparoscopic procedure.

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Key words : Laparoscopic radical nephrectomy, Acquired cystic disease of the kidney, Renal cell carcinoma, Duplicated inferior vena cava

INTRODUCTION

Duplication of the inferior vena cava (IVC) is a rare malformation seen in less than 5% of the population[1)]. As the number of laparoscopic nephrectomies performed increases, however, so does the chance that urologists will laparoscopically nephrectomize patients with anomalies of the venous system. There have been a few reports of nephrectomy for patients with duplicated IVC[2–4)], but the patterns of renal vessels in patients with duplicated IVC have not yet been reported. Because the branches of the left IVC—including the renal, adrenal, and gonadal veins—might have various patterns with regard to their number and location, preoperative radiological evaluation is essential.

Laparoscopic radical nephrectomy is an established procedure[5)] but may be more difficult than usual when the patient has a renal disease accompanied with multiple renal cysts, such as acquired cystic disease of the kidney (ACDK) or autosomal dominant polycystic kidney (ADPKD). A hand-assisted laparoscopic nephrectomy is sometimes used in ADPKD[6,7)] because a purely laparoscopic approach is difficult when the kidney is huge. Because the end-stage kidney is usually small, it is usually removed in a purely laparoscopic procedure. When it is significantly enlarged by multiple renal cysts due to ACDK, however, a hand-assisted procedure may be considered. In addition, multiple renal cysts can make it hard to recognize the correct dissection layer around Gerota's renal fascia.

Here we report a case in which a patient with ACDK-associated cystic RCC accompanied by duplicated IVC was treated successfully using a purely laparoscopic procedure.

CASE PRESENTATION

The 59-year-old male patent who had undergone chronic dialysis for 13 years because of membranous glomerulonephritis presented with gross hematuria. Radiological examinations showed that the left kidney had a cystic renal tumor (4 cm) in the upper pole and multiple renal cysts due to ACDK (Fig. 1A). There were duplicate IVCs on both sides of the aorta (Fig. 1B) and the left IVC was bigger than the right one. The left IVC joined the left renal vein, which then crossed anterior to the aorta and joined the right IVC. We tried to obtain information about the left renal vein by 3-dimensional computed tomography (3D-CT), but the decreased blood flow of the left renal artery prevented visualization of the left renal vein. Standard CT indicated that there might have been multiple renal veins and also showed dense calcification at the entrance of the left renal artery, suggesting decreased blood flow probably due to arteriosclerosis.

Operation procedure

The patient was placed in a semilateral position (70 degrees), and the operation was started with four trocars. We dissected along the anterior rather than posterior

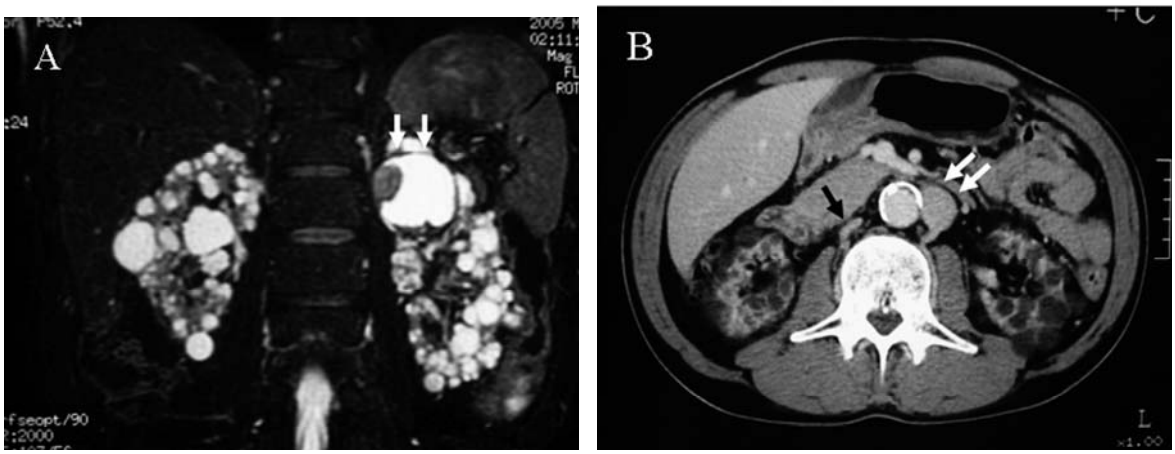

Fig. 1. (A) Abdominal MRI showed multiple renal cysts due to ACDK and a cystic renal tumor (white arrows) in the upper pole of the left kidney. (B) Abdominal CT. There were duplicate IVC located on both sides of the aorta. The left IVC (white arrows) was bigger than the right one (black arrow).

surface of the renal fascia because this approach let us first identify the left IVC. We thought this approach safe in the present case because it would enable us to easily determine the anatomy of the left IVC and its branches. Although there were multiple renal cysts on the surface of the kidney, the correct dissection layer around the renal fascia could be clearly recognized. We paid special attention to the dissection around the cystic renal tumor because of the risk of rupture. We tried not to touch the cystic renal tumor at the dissection according to the surgical principal of RCC. When we exposed a part of the left IVC and extended the dissection along the IVC, we found that two renal veins, a gonadal vein, and an adrenal vein were connected directly to the left IVC (Fig. 2). One small renal artery was found in front of the renal vein and was divided. Then the main renal artery behind the renal veins was found, clipped, and divided. Each of the two renal veins was individually divided by using an Endo-GIA vascular stapler. Since the renal tumor was in the upper pole of the kidney, adrenalectomy was also performed. The operation time was 345 minutes and the blood loss was 160 cc.

The pathological diagnosis was the clear cell type of renal cell carcinoma. The postoperative course was stable and the patient was discharged on the tenth postoperative day.

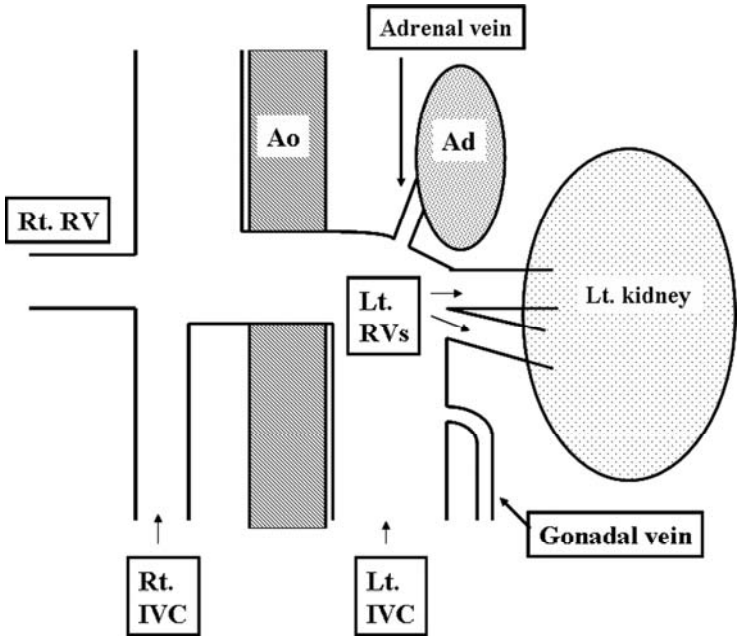

Fig. 2. A schema of the duplicated IVC and its branches. The left IVC was bigger than the right one. The left IVC joined the left renal veins (RVs), crossed anterior to the aorta (Ao), and flowed into the right IVC. A gonadal vein and an adrenal vein were directly connected to the left IVC.

DISCUSSION

There have been several reports of hand-assisted bilateral laparoscopic nephrectomy for ADPKD[6,7]. The hand-assisted procedure may have been selected because the massively enlarged kidney due to ADPKD requires a large working space and the dissection around the kidney might be difficult if a purely laparoscopic procedure were used. Although the tumor in the present case was accompanied by multiple renal cysts due to ACDK, we thought that radical nephrectomy could be performed purely laparoscopically because the kidney was not excessively large. Sufficient working space in the operation was obtained by the transperitoneal approach. This was why we selected it rather than the retroperitoneal approach. The branches of the left IVC were safely and clearly identified by the transperitoneal approach.

A duplicated IVC is a relatively rare anomaly[8]. Although the present case could be categorized in Type BC of the simplified classification of congenital IVC anomalies that was reported by Chuang et al.[1], the renal vein patterns in duplicated IVC have not yet been reported. Uwatoko et al. reported donor nephrectomy of a patient with duplicated IVC. In their report, the patient had one left renal vein that joined the left IVC and had one renal artery that was in front of the renal vein[2]. Since the location and the number of renal veins should have various patterns in different patients with duplicated IVC, preoperative evaluation by radiological examinations would be important. In the present case, however, 3D-CT could not show renal veins clearly. Visualization of renal veins by 3D-CT might be difficult in end-stage kidney disease because renal blood flow usually decreases in that situation. Unable to clearly evaluate renal veins preoperatively, we dissected the anterior surface of Gerota's fascia and tried first to determine the location of the left IVC. We then exposed its surface in order to identify veins draining into it. We safely identified two renal veins, an adrenal vein, and a gonadal vein that were connected directly to the left IVC. This anterior approach let us determine the anatomy of the local venous system more easily.

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和文抄録

重複下大静脈を伴う ACDK 随伴腎細胞癌に対して腹腔鏡下根治的腎摘徐術を施行した 1 例

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症例は13年間透析を行っている59歳，男性．血尿を主訴に受診し，画像診断で左腎上極の嚢胞性腫瘤，ACDK による多発性の腎嚢胞，そして重複下大静脈を認めた．腎静脈を含む左下大静脈からの分枝の数や位置に関して先天的な異常の可能性があると考えられたが，3 次元 CT による検討では終末腎のため腎血流が減少し，左腎静脈の情報は得られなかった．経腹膜的に腹腔鏡下根治的腎摘除術を施行した．左下大静脈を最初に同定しその表面に沿って広い範囲で剥離することにより，左下大静脈に流入する静脈を同定することができた．2 本の腎静脈とさらに左下大静脈に直接流入する副腎静脈と性腺静脈を確認できた．腎嚢胞が多発し腫大した腎臓であったが，pure laparoscopic な手技で切除することができた．

（泌尿紀要 **53**：875-878，2007）