

부분 신절제술 후 발생한 신동맥 가성동맥류의 자연 치유: 증례 보고

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Spontaneous Treatment of Renal Artery Pseudoaneurysm after Partial Nephrectomy: A Case Report

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A partial nephrectomy is being used increasingly for the removal of renal cell carcinomas. A renal artery pseudoaneurysm (RAP) is a rare, potentially life threatening complication after a partial nephrectomy. This paper presents a case of spontaneous thrombosis of RAP after a partial nephrectomy. The presented case is believed to be the largest in diameter (59 mm) among the reported cases of spontaneous treatment of RAP by complete thrombosis.

Key words : Renal artery pseudoaneurysm; Spontaneous thrombosis;
Partial nephrectomy

Introduction

A partial nephrectomy has become a much more prevalent procedure due to the tremendous increase in tomographic imaging studies and improvements in surgical techniques [1]. The purpose of a partial nephrectomy is to preserve the maximum renal function without affecting the overall tumor-specific survival rate [1]. On the other hand, several complications can occur during the postoperative period after a partial nephrectomy. Some can be managed conservatively but serious complications require interventional treatment [2, 3]. A renal artery pseudoaneurysm (RAP) is one of the most serious complications after renal surgery. This paper describes a case of RAP after a partial nephrectomy. The patient

was treated spontaneously by complete thrombosis of the RAP. The spontaneous treatment of a RAP in the present case is believed to be the largest in diameter reported thus far.

Case Report

A 47-year-old woman underwent a computed tomography (CT) scan as part of an evaluation of left flank discomfort. She had a solitary left kidney due to unilateral renal agenesis. Contrast CT demonstrated a 54 × 49-mm solid mass in the lower pole of her left kidney (Fig. 1). The preoperative diagnosis was renal cell carcinoma and the patient underwent a left partial nephrectomy under video-assisted mini-laparotomy surgery (VAMS) [4]. Two incisions were made; one 6-cm muscle-splitting incision above the left kidney to

allow sufficient working space and a 1-cm incision for the camera port. The procedure was performed under a combination of direct and laparoscopic views. The lesion was removed after clamping the renal artery and vein. The cold ischemic time was 64 minutes, and intraoperative hemostasis was achieved by electric cauterization. An open collecting system was secured

by running a 4-0 Vicryl suture. No significant major vessel injury was visible in the surgical field. The final pathology examination revealed a stage T2N0M0, Furman grade 3, clear renal cell carcinoma. On postoperative day (POD) 8, the patient complained of left flank discomfort and gross hematuria. Her



Fig. 1. Transverse CT image of the arterial phase shows a round hypervascular mass in the left kidney.



Fig. 3. Follow-up CT scan was performed three months after surgery. Transverse CT image of the arterial phase shows a 59 mm sized pseudoaneurysm with partial thrombosis (arrows) in the left kidney.

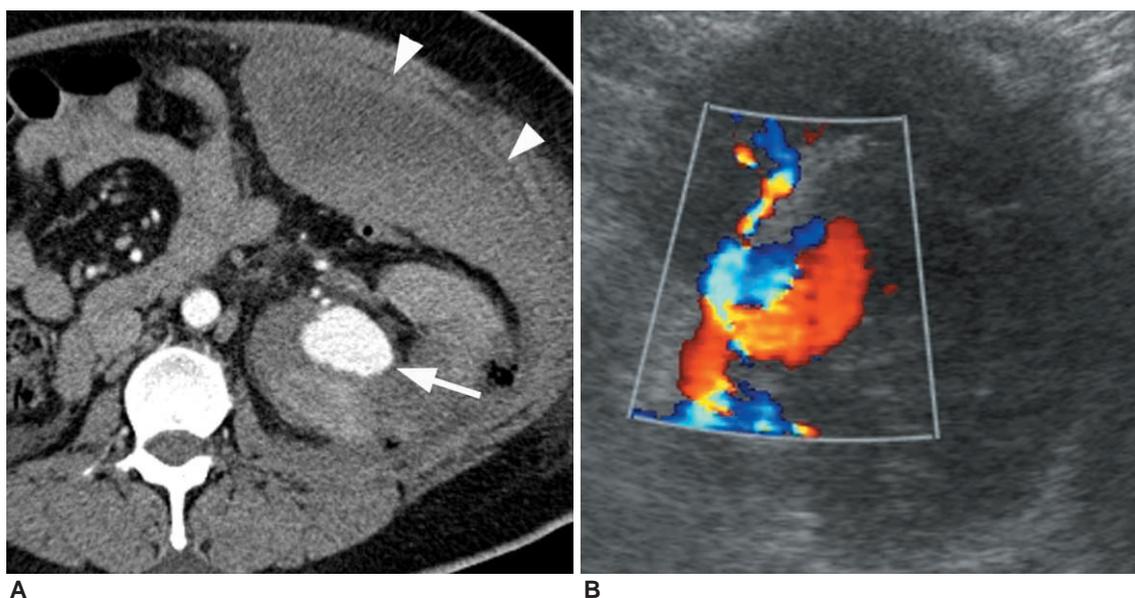


Fig. 2. A. Transverse CT image of the arterial phase shows a collection of contrast medium (arrow) near the renal sinus of the left kidney that is compatible with a pseudoaneurysm. A large intraperitoneal hematoma (arrowheads) is noted along the left anterior abdominal wall.
B. Color Doppler sonography shows a mass with swirling blood flow in the left kidney, which is the typical appearance of a pseudoaneurysm.

hemoglobin level dropped to 6.7 g/dL (10.0 g/dL on POD 1). Contrast CT revealed a large intraperitoneal hematoma along the left abdominal wall and a 32-mm contrast-filled sac in the hilum of the left kidney (Fig. 2A). Color Doppler ultrasonography (US) showed swirling blood flow connected through a small track to an adjacent artery in the left kidney, indicating a RAP (Fig. 2B). In view of these findings, endovascular treatment was recommended but the patient refused.

She became hemodynamically stable and her abdominal pain improved with time. Her hemoglobin stabilized at 10.1 g/dL on POD 14 and was maintained between 10.0–10.9 g/dL for three months. At the three months follow-up CT, the RAP grew to 59 mm in size and showed an enlarged contrast-filled sac (43 mm) and partial thrombosis (Fig. 3). Therefore, endovascular treatment strongly recommended again. She underwent angiography for embolization 2 weeks

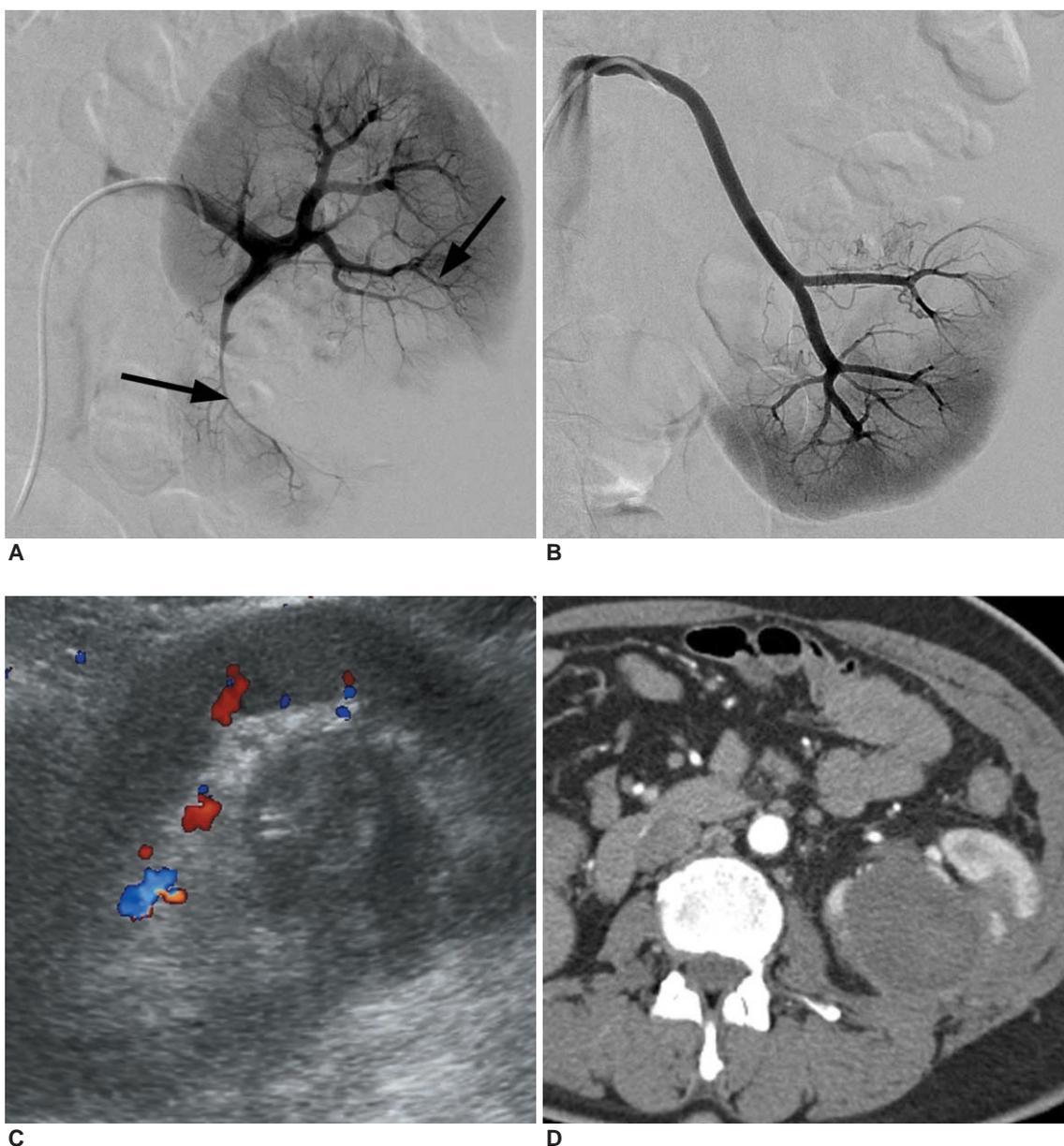


Fig. 4. **A, B.** Left renal angiogram demonstrates two left renal arteries with displacement by an avascular mass (arrows) in the lower pole of the left kidney.
C. Color Doppler sonography immediately after a renal angiogram shows a complete thrombosis of the pseudoaneurysm.
D. Transverse CT image of the arterial phase shows complete thrombosis of the left renal artery pseudoaneurysm.

after the CT scan. Renal artery angiography revealed a displacement of two left renal arteries by the avascular mass in the lower pole of the left kidney (Fig. 4A, B). Selective renal artery angiography was performed but no pseudoaneurysm could be found. It was surmised that the pseudoaneurysm might have thrombosed spontaneously. Color Doppler US was performed immediately to verify the thrombosis of the pseudoaneurysm; there was no internal vascular flow in the low echoic thrombosis (Fig. 4C). After one month, a CT scan confirmed the complete thrombosis of the pseudoaneurysm (Fig. 4D).

Discussion

A range of complications can occur during the postoperative period after a partial nephrectomy. Some complications, including urinary fistula or small perinephric hematoma, can be managed conservatively but serious complications, including acute renal failure, large hematoma or perinephric abscess, require intensive care unit admission and/or immediate intervention [3]. RAP is one of the most serious complication. The condition is normally recognized after percutaneous renal procedures [5], renal trauma [6] and renal transplantation [7]. RAP after an open partial nephrectomy is a rare complication with a reported incidence of 0.43% [8].

The natural history of a pseudoaneurysm varies from spontaneous resolution to a free rupture. Rupture is the most serious cause of morbidity from pseudoaneurysms. Pseudoaneurysms can undergo spontaneous thrombosis, but there is no generally known method to predict it [5, 8]. The largest reported diameter of a spontaneously thrombosed RAP after a partial nephrectomy was 33 mm [8]. This case showed complete spontaneous thrombosis of a RAP, 59 mm in diameter. To our knowledge, this is the largest spontaneous thrombosed RAP reported thus far.

The diagnosis of RAP requires a high degree of clinical suspicion because most patients present initially with non-specific symptoms. RAP should be considered in a differential diagnosis of any patient

with gross hematuria and flank pain at the surgery site.

Angiography is considered the “gold” standard for diagnosis but it is an invasive procedure. Other modalities, such as Doppler US, CT angiography and magnetic resonance angiography, are useful for noninvasive detection and diagnosis of pseudoaneurysm. CT is a valuable diagnostic tool because it has a short acquisition time, enables imaging of the entire urinary tract, and is the technique of choice for follow-up. A pseudoaneurysm may resemble a contrast material-filled sac on contrast-enhanced CT, and it can resemble a cystic mass on grey-scale US. Color Doppler US shows characteristic “to-and-fro” flow within the mass [9].

Depending on the clinical status of the patient, the management options for RAPs include a nephrectomy, open vascular surgery or coil embolization. Among these, percutaneous angiography with selective coil embolization should be the initial treatment of choice because it is minimally invasive [10].

RAP is a rare but potentially life-threatening complication after a partial nephrectomy. The diagnosis of RAP is often difficult. Therefore, a high clinical suspicion is needed in patients with gross hematuria or showing signs of internal bleeding to initiate early intervention and prevent fatal rupture. On the other hand, this case shows that a spontaneous occlusion can occur in large sized RAP when invasive treatment has not been performed.

요 약

신세포암의 제거를 위해 최근 부분 신절제술이 점점 증가하고 있다. 부분 신절제술 후 발생할 수 있는 신동맥 가성동맥류는 드물지만 생명을 위협하는 합병증이다. 우리는 부분 신절제술 후 발생한 신동맥 가성동맥류에 자연적으로 혈전이 형성된 증례가 있어 보고 하고자 한다. 지금까지 보고된 신동맥 가성동맥류의 혈전형성으로 자연 치유된 증례 중 직경(59 mm)이 가장 크다.

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