Aorto-Left Renal Vein Fistula Caused by a Ruptured Abdominal Aortic Aneurysm

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Retroaortic left renal vein is a malformation in which the left renal vein courses dorsal to the abdominal aorta. In patients with abdominal aortic aneurysm, an aorto-left renal vein fistula can form if the left renal vein is sandwiched between the aneurysm wall and lumbar vertebrae. The patient was an 84-year-old man with lower back pain. We performed a contrast-enhanced computed tomography (CT), although renal dysfunction was noted. The CT showed a ruptured juxta-renal abdominal aortic with aorto-left renal vein fistula. This clinical condition can cause severe renal dysfunction, in spite of which an enhanced contrasted CT scan would be extremely informative preoperatively.

Keywords: aorto-left renal vein fistula, abdominal aneurysm, retroaortic left renal vein

INTRODUCTION

Aorto-left renal vein fistula is a rare disease that occurs due to abdominal aortic aneurysm. It is known to cause not only abdominal pain, pulsatile abdominal mass but also vascular murmur in the area, hematuria, and nonfunctioning left kidney. Aorto-left renal vein fistula is often seen in patients with retroaortic left renal vein. Mansour, et al., reported that 94% of the patients with aorto-left renal vein fistula had retroaortic left renal vein. In this type of patient, the left renal vein does not become a landmark to detect the proximal site of renal arteries during surgery because the vein is located dorsal to the aorta. In addition, caution is required to control bleeding from a fistula when an incision is made in the aortic aneurysm. We performed a contrast-enhanced computed tomography (CT) to make the details of anatomy of the ruptured aneurysm and the other structures in spite of severe renal dysfunction. The results of CT led to the definitive diagnosis of aorto-left renal vein fistula.

CASE REPORT

An 84-year-old man was transferred from a nearby hospital with a chief complaint of left abdominal pain for two days. The plain CT showed enlargement of the existing abdominal aortic aneurysm. The patient was diagnosed with impending rupture and referred to our hospital. On admission, the blood pressure was 119/69 mmHg and vascular murmur was audible in the area of left abdominal pain. Hematuria was noted upon bladder catheterization. Blood test results were hemoglobin of 9.9 g/dl and hematocrit of 29.3%, indicating anemia, and blood urea nitrogen of 44.9 mg/dl and creatinine of 3.5 mg/dl, indicating renal dysfunction. The contrast-enhanced CT showed a juxta-renal abdominal aortic aneurysm with maximum diameter of 84 mm. The aneurysm was perforated into the left renal vein that coursed dorsal to the aneurysm, and the left renal vein was enlarged. There was no contrast enhancement of the left kidney, and hematoma was observed in the retroperitoneal space (Fig. 1).

The above findings led to the diagnosis of ruptured abdominal aortic aneurysm and perforated left renal vein. Thus, an emergent abdominal aortic replacement was...
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structures, because our patient had audible vascular murmur and hematuria in spite of the severe renal dysfunction. The results of contrast-enhanced CT led to the venous malformation of retroaortic left renal vein and the definitive diagnosis of aorto-left renal vein fistula. Therefore, preoperative contrast-enhanced CT was useful in our case as well as previous reports mentioned.1,4,5)

It has been reported that approximately 3% of the population has retroaortic left renal vein.6) In these people, the left renal vein does not become a landmark for renal artery during surgery because the vein is located dorsal to the aorta. Aorto-left renal vein fistula is often seen in patients with retroaortic left renal vein and the definitive diagnosis of aorto-left renal vein fistula. Therefore, preoperative contrast-enhanced CT was useful in our case as well as previous reports mentioned.1,4,5)

A caution is required to control bleeding from this type of fistula when an incision is made in the aortic aneurysm.4,5) There are many reports in which an occlusion catheter was used in aorto-caval fistula cases to control bleeding. When laparotomy was performed by abdomino-midline incision, slightly bloody ascites was noted and hematomas of approximately 150 cc were observed proximal to the aneurysm and in the left retroperitoneal space. Proximal clamping was performed above the renal arteries, and distal clamping was performed in the common iliac arteries. When an incision was made into the aneurysm and the mural thrombus was removed, a fistula of 2 cm (black arrow) between the posterior wall of the aneurysm and retroaortic left renal vein was observed (Fig. 2). Bleeding was observed from the torn left renal vein and was controlled manually. The fistula was closed using 4-0 Prolene with felt strips. An I-shaped prosthetic graft was used for replacement between the infra-renal aorta and terminal aorta. The proximal cross clamping time was 46 minutes and the operative time was 3 hours 42 minutes. The ventilator was weaned on the first day after surgery. Serum creatinine was increased to 4.3 mg/dl on the second day after surgery, so the patient required continuous hemodiafiltration (CHDF). After the treatment, the renal function has gradually improved. When blood tests were performed 4 months after the surgery, the creatinine improved to 1.0 mg/dl.

**DISCUSSION**

In this case, because abdominal auscultation revealed a vascular murmur, a contrast-enhanced CT was performed in our hospital, although renal dysfunction was noted with hematuria. Therefore the findings of CT led to the strong suspicion of aorto-left renal vein fistula. In addition, in emergent cases with renal dysfunction such as our patient, there might not be consensus of opinion regarding additional contrast-enhanced CT examination. However, we performed a contrast-enhanced CT to make the details of anatomy of the ruptured aneurysm and the other
intraoperative bleeding from the fistula.\(^5,8,9\) In this case, preparation was made to insert an occlusion catheter through the femoral vein. However, it was not used because bleeding was successfully controlled manually. But we think that the stand-by of the balloon system is needed as previous reports strongly have suggested.\(^5,8,9\) There have been multiple recent reports on endovascular stent-grafts to treat aorto-caval fistulas caused by abdominal aortic aneurysms.\(^5,10\) Endovascular treatment is an attractive modality because it is minimally invasive and causes less blood loss than open surgery. In this case, we thought that endovascular treatment could be difficult because of the fistula was located in the left renal vein. In cases of aorto-left renal vein fistula, renal dysfunction is caused by a non-functioning left kidney due to increased venous pressure and reduced pulsatile arterial pressure. In addition there have been reports that surgical closure of fistulas resulted in improved renal function.\(^2,3,7\) In this case, although CHDF was performed after the surgery for only a short period of time, the renal function gradually improved and was normalized at the outpatient visit 4 months after surgery.

In conclusion, the possibility must be entertained that the aorto-left renal vein fistula in abdominal aortic aneurysms often correlate to the retro-aortic left renal vein. This clinical condition can cause severe renal dysfunction, in spite of which an enhanced contrasted CT scan would be extremely informative preoperatively.

**Disclosure Statement**

We declare that we have no conflict of interest in connection with this paper.

**References**


