

Surgical Treatment of Ruptured Renal Artery Aneurysm: A Report of 2 Cases

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The rupture of a renal artery aneurysm is a rare disease that is difficult to diagnose. Although we usually consider the appropriate treatment to be open laparotomy with aortic aneurysm surgery or stenting with graft insertion through intravascular intervention, thus far, there is no general consensus on the treatment protocol for renal artery aneurysm. Notably, ruptured renal artery aneurysm is a true critical emergency that may result in a fatal outcome. We are reporting two renal artery aneurysm patients who had ruptured and underwent emergency laparotomy.

Key words: 1. Aneurysm
2. Renal artery

CASE REPORTS

1) Case 1

A 63-year-old female visited the emergency room (ER) with flank pain that had started early in the morning of the day of admission. The patient had a past medical history of hypertension and angina and had been on medical treatment for 8 years. The initial blood pressure was 106/52 mmHg and heart rate, 90 beats/min, but after 1 hour, the blood pressure fell to 80/50 mmHg and the heart rate increased to 110 beats/min with continuously agonizing flank pain on the left. In the physical examination, a pulsating mass was palpated in the middle abdomen. The hemoglobin dropped from 8.05 to 5.5 g/dL in terms of complete blood cell count, whereas other blood tests, the chest X-ray, and the electrocardiogram were normal. An abdominal computed tomography (CT) scan revealed a 4.5×5.0 cm ruptured aneurysm with active bleeding, and hematoma was spreading widely through the peri- and pararenal spaces into the left retroperitoneum (Fig. 1).

We diagnosed ruptured left renal artery aneurysm and performed an emergency operation. The patient was laid in a supine position, and we performed a left anterolateral thoracotomy through the seventh intercostal space for the snaring and cross-clamping of the descending thoracic aorta. Then, we approached the retroperitoneal space through midline laparotomy. The descending thoracic aorta was cross-clamped to minimize the bleeding before opening the retroperitoneal space. Aneurysmectomy and suture closure were carried out in the left renal artery orifice. Subsequently, we released the aorta cross clamp and performed left renal vein ligation and left nephrectomy. Surgery was completed after bleeding control and hematoma evacuation in the retroperitoneal space. The pathological report revealed an atherosclerosis of the renal artery. Postoperative abdominal CT showed a stump of the left renal artery and almost full resorption of hematoma in the retroperitoneal space (Fig. 2). After the surgery, the patient maintained normal renal function, and the patient was discharged 14 days after surgery without any complications.

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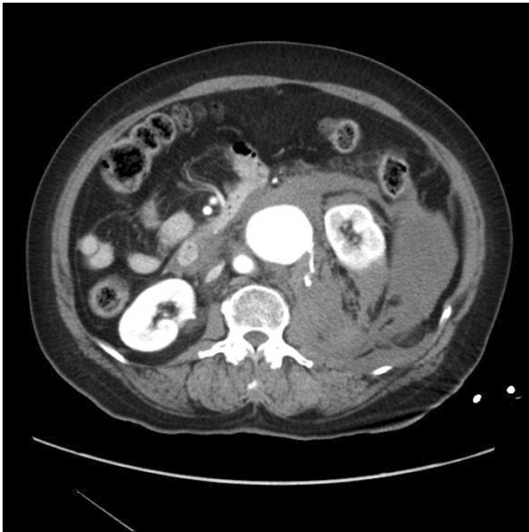


Fig. 1. Abdominal computed tomography scan (case 1) shows left ruptured renal artery aneurysm with active bleeding. Hematoma is extended into the pelvic extraperitoneal space along the left peri- and pararenal space.

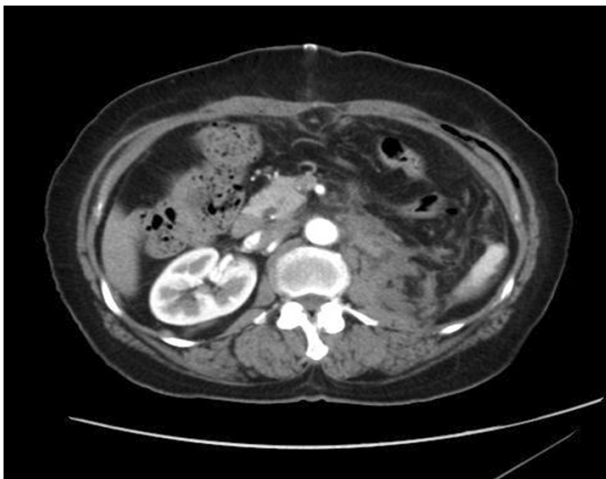


Fig. 2. Postoperative abdominal computed tomography scan (case 1) shows a stump of the left renal artery and almost full resorption of the hematoma in the retroperitoneal space.

Further, the six-month follow-up revealed no disease recurrence.

2) Case 2

A 72-year-old woman visited the ER with abdominal pain and vomiting that had started a day earlier. The patient was on medication for hypertension and diabetes. The initial blood

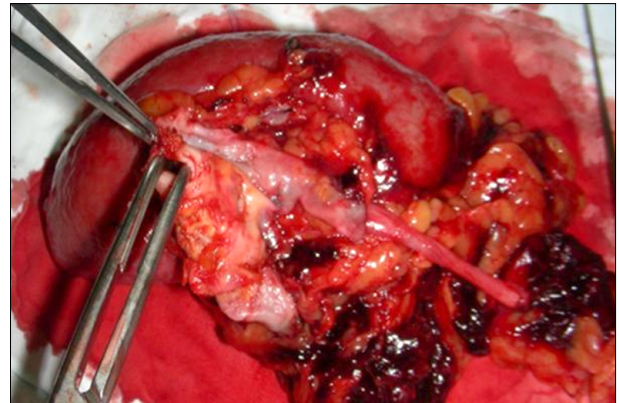


Fig. 3. This photograph shows a kidney resected during surgery (case 2). The forceps indicate the ruptured renal artery aneurysmal sac. The biopsy report revealed ruptured renal artery aneurysm with atherosclerosis.

pressure was 116/81 mmHg with a heart rate of 98 beats/min. Hemoglobin dropped from 6.0 to 4.7 g/dL, while the blood urea nitrogen and creatinine levels increased to 32.9 mg/dL and 2.46 mg/dL, respectively. We started emergency transfusion, but the patient's mental state changed when the heart rate dropped to 30 beats/min; therefore, we performed tracheal intubation and cardiopulmonary resuscitation. The patient was resuscitated after 5 minutes and showed abdominal distention; hence, we performed abdominal sonography in the ER, which showed hemoperitoneum. Emergency laparotomy was performed without any further evaluation. A huge hematoma was found in the retroperitoneum with bleeding into the peritoneum because of which we suspected ruptured abdominal aortic aneurysm. We performed a left anterolateral thoracotomy through the seventh intercostal space for the snaring and cross-clamping of the descending thoracic aorta to minimize bleeding and then opened the retroperitoneum. An aneurysm 5×4 cm in size was found in the left renal artery, and we were able to check the bleeding upon releasing the clamp. Aneurysmectomy and suture ligation were performed in the left renal artery orifice. Subsequently, we released the aorta cross clamp and performed left renal vein ligation and left nephrectomy. Surgery was completed after bleeding control and hematoma evacuation in the retroperitoneal space. The postoperative plasma creatinine was more than 3.0 mg/dL, but the patient recovered without any other symptoms

of uremia. The pathological report revealed an atherosclerotic lesion of the left renal artery (Fig. 3). The patient was discharged 21 days after the operation and had a creatinine level of 2.7 mg/dL. Two months after the operation, the hematoma completely vanished in the abdominal CT and the renal function was recovering. At the four-month follow-up, the patient reported that she had experienced no problems in the last four months.

DISCUSSION

Nontraumatic renal artery aneurysm is a rare disease, known to exist in 0.1% of the population [1]. Usually, renal artery aneurysm does not exhibit any symptoms. However, its incidence is increasing with an increase in the frequency of abdominal radiological exams. The occurrence of renal artery aneurysm in an autopsy study is known to be 0.01% to 0.09%, but since a small or intra-renal aneurysm cannot be found in an autopsy, we believe that the abovementioned number is an underestimation [2]. It was reported that the incidence of this medical problem increased to 0.73% to 0.97% after visceral angiography became widespread [3]. Clinical manifestation of renal artery aneurysm vary from being asymptomatic to fatal rupture [4]. The spontaneous rupture of renal artery aneurysm is very rare since it occurs only in 3% of all patients; however, it is the most catastrophic complication of this medical condition [5]. There are not many reports in Korea on the spontaneous rupture of a renal artery aneurysm. The exact reason for non-traumatic renal artery aneurysm is not known, but it is usually reported that vascular diseases such as atherosclerosis, fibromuscular dysplasia, polyarteritis nodosa, or pregnancy are known to be related. Atherosclerosis is a main factor in the elderly, and for the fibromuscular dysplasia in young people [6]. Both the abovementioned cases exhibited atherosclerotic changes in a histological exam.

Thus far, there has been no consensus on the diagnosis or treatment of renal artery aneurysm. The most important factor in the diagnosis of any medical condition is clinical suspicion. Since many renal artery aneurysms are asymptomatic, they may be diagnosed incidentally from an abdominal CT scan or angiography, or from looking for the cause of

secondary hypertension. However, in the cases included here, it may be found on the basis of a spontaneous rupture [7]. Surgical treatment may include onlay venous patch angioplasty after aneurysmectomy, renal artery reconstruction, or a kidney preservation technique such as autotransplantation, which may be idealistic. However, in cases of rupture, most cases may require nephrectomy because of insufficient surgical field vision due to the hematoma or hemodynamic instability. In one of the considered cases, cardiac arrest took place, which required an emergency operation without further evaluation such as CT scanning. In both of our cases, there was a significant amount of bleeding and hematoma, which blurred the view of the surgical field without proximal aorta clamping and required nephrectomy because we found it impossible to save the renal artery. There are three sites for aorta clamping: the infrarenal aorta, infrahepatic aorta, and descending thoracic aorta. We believe that descending aorta clamping through left minithoracotomy could be a good choice for ruptured abdominal aorta aneurysm in the case of unstable vital signs. Recently, an intra-aortic balloon device has been used through a femoral artery during fluoroscopy or intraoperatively. Further, percutaneous transarterial embolization and stent graft insertion have recently been performed frequently [8]. However, treatment modality should match the capability of the center.

In conclusion, we had two rare cases of spontaneous rupture of renal artery aneurysm and treated successfully based on clinical suspicion and early surgical treatment.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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