Case Report

Rupture and Bleeding Secondary to Renal Infarction in a Patient with an Abdominal Aortic Aneurysm

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A 57-year-old man had been followed up for severe left ventricular dysfunction after acute myocardial infarction with a left ventricular thrombus. He had been treated with anticoagulant and antiplatelet therapy and was admitted to our hospital because of abdominal pain and shock. He had no prior episode of trauma. The electrocardiogram (ECG) showed no changes compared with the previous ECG. Enhanced abdominal computed tomography (CT) showed a retroperitoneal hematoma around an abdominal aortic aneurysm (AAA) and the right kidney. We suspected rupture of AAA or the right kidney, and we performed AAA replacement with a Y-shaped graft and nephrectomy of the right kidney. Pathological examination revealed hemorrhagic infarction of the lower part of the right kidney, with hemorrhage and rupture at the center of the infarct. In our case, enhanced CT showed extravasation from the lower part of the right kidney. In addition, postoperative echocardiography showed that the left ventricular thrombus had disappeared. We report a case of rupture and bleeding secondary to renal infarction in a patient with an AAA.

Keywords: renal infarction, hemorrhagic infarction, rupture, abdominal aortic aneurysm, left ventricular thrombus

Introduction

Renal infarction is a rare disease. In autopsy studies, incidence of renal infarction of up to 1.4% has been reported. Moreover, renal infarction with rupture is more infrequent. We report a case of rupture and bleeding, secondary to renal infarction in a patient with an abdominal aortic aneurysm (AAA).

Case Report

A 57-year-old male was admitted to our hospital because of abdominal pain. He had no prior episode of trauma. His blood pressure was 66/33 mmHg, and his hemodynamics status was unstable on arrival. He had suffered from an acute myocardial infarction seven years ago and had received a percutaneous coronary intervention at #3 and #7 with bare-metal stents. Since then, he had an ejection fraction of 36% and was followed up for severe left ventricular dysfunction. Two years ago, echocardiography showed a thrombus measuring 16 × 22 mm in the left ventricular apical region. Therefore, anticoagulant therapy with warfarin was initiated.

Myocardial infarction was ruled out because laboratory tests showed creatine kinase of 97 U/L and creatine kinase-MB of 2.7 ng/ml, and the electrocardiogram (ECG) showed sinus rhythm and no changes compared
Hemorrhagic Infarction of the Kidney with Rupture

with the previous ECG. Because his hematocrit was 40.8% on arrival and decreased to 32.8% after a few hours, we suspected active hemorrhage and performed enhanced computed tomography (CT). The CT showed a retroperitoneal hematoma adjacent to an abdominal aortic aneurysm (AAA). Figure 1a is at a level lower than figure 1b. (b) Enhanced abdominal CT in the arterial phase shows a retroperitoneal hematoma around the right kidney. This also shows contrast material extravasation from the right kidney (white arrow).

Fig. 1 (a) Enhanced abdominal computed tomography (CT) shows a retroperitoneal hematoma adjacent to an abdominal aortic aneurysm (AAA). Figure 1a is at a level lower than figure 1b. (b) Enhanced abdominal CT in the arterial phase shows a retroperitoneal hematoma around the right kidney. This also shows contrast material extravasation from the right kidney (white arrow).

We performed emergency operation. We could not find the defect on the wall of the aneurysm. When we excluded the hematoma around the right kidney, the bleeding from the surface of the right kidney could not be controlled. Therefore, we performed nephrectomy of the right kidney and AAA replacement with a Y-shaped graft. Pathological examination revealed hemorrhagic infarction of the lower part of the right kidney, with hemorrhage and rupture at the center of the infarct. The infarct was 1 × 1 cm, and the size of the rupture hole was 2 × 3 mm (Fig. 3).

His postoperative course was uneventful, and he was discharged from the hospital without any complications on the 29th postoperative day. In our case, postoperative echocardiography showed that the left ventricular thrombus had disappeared.

Discussion

It is generally accepted that renal infarction results from thromboembolism associated with cardiac diseases. Atrial fibrillation, myocardial infarction and rheumatic mitral stenosis have been reported as the three major cardiac causes of thromboembolism. The major sources of embolism include a left atrium or left atrial appendage thrombus in atrial fibrillation, a left ventricular thrombus

Fig. 2 3D-CT angiography shows contrast material extravasation from the lower part of the right kidney (white arrows).
in patients with myocardial infarction, and a thrombus originating from complex plaque in the aorta. $^{3,4,5}$ Left ventricular thrombosis is associated with an increased risk of embolism. $^{6,7}$ Systemic embolism occurred in 4%–63% of patients with a ventricular thrombus documented by echocardiography. $^{8}$ We detected a left ventricular thrombus in the apical region on preoperative echocardiography. However, the left ventricular thrombus had disappeared on postoperative echocardiography. Therefore, renal infarction in our case may have been caused by an embolus derived from the left ventricular thrombus.

Pathological examination in our case revealed that hemorrhage and rupture occurred in the infarct, in which there was inflammation and irreversible cellular injury. Reperfusion into the infarct may trigger a cascade of events, termed ischemia-reperfusion injury. $^{9}$ We suggest that elevation of perfusion pressure in the vasculature of the infarct may cause diapedesis of blood from the vessels injured by ischemia, eventually resulting in rupture and bleeding. Therefore, hemorrhagic infarction of the kidney may have a risk of rupture. Larger studies are required to confirm the association between hemorrhagic infarction of the kidney and the risk of rupture.

In our case, embolization of renal artery may have been an effective treatment for rupture and bleeding of the right kidney. However, we consider that an open surgery procedure had been an appropriate treatment because rupture of AAA could not be denied before the operation and catheterization in a patient with an AAA was more dangerous.

**Conclusion**

We report a case of rupture and bleeding, secondary to the renal infarction in a patient with an AAA. It is important to recognize that hemorrhagic infarction of the kidney may have a risk of rupture.

**Disclosure Statement**

None declared.

**References**