

A case report on spontaneous retroperitoneal hemorrhage

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To the Editor: Retroperitoneal hemorrhage is an acute abdominal complication commonly caused by trauma, iatrogenic operation injury, and rupture of tumor or solid organs such as kidney.^[1] Spontaneous retroperitoneal hemorrhage (SRH), namely, the spontaneous rupture of retroperitoneal vessels, is characterized by the low diagnostic rate and high mortality. Patients who undergo therapeutic anticoagulation and dialysis and have renal cell carcinoma have an SRH incidence of 0.6% to 6.6%, 0.9%, and 0.3% to 1.4%, respectively. However, SRH is very rare in individuals without these conditions.^[1] This study aimed to report a case of SRH accompanied by renal failure and acute left heart failure.

The patient was a 49-year-old woman (G4P3 and menopausal) of Han nationality. She had been diagnosed with hypertension for 2 years and type 2 diabetes for 19 years, complicated by diabetic nephropathy, diabetic peripheral neuropathy, diabetic peripheral vascular disease, nephrotic syndrome, renal insufficiency, and coronary heart disease. She was admitted to the People's Hospital of Bozhou on February 9, 2019, due to swelling in both legs, oliguria for 1 year, and worsening of the condition for half a month. On admission, her weight was 75 kg, blood glucose level was 15.47 mmol/L, blood pressure (BP) was 143/102 mmHg, hemoglobin (Hb) was 119 mg/dL, prothrombin time (PT) was 14.70 s, activated partial thromboplastin time (APTT) was 37.6 s, and international normalized ratio (INR) was 1.11. In addition, chest ultrasound showed bilateral pleural effusion, and echocardiography revealed a ventricular ejection fraction of 33%, enlarged heart, and heart dysfunction. She received diuretic, insulin, anti-creatinine drug, low molecular weight heparin (3200 U, subcutaneous injection, qd), aspirin 100 mg (oral, qd), and supportive treatments. After receiving these treatments, her hemostasis and coagulation tests remained in the normal range until February 14 [Supplementary Table 1, <http://links.lww.com/CM9/A407>]. On February 14, 2019, the patient suffered from acute left heart failure and was then transferred to the Department of Critical Care Medicine,

where she was treated with oxygen inhalation, sedation, antihypertensive, continuous renal replacement therapy (CRRT), CRRT anticoagulation with sodium citrate, dehydration, thoracic drainage, and albumin infusion. During this period, she could not lie down due to her dyspnea. The laboratory examination showed that her Hb was 97 mg/dL, PT was 15 s, APTT was 54.8 s, and INR was 1.15; free Ca²⁺ was normal. On February 19, her Hb was 93 g/L, and low molecular weight heparin and aspirin were stopped. At 07:00 AM on February 20, she complained of discomfort in the left lower abdomen, her Hb dropped to 71 g/L, PT was 14.8 s, INR was 1.18, and APTT was 42.1 s. Ultrasound suggested an abdominal pelvic effusion in the left lower abdomen (119 × 74 × 89 mm).

The diagnostic puncture of the peritoneal cavity was performed, and the light-yellow transparent liquid was obtained. The patient was given a rapid fluid replacement and a red blood cell injection. An area of heterogeneous density was observed under the left kidney [Figure 1] by abdominal computed tomography (CT). At 11:30 AM, after the infusion of 2 U of red blood cells, her laboratory results showed that Hb was 60 g/L, PT was 17.3 s, INR was 1.44, and APTT was 52.5 s. The heart rate increased to 120 beats/min, BP was 130/90 mmHg, and oxygen saturation was 96%. Lumbar artery rupture and active bleeding were considered, and an emergent lumbar artery embolization was suggested. However, during her transit to the catheterization laboratory, the patient lost consciousness and BP dropped from 117/84 to 50/30 mmHg. She was immediately given a rapid fluid replacement via central venous catheter and vasopressors, but her BP could not be maintained and her heart rate dropped rapidly. Despite cardiopulmonary resuscitation, the patient eventually died. The causes of death were rupture of retroperitoneal hematoma, hemorrhagic shock, and respiratory and cardiac arrest.

SRH refers to the spontaneous rupture of retroperitoneal blood vessels.^[1] However, the etiology of the disease is still unclear. Most patients have vascular diseases such as hypertension and atherosclerosis. Congenital defect or

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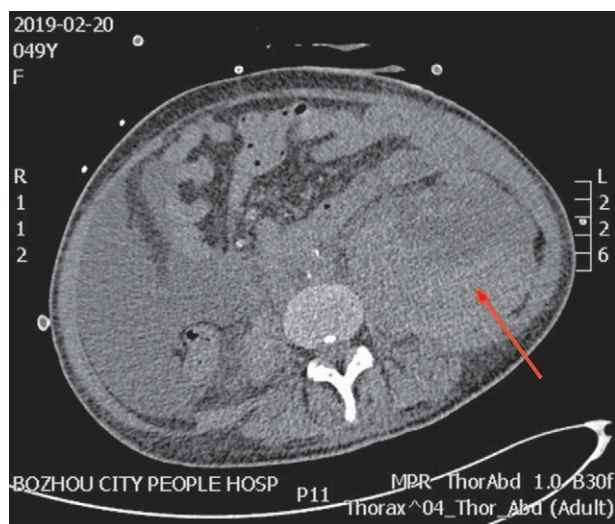


Figure 1: Plain abdominal CT on February 20, 2019, revealing a low-density shadow in the abdominal and pelvic cavities, suggesting effusion; exudative change in subcutaneous fat tissue space in the chest and abdomen; and uneven density shadow under the left kidney. The arrow indicates the location of the hematoma. CT: Computed tomography.

abnormal development of retroperitoneal vessels, pregnancy, and endocrine factors may also be involved.^[1] In the present case, the patient had a history of diabetes and hypertension for many years. Arteriosclerosis leads to structural changes in the arterial wall, including stenosis, hyaline degeneration, deformation, impaired vasodilation, and weakened blood vessel walls.^[2] After the CRRT dehydration treatment, the patient's edema was relieved. However, when the pressure around the retroperitoneal vessels suddenly changed, the weakened area of the blood vessel wall ruptured, leading to retroperitoneal hemorrhage. In addition, this patient also had the nephrotic syndrome, in which the permeability of blood vessels increased, and a large amount of protein penetrated into the retroperitoneal cavity, forming gelatinous edema. The increased pressure caused a peeling effect, leading to the rupture of blood vessels, which might also be related to the occurrence of retroperitoneal hemorrhage.

The typical clinical manifestations of SRH are Lenk triad^[3]: abdominal pain, shock, and non-pulsating abdominal mass. The nature of the abdominal pain depends on the location, incidence, and amount of bleeding. When a persistent retroperitoneal hemorrhage occurs, the abdominal pressure increases due to hematoma enlargement, leading to severe abdominal distension, anemia, and abdominal compartment syndrome. If the hematoma compresses the femoral nerve, it causes pain in the lower limbs and buttocks, paresis, and movement disorders.^[1] Provided that the patient has an unexplained decrease in Hb and the aforementioned clinical manifestations, the possibility of retroperitoneal hemorrhage should be considered. Regarding diagnostic methods, ultrasound can be used as a preliminary screening method, while diagnostic abdominal puncture and abdominal CT scans are more reliable that can locate the bleeding sites and provide more accurate information about hematomas. If necessary, enhanced CT can be performed to assess whether interventional or surgical treatment is required. In

the present case, the patient had an obvious rapid progressive decrease in Hb. The abdominal cavity (not retroperitoneal) and thoracic puncture examination showed a light-yellow fluid, and the volume of the pleural fluid was significantly lower than the initial volume, indicating no thoracic cavity or intraperitoneal hemorrhage (retroperitoneal hemorrhage not excluded). Hb did not increase after the blood transfusion, indicating internal bleeding. Moreover, abdominal CT and abdominal color ultrasound examination revealed a mass-occupying lesion in the retroperitoneum. The results indicated the possibility of retroperitoneal hemorrhage. Despite SRH and renal failure, the patient did not receive an enhanced CT scan to avoid moving again or aggravating the damage caused by the contrast agent to renal function.

The treatment of retroperitoneal hematoma should emphasize multidisciplinary team (MDT) cooperation and a comprehensive evaluation based on the cause of bleeding. Compression hemostasis can be used if the hematoma is integrated. Considering that ruptured retroperitoneum may cause uncontrollable hemorrhage and increase mortality, conservative treatment is recommended for patients with small hematomas or stable vital signs.^[4] However, it is vital to consider active anti-shock therapy and active surgical exploration for patients with acute bleeding and unstable hemodynamics. On the contrary, endovascular embolization is preferred for patients with unexplained bleeding and unstable vital signs. After the bleeding is controlled, selective surgical treatment is recommended to avoid blind retroperitoneum incision; otherwise, it may result in uncontrollable hemorrhage.^[4] It should be noted that overemphasis and dependence on diagnosis should be avoided in clinical practice, and the intervention and surgical treatment should be performed in time. In the present case, the vital signs of the patient were stable in the early stage, and conservative treatment was given. However, Hb progressively decreased, and the early symptoms of shock gradually appeared. Interventional therapy was planned immediately, but during the transit, the patient's BP suddenly dropped and she eventually died. The patient's family refused an autopsy. As a result, it was presumed that the cause of death was hemorrhagic shock caused by a ruptured hematoma.

Trauma, iatrogenic injury, cancer, dialysis, and anti-coagulation therapy are the main causes of SRH. However, the patient reported no history of trauma, and she had received CRRT and anticoagulant therapy only a few days before the occurrence of SRH. In line with this, the existing studies indicated that various underlying conditions could cause SRH.^[4,5] Nevertheless, even if the conditions found in these cases could weaken the blood vessels, whether a pre-existing anomaly was present in the retroperitoneal blood vessels was still unknown. Further studies are still required to better understand the pathogenesis of SRH.

In conclusion, physicians should be aware that SRH may be accompanied by renal failure and acute left heart failure, especially in the case of an unexplained decrease in Hb and the aforementioned clinical manifestations, which are important indicators for the presence of active

hemorrhage. In suspicious cases, immediate treatment and bleeding risk assessment should be planned. For a critically ill patient, interventional therapy is given before surgery. Also, MDT with effective communication and interdepartmental cooperation can be a safe, effective method to obtain satisfactory post-treatment results. More studies are still needed to understand better the etiology, early diagnosis, and treatment of SRH.

Declaration of patient consent

The authors certify that they obtained all appropriate patient consent forms. In the form, since the patient has passed away, her family gave consent for the inclusion of the patient's images and other clinical information in the study. They were assured that the patient's name and initials would not be published, and due efforts would be made to conceal the identity of the patient, although anonymity could not be guaranteed.

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Conflicts of interest

None.

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