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Spontaneous Rupture of Inferior Vena Cava Associated with Enoxaparin Use; Case Report and Review of the Literature

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Abstract

Tears of inferior vena cava (IVC) leading to retroperitoneal hemorrhage, generally occur due to blunt or penetrating trauma. Spontaneous rupture of IVC without any trauma history, however, is an extremely rare clinical entity with high mortality. A 75-year-old female patient receiving low molecular weight heparin for the last 5 days due to atrial fibrillation and peripheral artery disease referred to our Emergency Service with hypovolemic shock. Abdominal computed tomography revealed diffuse retroperitoneal hematoma. The patient required cardiopulmonary resuscitation upon development of cardiac arrest. Following resuscitation, she underwent emergency laparotomy, and the hematoma in the right retroperitoneal region was evacuated. During exploration, a 1-cm smooth edged tear located in the anterior aspect of IVC was found, and was repaired. Unfortunately, the patient failed to recover, and passed away within 72 hours due to multiple organ failure. The postmortem examination of vein specimens obtained from the patient revealed no histopathological abnormality. To our knowledge, the patient we are presenting here is the 3rd case in the English literature. Spontaneous rupture of the IVC is a clinical entity that should be kept in mind among other etiologies in cases presenting with acute abdominal symptoms.

Keywords: Inferior vena cava; spontaneous rupture; low molecular weight heparin

Introduction

While retroperitoneal hemorrhages are generally caused by traumas, they can also develop as a complication of vascular lesions, tumors, surgical interventions, or anticoagulant therapy [1]. Rupture of inferior vena cava (IVC) is a rare cause of retroperitoneal hemorrhage, and is associated with blunt or penetrating trauma [2]. Spontaneous rupture of IVC occurring without a trauma history, however, is an extremely rare clinical entity with only a few case reports in the literature [3,4].

Case

A 75-year-old female patient was referred from a county hospital to the Emergency Service of Bursa Yuksek Ihtisas Education and Research Hospital, due to sudden onset of back and abdominal pain and hypotension with the clinical profile of hypovolemic shock. From medical history, the medications she was receiving included: silazapril 2.5 mg/day, carvedilol 12.5 mg twice daily, acetyl salicylic acid 100 mg/day, metphormine 850 mg twice daily, furosemide 40mg/day for coronary artery disease, congestive heart failure, and diabetes mellitus. Additionally she was receiving low molecular weight heparin (LMWH) (Enoxaparin sodium) 1 mg/kg, daily for the last 5 days due to atrial fibrillation and peripheral artery disease. The history of the patient revealed no recent surgery or trauma. Physical examination of the patient disclosed abdominal distension, and ischemic wounds in the toes of the right foot. ECG revealed atrial fibrillation. The patient had blurred consciousness and was uncooperative upon admittance, and developed cardiac arrest shortly afterwards. She was intubated immediately and cardiopulmonary resuscitation (CPR) was performed. After 3 minutes of CPR, her rhythm recovered to sinus rhythm. However, the symptoms of hypovolemic shock persisted despite maximal medical therapy including controlled intravenous fluid support, administration of dopamine and dobutamine, adequate oxygenation and support of respiration with bag ventilation. Emergency ultrasound scan of the abdomen revealed a fluid accumulation in the right lower quadrant. Abdominal computed tomography revealed a diffuse retroperitoneal hematoma over the right lower quadrant of abdomen while the arterial structures were observed to be normal (Figure 1A and 1B). During this period, laboratory studies exhibited severe anemia (hemoglobin, 5.6 g/dl) along with a serum C-reactive protein level of 80.32 mg/dl, and an erythrocyte sedimentation rate of 79 mm/h. All other test results were normal.

The patient was operated on immediately. By a midline emergency laparotomy, diffuse hematoma over the right retroperitoneal region was evacuated. During exploration, a 1-cm long linear tear with smooth edges was located 2-3 cm superior to the anterior surface of the iliac vein bifurcation, and was treated by primary repair using 5/0 prolene suture. Unfortunately, she did not regain consciousness and she developed multiple organ failure as a result of which she expired at 72 hours postoperatively. Postmortem vein samples taken from the patient showed no abnormality in the histopathological examination.

Discussions

Ruptures of IVC are frequently associated with blunt or penetrating trauma. Spontaneous rupture of IVC which develops without any prior trauma history is a very rare clinical entity with only 2 reported cases in the literature. Previously, Nair et al. [3] reported on a 25-year-old male patient, and Mulkern et al. [4] reported a 75-year-old male patient. While Nair et al. [3] determined no predisposing factors in their case; Mulkern et al [4] noted a history of right nephrectomy due to tuberculosis. In the present case, there is a history of right heart failure and LMWH use. These findings suggest that there may be more than

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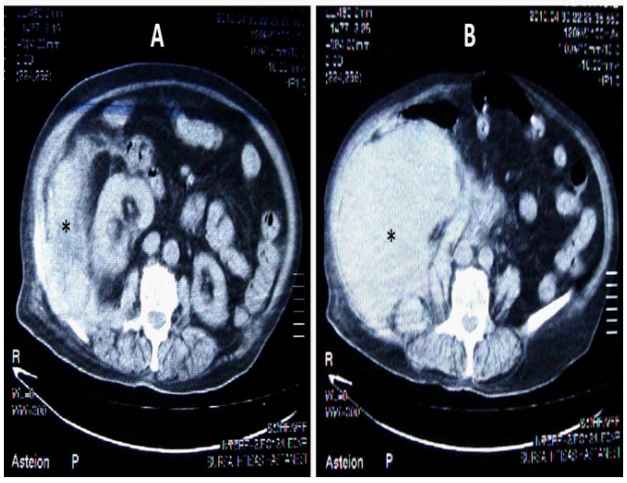

Figure 1: A and B) Computed tomography scans of abdomen at different levels revealed a diffuse giant well defined retroperitoneal hematoma (asterisks), displacing adjacent structures along the right psoas muscle and normal appearance of arteries.

one predisposing factors involved. In our case, venous hypertension and stasis due to right sided heart dysfunction may be predisposing factor for spontaneous vena cava rupture.

We believe that LMWH use was one of the major risk factors in our case. LMWHs are increasingly used for the prevention and treatment of many thromboembolic disorders, because they are as effective and more convenient than unfractionated heparin [1]. In various studies, despite its advantages over unfractionated heparin, LMWH is also noted to be a likely cause of major hemorrhagic complications [5,7]. While hemorrhage is associated with the performed procedure in majority of those cases, it may also appear with a spontaneous character and lead to fatal complications such as intracranial hemorrhage [7] or retroperitoneal hemorrhage, which was the case in our patient [5,6]. The effects of LMWH are most effectively monitored by measuring plasma anti-Xa activity [8]. Because of predictable bioavailability, dose-dependent kinetics and a high margin of safety, laboratory monitoring during LMWH administration is not routinely performed unless renal dysfunction is present [8]. In cases with renal failure, daily dose should be adjusted according the renal function to avoid accumulation of LMWH [8,9]. Age above 75 years has been shown to be an independent risk factor for bleeding complications and worse outcome. Dose adjustment of LWMH for patients older than 75 years of age is therefore recommended [8,9]. Our case is 75 years old female. She did not have renal failure. However the dose of LMWH had not been monitored due to impossibilities of county hospital laboratory.

In the patients demonstrating spontaneous rupture of IVC, a serious clinical profile of hemorrhagic shock is known to be the most important initial symptom. In cases with retroperitoneal hemorrhage, the following signs may also be observed: abdominal distension, abdominal and back pain, reduced hemoglobin levels, and peritoneal irritation [1,2]. Clinical data from the 3 cases (including our case) show that the interval between the onset of symptoms and development of hemorrhagic shock may vary from 1 hour to 10 days. Rupture of IVC in all three cases was located 1-2 cm superior to the iliac vein bifurcation, and had a diameter of 0.75-1 cm while showing a linear character. The rupture was on the anterior surface of IVC in 2 cases and over the posterolateral region in 1 case. Same as our case, the other 2 reported cases were treated with primary repair, as well. However, all three cases passed away between 3-11 days postoperatively due to various reasons, e.g. renal insufficiency, multiple organ failure, secondary to hypovolemic shock associated with hemorrhage. Including our patient, 2 of the 3 cases demonstrated no abnormality in venous structures in postmortem histopathological examinations. Although the data gathered from three patients are not adequate, we believe that spontaneous rupture of IVC may be associated with the combined effects of reduced vascular compliance and weakened vessel wall along with elevated intraluminal pressure.

Conclusions

As a rare cause of retroperitoneal hemorrhage, spontaneous rupture of IVC should be considered in cases presenting with clinical profile of acute abdomen.

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