Spontaneous Iliac Vein Rupture

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Abstract

Although exceedingly rare, spontaneous iliac vein rupture is a known surgical emergency. These injuries are morbid and present a great challenge given the difficulty in making this diagnosis of exclusion. We present an interesting case involving a woman who presented in extremis as a trauma patient following a ground-level fall. She was taken to the operating room emergently because of hemoperitoneum and unstable vital signs. Based on the absence of other traumatic injuries, we believe a spontaneous iliac vein rupture and subsequent hypotension caused the patient’s fall, and not vice versa. This case demonstrates the need for early diagnosis and treatment of spontaneous iliac vein rupture given the life-threatening nature of these injuries.

Spontaneous iliac vein rupture is an uncommon diagnosis. While many reported incidents are unrelated to any precipitating pathology, correlations have been reported with deep venous thrombosis (DVT), May-Thurner syndrome (MTS), and connective tissue disorders. Early diagnosis and treatment are paramount, as these patients typically present in extremis, and morbidity and mortality from this injury remain high. While a few cases are reported with non-operative management, the overwhelming majority requires surgical intervention.1 In this report, we will present an interesting case of spontaneous iliac vein rupture, review the literature, and comment on risk factors and outcomes.

Case Description

A 45-year-old woman presented to the emergency department (ED) after reportedly sustaining a ground-level fall at home. The patient had been discharged from the hospital earlier that day on Eliquis® for a left femoral DVT discovered during her admission. She was started on Eliquis a day before discharge and received 3 doses before leaving the hospital.

Upon arrival to the ED, the patient was alert but complaining of severe abdominal pain. She was hypotensive, tachypneic, and tachycardic. Physical examination revealed a soft, but distended and tender abdomen, and 1+ peripheral pulses bilaterally. No signs of external trauma were visible, aside from some minor abrasions on her knees. Her hemoglobin was 6.3 g/dL.

Focused Assessment with Sonography for Trauma (FAST) revealed fluid in her left lower quadrant and pelvis. The abdominal plain film was negative; the computed tomography scan from her previous admission (1 day before discharge) showed a 1.2 cm splenic artery aneurysm, but no iliac DVTs.

The hospital’s protocol for massive transfusion was initiated; the patient received tranexamic acid, despite the risk for progression of her left femoral DVT. The patient, however, remained hypotensive and was taken to the operating room for an exploratory laparotomy because of suspected hemoperitoneum.

On initial exploration, a large zone 3 hematoma extending from the left pelvis to the left upper quadrant was appreciated and had displaced the colon and small bowel to the right. No apparent injury was detected to her abdominal organs and no intraperitoneal bleeding. Furthermore, no internal sign existed of abdominal wall or flank contusion/hematoma. The patient remained hypotensive despite all resuscitative efforts, including intraoperative blood transfusion, and the hematoma was observed to be expanding into zone 2.
To better view the retroperitoneum, a left medial visceral rotation was conducted. Splenectomy was then performed resulting from concern that her splenic artery aneurysm had ruptured. The hematoma, however, continued to expand.

The hematoma was opened with a small incision and decompressed following a thorough exploration. The left paracolic gutter, pelvis, and left lower quadrant were packed. The aorta was compressed manually near the celiac artery. The site of active bleeding remained concealed while the patient continued to decompensate, with systolic blood pressures dropping to 30 mmHg–40 mmHg.

The patient remained unresponsive to all resuscitative efforts including multiple blood transfusions. Since prolonged exploration failed to elucidate the source of the hemorrhage, the decision was made to perform a left thoracotomy to cross-clamp the aorta. We believed this would also allow for cardiac massage and other more direct cardiopulmonary resuscitative measures, if necessary.

Thoracotomy was performed in the standard fashion. The aorta was cross-clamped, which allowed the anesthesia team to continue the resuscitation and preserve blood flow to the heart, lungs, and brain. The cross clamp was intermittently released over the next 30 minutes while exploration continued to minimize the risk of ischemic injuries to distal organs. The patient's blood pressure improved, and the clamp was removed.

Further exploration revealed a venous bleed in the patient's left lower quadrant and pelvis. Vascular Surgery was consulted because of concern for iliac vessel injury. Ultimately, a spontaneous injury to the left external iliac vein was discovered in an area where no surgical dissection had occurred. The retroperitoneal tissue around the iliac vein injury appeared to have been auto-dissected by the hematoma, suggesting the rupture was spontaneous.

The rupture was significant, with bleeding anteriorly and posteriorly; the vein was ligated to control the hemorrhage. The vein appeared to be grossly normal on cursory examination during the emergent exploration.

The left lower quadrant, pelvis, and left chest were packed following ligation of the left external iliac vein, as the patient remained hypothermic and coagulopathic. The abdomen was temporarily closed with negative pressure wound therapy, and the thoracotomy was covered with a sterile towel and ioban for temporary closure. The patient remained intubated and was taken to the surgical intensive care unit for further resuscitation.

Her left chest was closed on postoperative day (POD) 2, and her abdomen was closed POD5. The patient had a protracted hospital course but was eventually discharged to a long-term rehabilitation facility in good condition and on oral anticoagulation. She had slight progression of her DVT on repeat ultrasound, but never developed a pulmonary embolism despite her noncompliance with anticoagulation.

The patient has since been followed for 12 months. She has reported some mild, persistent left leg swelling but is doing well overall.

Discussion

Spontaneous iliac vein rupture is rare, with fewer than 50 cases reported in the literature. Typically, injuries to the iliac veins are iatrogenic (ie, surgery, endovascular procedures, central lines) or related to trauma.

Hossne et al reported the first case of spontaneous iliac vein rupture in 1961. In 2006, a review of the literature described 33 cases. The majority occurred in older (mean age of 60.6 years) women (85%). The majority of patients were also left-sided (94%) and reported clinical or histological evidence of DVT or thrombophlebitis before presentation (79%). To our knowledge, 12 additional instances have been reported, including a report of 9 cases (8 involving women) at a single institution.

The literature over the last 10 years is consistent with the 2006 review, with the majority of cases reporting a history of thrombophlebitis and occurring in women 39–70 years of age. Our case is similar to the literature in that it occurred in a middle-age woman, involved the left iliac vein, and was treated with open surgery.

The etiology of spontaneous iliac vein rupture remains unclear. Proposed mechanisms include mechanical (intra-abdominal mass, DVT), inflammatory (thrombophlebitis), and hormonal factors (pregnancy). In patients with MTS, disturbance or stasis of blood flow is one example of a mechanical factor that could cause spontaneous vein rupture. MTS involves compression of the left iliac vein against the spine as the vessel courses under the right common iliac artery. Symptoms can range from leg swelling and pain to DVT and vein rupture.
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The majority of reported cases have been managed with open repair. However, some rup-
tures were managed nonoperatively, and 3 with endovascular repair (1 being combined open and endovascular). Surgical management options include ligation of the vein, bypass, or primary suture repair of the injury. Endovascular treatment has not been widely reported and would certainly be a challenge depending on the nature of the vein injury and clinical condition of the patient. One of the major limitations to endo-
vascular treatment appears to be the difficulty of diagnosing the rare injury.

Associated morbidity is as high as 50%, with a mortality rate up to 27%. The most commonly reported long-term sequelae are leg swelling and chronic venous insufficiency. These conditions are often seen with iliac vein ligation or with residual iliac vein stenosis or thrombus.

Our case of a spontaneous left external iliac vein rupture is unique. Although the patient presented as a trauma patient following a ground-level fall, her spontaneous iliac vein injury, along with sub-
sequent hemorrhagic shock, most likely caused the fall. She had no signs of external or internal trauma aside from some minor abrasions on her knees. Pelvic X-ray immediately postoperatively was negative for any fractures.

Conclusion

As previously reported in the literature, this case illustrates the importance of early diagno-
sis, prompt initiation of resuscitation in unstable patients, and immediate operative intervention in almost all cases. Furthermore, this diagnosis should be a consideration in patients with unex-
plained retroperitoneal hematomas, DVT, thrombophlebitis, recent pregnancy, or a combination of the aforementioned diagnoses. While spontaneous iliac vein rupture remains a rare occur-
rence, physicians—especially trauma and vascular surgeons—need to be aware of the diagnosis to facilitate immediate resuscitation and treatment.

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