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A Case Report: Atraumatic Splenic Rupture with Epstein-Barr Virus Infection, Chronic Pancreatitis, and Cocaine Use

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Abstract

Background: *Atraumatic splenic rupture (ASR) accounts for 3% of splenic ruptures worldwide. It is a life-threatening condition that can occur spontaneously due to a variety of etiologies like malignancy, infectious diseases, or iatrogenic causes. Epstein Barr Virus (EBV) with infectious mononucleosis is the highest reported etiology leading to ASR. While EBV is well-documented in the literature, there is a paucity of literature on ASR with relation to EBV, chronic pancreatitis, and cocaine use.*

Case Summary: *A 45-year-old female with a history of chronic pancreatitis and cocaine use was evaluated in the emergency department (ED) for an abdominal pain flare-up radiating into the chest. She reported no history of recent trauma. Investigations showed evidence of acute EBV infection, anemia, proteinuria, splenic cyst, and a grade III pericapsular splenic hematoma. The patient was transferred to another hospital and received an embolization with coils placed. One week following the procedure, she returned to the ED with LUQ pain. Imaging showed an enlargement of the hematoma of the spleen and ascites, and the patient was transferred to a trauma center for further care.*

Conclusion: *In this case report, we describe a patient with a history of chronic pancreatitis and cocaine use and evidence of EBV infection who presents with ASR. There is limited literature on the concurrent effects of EBV, pancreatitis, and cocaine use on the spleen, potentially leading to ASR. Further research into ASR as a potential, rare complication of these conditions is needed.*

Introduction

Splenic rupture is a life-threatening condition that is commonly caused by trauma to the abdominal region. However, there are cases that occur spontaneously and are more uncommon, known as atraumatic splenic ruptures (ASR). ASR accounts for 3% of splenic ruptures worldwide1.

ASR can arise from a variety of etiologies, including malignancy, infectious, inflammatory, or iatrogenic. While pathologies of ASR differ, these etiologies often lead to complications in the abdominal area, such as splenic vein thrombosis, which ultimately results in ASR. Of note, approximately 14.8% of documented ASR cases can be attributed to viral infectious disorders, of which 74.5% are due to infectious mononucleosis, a viral disorder commonly caused by Epstein-Barr Virus (EBV)2. Meanwhile, approximately 10.9% of documented ASR cases can be attributed to local, non-infectious inflammatory causes, of which 64.4% are due to chronic pancreatitis. Drug and treatment-related splenic rupture constitute approximately 9.2% of documented ASR cases3. While splenic rupture may be overlooked in cases without reported trauma, clinicians should suspect ASR if a patient presents with symptoms such as hemodynamic instability, a swollen spleen, and abdominal pain.

Cases of EBV infection and chronic pancreatitis have been reported. However, there is a paucity of literature on the effects of cocaine on the spleen in combination with EBV and chronic

Case Presentation

A 45-year-old female with a history of pancreas divisum (PD) with stent placement, chronic pancreatitis, and cholecystectomy was evaluated in the emergency department (ED) for an abdominal pain flare-up radiating into the chest. The patient reported no history of trauma, head injury, headache, neck pain, shortness of breath, chest pain, or any other associated symptoms. On the physical exam, the patient was alert and oriented with good strength and sensation. There were good heart and lung sounds and no abdominal tenderness was found. She was anemic with a hemoglobin level of 7.8 g/dL (N=12-16 g/dL) and low hematocrit of 22.8% (N=36%-48%). She was given a red blood cell infusion for these findings. The patient's urine test was positive for 1+ protein, 3+ blood, 3+ leukocytes, 23 white blood cells/hpf (N=2-5 WBC/hpf), and 440 red blood cells/hpf (N=4 RBC/hpf). In addition, her urine drug test was positive for benzodiazepines-cocaine-cannabinoids. Electrolyte and protein tests showed elevated D-dimer at 1.933 (N=<0.50), as well as low total protein, amylase, and albumin. Of note, the patient also had elevated levels of Epstein-Barr virus (EBV) early antigen (EA) IgG antibodies.

Chest and abdominal CT angiography were performed which showed a ruptured pericapsular splenic hematoma measuring at least 3.5 cm thick with a small acute hemoperitoneum, as well as a new 9 cm thick cystic structure in the superior spleen. Imaging was also significant for dependent atelectasis in bilateral lungs, with a 5 x 3 x 2 mm nodule in the left upper lobe

and a possibly inflammatory cluster of tiny nodules in the right upper lobe. Minimal coronary artery calcifications were found in the heart, and abdominal and pelvic CT with IV contrast showed cholecystectomy with intra- and extrahepatic biliary dilatation, probably physiologic related to the cholecystectomy. The patient was admitted by surgery for splenic rupture, hematoma, and anemia.

The patient was on multiple medications for depression, anxiety, and stress. This includes sertraline (1 tab PO BID), lamotrigine (25 mg PO BID), zolpidem (10 mg PO HS), clonazepam (1 mg PO QID), and alprazolam (1 mg PO BID). In addition, the patient was on ondansetron (4 mg IVP Q4H PRN) for nausea and vomiting, dulera (1 puff IH daily) for asthma, and methadone hydrochloride (10 mg PO Q6H) and cyclobenzaprine (10 mg PO BID PRN) for pain.

The patient was transferred to a trauma medical center for surgery, where she received an embolization with coils placed, after which she was discharged in stable condition. The patient was counseled to stop using benzodiazepines and to follow up with her primary clinic in 1-2 days to review symptoms and to recheck urine findings. She was also referred to cardiology/pulmonology, gastroenterology, urology, hematology-oncology, and a detox clinic to review her symptoms and address benzodiazepine use.

One day following her discharge and one week following her initial visit, the patient returned to the ED with left upper quadrant (LUQ) pain radiating to the left shoulder, as well as shortness of breath and dizziness that worsened with any activity. Upon physical exam, she was febrile and tachycardic, with LUQ tender to palpation and a petechial rash on her abdomen. CTs of the chest, abdomen, and pelvis showed an enlargement of the splenic hematoma and hemorrhagic ascites when compared to the initial CT. The patient was then transferred to the trauma medical center for further care, after which it was reported that the patient did well on repeat transfer and was in stable condition.

Figure 1: CT Abdomen and Pelvis with IV Contrast (Ventral View) depicting ruptured pericapsular splenic hematoma.

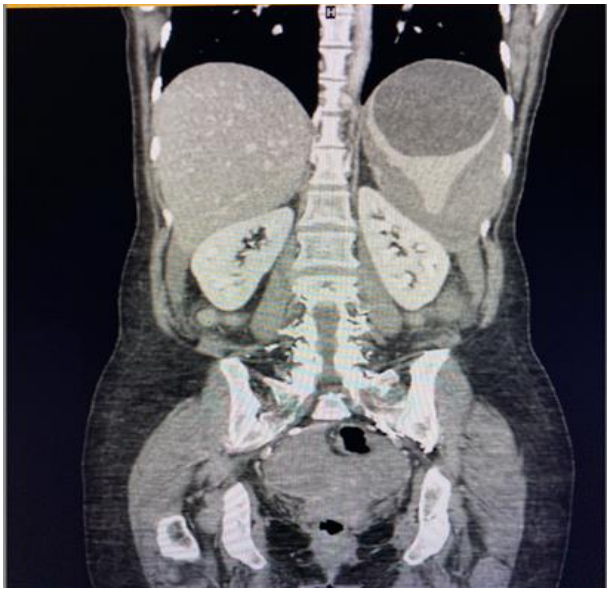

Figure 2: CT Abdomen and Pelvis and IV Contrast (Axial Plane) depicting ruptured pericapsular splenic hematoma.

Discussion

Atraumatic Splenic Rupture (ASR), especially in an undiseased spleen, is an extremely rare and life-threatening condition that can stem from multiple causes. This patient presented with multiple underlying medical problems including chronic pancreatitis, cocaine use, and a recent infection of EBV which may have all contributed to her atraumatic splenic rupture.

It is well documented that splenic ruptures are a rare complication of chronic pancreatitis, as more commonly, chronic pancreatitis primarily progresses to pancreatic pseudocysts and splenic vein thrombosis, rather than a splenic rupture. Malka et al conducted a study following 500 patients with chronic pancreatitis for a mean of 7 years, analyzing the patients that presented with secondary splenic complications, such as pseudocysts and haematomas. Overall, 11 patients (2.2%) developed splenic complications, while only 4 patients (0.8%) eventually presented with a splenic rupture. Meanwhile, another case study found a 63-year-old patient with acute pancreatitis and splenic rupture who also presented with pseudocysts4. Another study performed found 19 patients with pancreatitis leading to splenic rupture or a splenic hematoma. The leading etiology found from this study was that many of the patients were middle-aged men who had larger amounts of alcohol consumption5.

Notably, our patient did not develop pancreatic pseudocysts or spider vein thrombosis and had no report of excessive alcohol consumption. Rather, she showed a ruptured pericapsular hematoma and a splenic cyst of uncertain significance. Furthermore, the pathogenesis of an atraumatic splenic rupture secondary to pancreatitis is poorly understood. It is thought that the proximity of splenic hilar structures to the pancreatic tail, which can become inflamed, plays a role in causing ASR, as patients with splenic complications are found to have pancreatic tail necrosis6,7.

Infectious mononucleosis secondary to EBV is the highest reported cause of atraumatic splenic rupture. Cases of ASR in relation to EBV are typically seen in younger adult males involved in contact sports. Current guidelines for patients with EBV include restriction of physically inducing activities for 3 weeks8. The pathophysiology of EBV infection-related splenomegaly involves the proliferation of mononuclear cells,

which accumulate in the spleen and other lymphoid tissue, leading to splenomegaly and thinning of the splenic capsules9. Thus, EBV infection may lead to a higher chance of splenic rupture during physical activity or contact sports.

There is a limited number of cases reporting cocaine and EBV leading to ASR in the current literature. In the five cases examined, the patients were males ranging from ages 20-45 and it is proposed that cocaine's impact on the spleen is associated with its impact on the vasculature of the body. Cocaine is a sympathomimetic drug that leads to hypertension and tachycardia via vasoconstriction of the vessels. If overused, cocaine use may lead to end organ damage and ischemia because of these vasoconstrictive changes. Therefore, cocaine's toxic effects on the cardiovascular system lead to hemodynamic instability and alterations, leading to infarction into different organs like the spleen1,10.

To summarize, many of the reported cases related to pancreatitis and splenic rupture included either a pancreatic pseudocyst, spider-vein thrombosis, or alcohol consumption. Furthermore, there is only a small amount of reported cases of EBV and cocaine use found which included males ranging from the ages of 21 to 42. In contrast, our patient is a 43-year-old female who did not display any pseudocyst, spider-vein thrombosis, or alcohol consumption. This combination of etiologies makes this an interesting case that has not been reported in the literature. Future research should focus on the potential risk factors leading to ASR and their summative effects, as 7% of ASR cases are still considered to be idiopathic.

Conclusion

Atraumatic splenic rupture (ASR) is a rare and life-threatening complication with many different etiologies that can lead up to it. In this case report, we present an unusual case of ASR with a patient who presents with multiple etiologies: EBV, chronic pancreatitis, and cocaine use. While EBV and ASR are rare, there are several cases that display this connection. However, there is a paucity of literature showing the effects of chronic pancreatitis and cocaine usage on the spleen, potentially leading to ASR. This case highlights the need for more research looking into how ASR is a potential, rare complication of chronic pancreatitis and drug usage.

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