

Atrial Fibrillation and Splenic Infarction Presenting with Unexplained Fever and Persistent Abdominal Pain – A Case Report and Review of the Literature

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Atrial fibrillation is a common clinical problem and may be complicated with events of thromboembolism, especially in patients with valvular heart disease. Splenic infarction is a rare manifestation of the reported cases. The symptoms may vary from asymptomatic to severe peritonitis, though early diagnosis may lessen the probability of severe complications and lead to a good prognosis. We report a 79-year-old man with multiple cardioembolic risk factors who presented with fever and left upper quadrant abdominal pain. To diagnose splenic infarction is challenging for clinicians and requires substantial effort. Early resumption of the anti-coagulation component avoids complications and operation.

Key Words: Atrial fibrillation • Splenic infarction • Thromboembolism event • Valvular heart disease

INTRODUCTION

Splenic infarction is a rare cause of an acute abdomen. According to a sizeable autopsy series, only 10% of splenic infarctions had been diagnosed antemortem.¹⁻³ It can occur in a multitude of conditions, with general or local manifestations, and was often a clinical “blind spot” during the process of diagnosis. However, splenic infarction must be considered in patients with hematologic diseases or thromboembolic conditions.

Splenic infarctions may cause significantly increased morbidity, and earlier diagnosis of this serious condition does improve outcomes. We reported a case with multiple risk factors for cardioembolism, wherein

the patient suffered from severe acute abdominal pain due to splenic infarction. Fortunately, early diagnosis and anticoagulation therapy helped the patient to avoid emergency surgery and a possible negative outcome.

CASE REPORT

The patient was a 79-year-old man with degenerative valvular heart disease and congestive heart failure (CHF). Chronic atrial fibrillation (AF) was noted for an extended period of time, and was medically managed by digoxin 0.125 mg per day for rate control. Routine anticoagulation or antiplatelets agents had been discontinued for several months due to the patient’s active peptic ulcer disease. Additional systemic diseases suffered by this patient included hypertension, chronic renal insufficiency, gouty arthritis, and chronic obstructive lung disease (COPD). However, the patient had no history of smoking or alcohol use, and had not traveled in the past year. His regular medication regimen also included valsartan 80 mg twice per day, sulfinpyrazone 50

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mg per day and sustained-release theophylline 125 mg, twice per day.

The patient was first admitted to our medical center diagnosed with acute cholangitis. He received endoscopic retrograde cholangiopancreatography, but the stone had passed spontaneously. Thereafter, the patient's situation improved with an appropriate course of antibiotics. However, another episode of acute left upper quadrant pain developed 2 weeks later. The character of pain was described by the patient as dull and constant for more than 3 days. The abdominal pain was associated with nausea and a high spiking fever up to 39.4 °C, and the pain became aggravated during deep inspiration; he rated the pain at 8 on a scale of 1-10. The pain also radiated to the patient's left flank, back, and mid-scapular regions.

On examination, the patient was alert and communicative. His blood pressure was 145/88 mmHg, and it was observed that the patient had irregular heartbeats. A harsh systolic murmur grade III/VI was heard over the left lower sternal border and apex. The abdominal examination was significant for pain, with deep palpation in the left upper quadrant (LUQ). There was tenderness on the LUQ abdomen, flank, and the costovertebral angle. Patient bowel sounds were normal. Additionally, there was neither rebounding pain nor indication of muscle guarding.

Routine blood cell counts showed no anemia and no leukocytosis. Results of a coagulation test and serum chemistries were also normal. An abdominal X-ray

demonstrated a nonspecific bowel gas pattern, and electrocardiogram (ECG) showed AF with rates 80-100 beats per minute. The transthoracic cardiac echo showed left ventricular ejection fraction of 52%, dilated left atrium (LA), mitral annulus calcification with mild mitral regurgitation and tricuspid regurgitation. No thrombus was noted from the transthoracic echocardiography.

These data helped us exclude some common disorders associated with abdominal pain. The possibility of pancreatitis was not favored due to normal amylase and lipase levels. Diverticulitis was unlikely because of negative stool occult blood and the location was atypical. No rib fracture or foreign body was found by chest x-ray. Urinary analysis excluded the diagnosis of acute pyelonephritis and ureter stones. ECG and cardiac markers did not show evidence of myocardial infarction. Abdominal echo results also showed no liver abscess, no biliary tract stones and no spleen abscess.

Due to these diagnostic challenges, an abdominal computed tomography (CT) was arranged. It showed wedge-shaped areas of hypoattenuation in the central and posterior aspect of the spleen, which was consistent with infarcts (Figure 1). Owing to his underlying medical comorbidities, emboli of cardiac origin was highly suspected, and transesophageal echocardiography (TEE) was indicated.

The TEE showed dilated LA with heavy spontaneous echo contrast (SEC) over the LA. A small and round thrombus with a radius of $0.753 \times 0.7 \text{ cm}^2$ was found over the left atrial appendage (Figure 2).

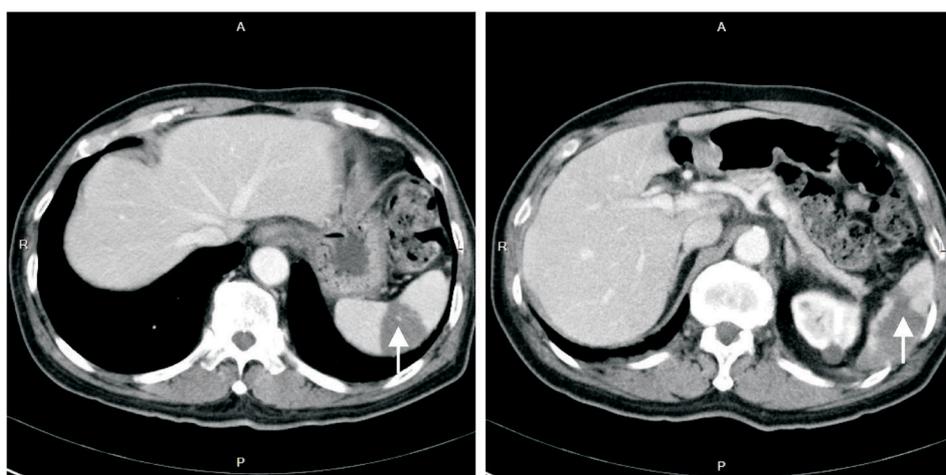


Figure 1. Wedge-shaped areas of hypoattenuation in the central (left figure, white arrow) and posterior aspect of the spleen (right figure, white arrow), which was consistent with infarcts.

With the use of managed narcotics, the abdominal pain downgraded to 2-3 on a scale of 1-10. Warfarin was titrated to the optimal dose to keep international normalized ratio around 2.0-3.0. Prophylactic antibiotics were given to prevent a secondary abdominal infection. Under medical control, the patient's condition gradually stabilized and no surgical intervention was necessary. The patient was then discharged and regularly followed up at an outpatient clinic.

DISCUSSION

Splenic infarction is rarely seen as a cause of acute abdomen. Patients under the age of 40 years typically have an associated hematologic disorder, and older patients typically have an embolic event as the etiology.^{1,2} In tropical regions, particularly sub-Saharan Africa, India, and the Middle-East, it is well known that sickle cell disease can precipitate splenic infarction. Patients with sickle cell trait, as well as hemoglobin SC disease, may develop splenic infarction.^{1,2} Other possible causes of splenic infarction include polycythemia vera, Gaucher disease, pancreatitis, endocarditis, collagen-vascular disease, trauma, wandering spleen, parasitic or viral infection, and hypercoagulability status.^{1,2}

Cardioembolus-related splenic infarction accounts for 22-55% of all causes of splenic infarction.³⁻⁷ Potential cardiac sources of emboli can be categorized into masses (including thrombi, atherosclerotic plaques, vegetations, and tumors), passageways for paradoxical embolism (patent foramen ovale, atrial septal defect), and propensity for thrombus formation (left atrial SEC, mitral annular calcification). The most common sources of emboli are the left atrial or left ventricular thrombus, left atrial SEC, and aortic atherosclerosis. Left atrial thrombi, most often associated with AF and/or rheumatic mitral stenosis, account for a major cause of cardiogenic thromboemboli.⁸

In a 10-year retrospective study,⁷ Antopolsky et al. examined the risk factors in patients with splenic infarction. These risk factors include AF (23%), previous thromboembolism (10%), previous cardiac valve surgery (12%), essential hypertension (31%), diabetes mellitus (23%), ischemic heart disease (19%), CHF (8%), and COPD (8%).



Figure 2. Transesophageal echocardiography in high esophageal level showed marked spontaneous echo contrast in the left atrium (black arrow); a small thrombus about $0.753 \times 0.7 \text{ cm}^2$ was found over the left atrial appendage (white arrow).

Contrast CT scan plays an important role in the diagnosis of splenic infarctions. It also has the advantage of showing the infarction in the spleen, other major organs and the extent of thrombosis involvement, and still can reveal the source of the infarction. Computed tomography is an important diagnostic tool and should be considered in every patient with unexplained abdominal pain, especially LUQ pain.

Sometimes splenic infarctions do cause significant morbidity and mortality and require prompt diagnosis and treatment. In Jaroch et al.'s study,⁵ the mortality rate was about 18%, and 9% of the patients needed a splenectomy. In Goerg et al.'s study,⁶ the mortality rate was 17%, with 21% of patients needing a splenectomy.

It can also be the first warning sign of underlying disease, thus requiring immediate treatment. The diagnosis of splenic infarction was the clue that led to the diagnosis of serious underlying conditions (hypercoagulable status, AF, polycythemia vera). And it has been documented that earlier diagnosis does improve outcomes.

Our patient was at a high risk for thromboembolic events because of his chronic AF, degenerative valvular disease, old age, CHF, hypertension, and COPD. Besides, the heavy SEC and thrombus at LA are also further convincing markers for an increased risk of thromboembolism.^{9,10}

Regarding his AF, the simplest and most validated stroke risk scheme is the CHADS2 (cardiac failure,

hypertension, age, diabetes, stroke doubled) score.¹¹ The CHADS2 risk index is based on a point system in which 2 points are assigned for a history of stroke and 1 point is assigned for age > 75 years, history of hypertension, diabetes, and recent cardiac failure. A score of 0 is classified as low risk, 1-2 as moderate risk, and > 2 as high risk. For our patient, the patient's CHADS2 score is 3 points (1 for CHF, 1 for age > 75 y/o, and 1 for hypertension), and the adjusted stroke rate is 5.9%. So anticoagulation should be considered. However, the patient also suffered from peptic ulcer disease. For clinicians, to retain a balance between bleeding episodes and episodes of thromboembolism is always difficult.

CONCLUSION

Splenic infarction is a rare diagnosis that is often overlooked. We should keep in mind this diagnosis especially for those patients in the presence of predisposing conditions for thrombosis and LUQ pain with fever without a definite source. TEE is the preferred approach for the detection of thrombi in the LA and left atrial appendage, being much more sensitive than transthoracic echocardiography.

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