

Splenic abscess associated with infective endocarditis; Case series



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Splenic abscess is a well-described but rare complication of infective endocarditis. Rapid diagnosis and treatment are essential as its course can be fatal. We present three case reports that describe the management of splenic abscesses in patients initially diagnosed with infective endocarditis. In all cases, the diagnosis was based on the findings of abdominal computed tomography (CT) scan or magnetic resonance imaging (MRI). In two of the cases, splenectomy was performed before valve surgery; while in the third case, the spleen was removed after cardiac surgery. All three patients recovered fully, with satisfactory follow-up as outpatients. Immediate splenectomy, combined with appropriate antibiotics and valve replacement surgery alongside multi-disciplinary team work could be the treatment of choice in this clinical scenario.

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Introduction

Splenic abscess is a well reported but rare complication in infective endocarditis. Splenic infarction is a more common and usually benign condition. It is estimated that approximately 5% of patients with splenic infarction will develop splenic abscesses [1–3].

We report the cases of three patients who presented with splenic abscesses secondary to infective endocarditis with evidence of sepsis, vegetation, and positive blood cultures. Those cases were referred to our center and operated on during the first half of 2014. The course of the disease in all three cases was variable but all were, at the very least, either very severe or critical.

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Case descriptions

Case 1

A 42-year-old female patient was transferred to our center after a diagnosis of infective endocarditis and septic embolization with multiple splenic abscesses for further workup. The patient presented initially with prolonged fever, shortness of breath, and debilitating symptoms. Her initial echocardiography revealed severe aortic regurgitation and vegetation attached to the left ventricular outflow tract just below the aortic valve. Her blood cultures were positive for enterococcus faecalis. She later developed septic embolization to the spleen, and was transferred to our center for further management.

Despite being septic, morbidly obese, and in heart failure, the patient maintained stable hemodynamics and normal oxygen saturation at room air. A clear, soft, early diastolic murmur on the aortic area and tender, left hypochondrium

were crucial findings by local examination. Other than being anemic with high Pro brain natriuretic peptides (Pro-BNP) indicating significant heart failure, her laboratory findings were unremarkable. Ultrasound and computed tomography (CT) scan of the abdomen confirmed the presence of three splenic lesions which could most likely be abscesses (Fig. 1A and B, respectively).

After evaluation and discussion by a multidisciplinary team comprising cardiac surgeons, cardiologists, general surgeons, and infectious disease specialists, the decision for a splenectomy was carried out, and the patient was returned to the coronary care unit (CCU) in a stable condition. Splenectomy specimen with pus was sent for pathology examination and culture and sensitivity tests.

After six weeks of antibiotics and medical optimization, we were able to perform coronary angiography on our patient. This revealed normal coronaries, and the patient subsequently

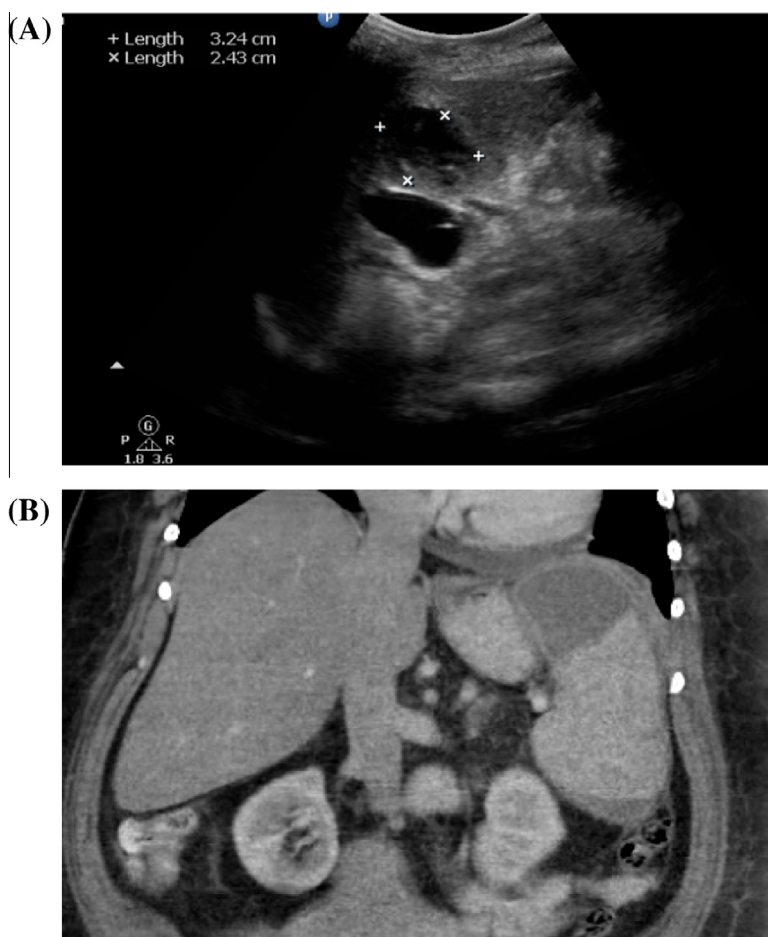


Figure 1. (A) Case 1: Ultrasound abdomen showing partially defined anechoic avascular cystic lesion in the spleen, measuring 3.2×2.4 cm, likely representing a splenic abscess. (B) Case 1: Computed tomography (CT) scan of the abdomen showing enlarged spleen with large splenic lesion, likely representing an abscess.

underwent successful aortic valve surgery with replacement by metallic valve, followed by an uneventful postoperative course. After nine months of follow-up, the patient remains in good health.

Case 2

Our second case was a 32-year-old male patient diagnosed with infective endocarditis and transferred for further management. When seen in our center, he was in a critical condition, intubated, ventilated, and in pulmonary edema with hemodynamic instability. He was admitted directly to CCU for stabilization and investigation. Echocardiography confirmed the presence of severe mitral regurgitation, vegetation attached to the

mitral valve, and rupture chordae, most likely due to infective endocarditis (Fig. 2A and B). Ejection fraction ranged between 40% and 50%. The patient was kept on inotropes in the CCU. An infectious disease specialist was consulted and the patient was kept on triple antibiotic therapy, as his initial blood cultures were negative.

A CT of the head revealed the presence of multiple strokes, with the largest one in the area of the cerebellar artery. Despite that, the patient was moving his four limbs and obeying commands while he was intubated. Brain magnetic resonance imaging (MRI) revealed some hemorrhagic transformation in the area of infarction in the cerebellar artery territory. Neurological opinion favored surgery, as the strokes were multiple and the heart may continue to be a source of showers of

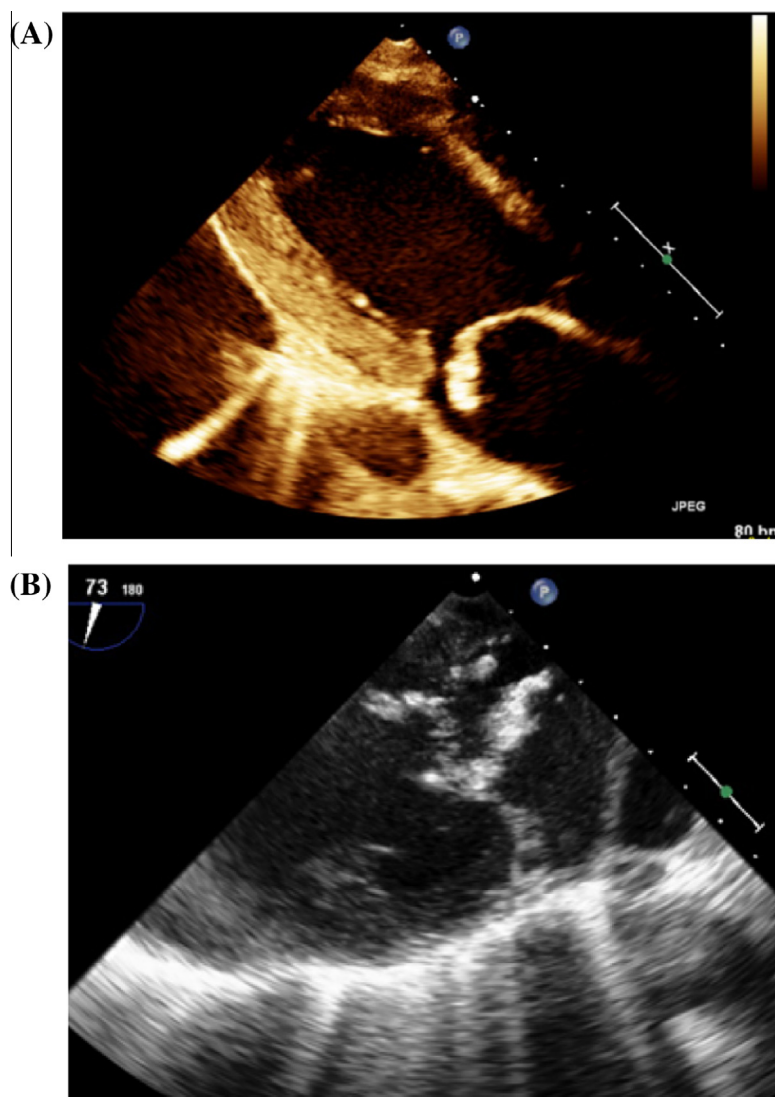


Figure 2. (A) Case 2: Transthoracic echocardiography (TTE) view showing flail anterior mitral leaflet. (B) Case 2: TEE showing flail anterior mitral leaflet with large mobile mass attached to it, most likely representing vegetation.

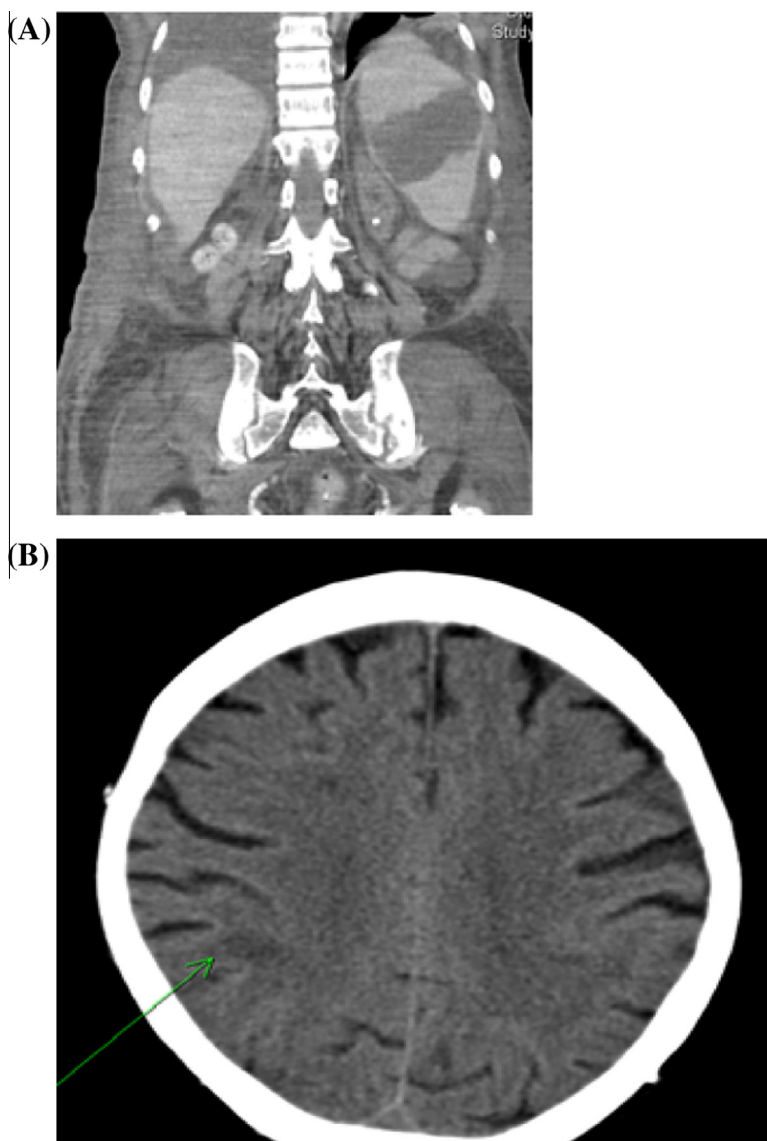


Figure 3. (A) Case 3: CT scan of the abdomen showing large splenic abscess collection. (B) Case 3: CT scan of the brain showing (arrow) a small, faint hypodense area that could be related to the embolic phenomena of infective endocarditis (IE).

embolism to the brain. Consensus after discussions between cardiology, cardiac surgery and neurology services was to surgically replace the mitral valve. The patient's family consented to the high risk procedure. A bio-prosthetic valve was inserted on January 9, 2014, followed by a non-eventful early postoperative course.

On day 17 post-cardiac surgery, the patient had sudden and severe abdominal pain. An abdominal ultrasound revealed huge amounts of fluid collection in the perisplenic region, considered most likely due to ruptured spleen. Emergency laparotomy and splenectomy were performed, and the presence of splenic rupture complicating splenic abscess was confirmed by pathology. The patient continued to improve clinically until his

discharge. Eight months after discharge, he is without neurological deficits and doing well.

Case 3

A 54-year-old male patient was referred from another hospital as a case of native mitral valve endocarditis. His blood cultures were positive for methicillin resistant staphylococcus aureus (MRSA), *Klebsiella pneumoniae*, *Staphylococcus epidermidis*, vancomycin-resistant *Enterobacter* and *Proteus mirabilis*. He had end stage renal disease and was on hemodialysis. After admission, transthoracic and transesophageal echocardiography revealed large vegetation attached to the base of the posterior mitral leaflet with mobile

component. There was severe mitral regurgitation, but normal left ventricle (LV) ejection fraction.

Based on culture and sensitivity tests, the infectious disease (ID) team started the patient on a triple antibiotic regimen that was planned initially to continue for six weeks. Due to poor response to antibiotics and persistent fever, CT scans of the chest, abdomen and pelvis were carried out. There were multiple nodules in both lungs, some of them with central cavitation, which were considered most likely due to septic embolization. There was a large splenic abscess with a 4.7×2.1 cm loculated subphrenic collection and moderate free ascites (Fig. 3A). Splenectomy was successful, and pathology confirmed the splenic abscess.

The patient developed seizures, and CT and brain MRI revealed the presence of scattered, faint hypodense areas that could represent the spread of septic emboli from the heart (Fig. 3B). Repeated frequent seizures were treated aggressively by the neurology team. After another few weeks of antibiotics, blood cultures were clean of any organisms and patient was cleared by ID and neurology teams to undergo cardiac surgery.

The patient had successful mitral valve replacement with a bio-prosthesis of 27 mm. He had postoperative bleeding with impending tamponade that needed reopening and evacuation of the hematoma and hemostasis. Later, he developed repeated intubation and extubation for respiratory causes. He had extensive postoperative physiotherapy and rehabilitation.

Approximately five weeks after postoperative care, the patient showed good recovery and we were able to discharge him in good condition. He is steadily improving with follow up in cardiology, neurology, and physiotherapy clinics.

Discussion

Infective endocarditis is one of the worst complications of valvular heart disease and is sometimes life-threatening. Splenic abscess is described as a rare complication of left-sided infective endocarditis. Splenic infarctions are more common conditions and are often asymptomatic. Approximately 5% of patients with splenic infarction will eventually develop splenic abscess [1-3]. The spleen may be affected either by bacteremia seeding an infarcted splenic zone, or directly through seeding of the spleen by infected embolized vegetations of the heart valves [4]. Splenic abscesses are associated with high morbidity and mortality rates, but early

recognition of the symptoms and prompt treatment should allow for a favorable outcome [5].

Symptoms and signs that could arouse suspicion of splenic abscess are nausea, vomiting, hiccups and back, left flank or left upper quadrant pain, and unexplained abdominal distension [8]. On a chest X-ray, a left-sided pleural effusion or left lower lobe infiltrate may increase suspicion [8]. However, the most common clinical presentation of splenic abscess is persistent or recurrent fever and sepsis, in spite of adequate antimicrobial treatment. The majority of patients with splenic abscesses have no localized findings on clinical examination and chest X-ray findings are nonspecific [8].

Abdominal CT scan and MRI are considered gold standard techniques for diagnosis of splenic abscess, with sensitivity and specificity varying between 90% and 95% [6-7].

Surgical treatment includes splenectomy, which is often performed prior to valve replacement because of the risk of secondary valve infection [3-7]. Successful one-stage procedures (splenectomy combined with valve replacement) have also been described in the literature [4]. Depending on the patient's condition, on individual preference and on the experience of the surgeon, a laparoscopic approach offers an effective and safe alternative to laparotomy [6]. Percutaneous drainage under ultrasonography or computed tomography guidance are options for high risk patients and for whom major surgery is contraindicated [5].

In two of our cases, splenectomy was performed before cardiac surgery while the third case of splenectomy was performed after cardiac surgery as the splenic abscess was identified after the cardiac operation.

Adequate antibiotic treatment should accompany surgery in the management of splenic abscess. Although gram-positive cocci (*Streptococcus viridans* and *Staphylococcus aureus*) appear to be the most common causative agents, there are wide variations of organisms. Antimicrobial regimens should therefore be based on individual blood cultures and perioperative cultures [8].

In all three of our cases, various bacterial species were isolated, including *K. pneumoniae*, *S. epidermidis*, vancomycin resistant enterobacter (VRE), *P. mirabilis*, and others. This may explain the diversity of clinical presentation and the clear resistance to various standard antibiotic regimens.

Our cases were unique in the following ways:

- 1- All three cases were native valve endocarditis, a known aggressive disease.

- 2- Embolic phenomena were not restricted to the spleen but were extended to the brain in two of the cases.
- 3- Isolated micro-organisms were not the common ones for infective endocarditis (IE), presenting a challenge in dealing with infections and choice of suitable antibiotics.
- 4- Multi-disciplinary care was an essential component of the entire period of care for all three patients.

Conclusions

A high index of clinical suspicion of splenic abscess should be maintained while treating patients with infective endocarditis. Abdominal CT or MRI should be considered in any case of infective endocarditis with vague abdominal complaints or prolonged fever not responding to antibiotics. Immediate splenectomy, combined with appropriate antibiotics and valve replacement surgery alongside multi-disciplinary care could be the treatment of choice in this clinical scenario.

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