Primary Nonbacterial Thrombotic Endocarditis Presenting with Bowel Infarction Secondary to Superior Mesenteric Artery Embolism

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ABSTRACT: Nonbacterial thrombotic endocarditis (NBTE) is a rare antemortem diagnosis that is commonly associated with hypercoagulable states such as advanced malignancies, disseminated intravascular coagulation, and autoimmune diseases such as antiphospholipid syndrome and systemic lupus erythematosus. We present a case of a previously healthy 42-year-old man who presented with small bowel infarction caused by embolic occlusion of the superior mesenteric artery and was subsequently diagnosed with NBTE. Despite thorough investigation, efforts to find an underlying cause failed to reveal any associated systemic illnesses. This case report emphasizes the importance of further investigation into the possible underlying causes of NBTE, as it can manifest without any apparent systemic factors.

CASE REPORT

A 42-year-old man presented to the emergency department with a 2-day history of diffuse, unrelenting abdominal pain that began after he woke up in the morning. The patient described his pain as severe, colicky, radiating to the back without exacerbating or relieving factors, and associated with one episode of nonbloody, nonbilious emesis and one episode of hematochezia. He denied any fever, chills, diarrhea, weight changes, shortness of breath, chest pain, dysuria, or hematuria. The patient reported no significant medical history but admitted to being an avid smoker for the past 20 years (one pack/day) and a recreational marijuana and cocaine user. His family history revealed systemic lupus erythematosus in his mother.

Upon presentation, his blood pressure was 125/82 mm Hg, pulse 104 beats per minute, body temperature 36.7°C (98.1°F), and respirations 18 breaths per minute. Physical examination revealed that the patient was distressed secondary to abdominal pain, his abdomen was mildly distended with mild diffuse tenderness, and bowel sounds were mildly reduced; overall, however, these physical findings did not correlate with his severe abdominal pain. His physical examination was otherwise unrevealing.

Laboratory evaluation was unremarkable except for a mildly increased white blood cell count at 13.4 × 10^3/μL (reference range 4.2-10.7 × 10^3/μL) and a slightly increased hemoglobin count at 17.1 g/dL (reference range 12.2-16.4 g/dL). Oral and intravenous contrast-enhanced computed tomography (CT) of the abdomen and pelvis revealed an acute splenic infarction, a thrombus within the superior mesenteric artery with thickened loops of jejunum, and mild hepatomegaly with diffuse fatty infiltration. The patient then underwent emergent laparotomy, with resection of 285 cm of necrotic jejunum, and superior mesenteric artery thrombectomy with endarterectomy. He was placed on intravenous heparin and broad-spectrum antibiotics.

The initial electrocardiogram performed shortly after presentation showed normal sinus rhythm. Transthoracic echocardiogram was also performed to evaluate for cardiac sources of embolism but failed to reveal any abnormalities. Follow-up transesophageal echocardiogram revealed a freely mobile, pedunculated, echodense 1.6 × 0.5 cm^2 mass attached to the interannular fibrosa of the aortic valve that prolapsed into the aorta during systole (Figure 1). Serial blood cultures failed to reveal any infectious organisms. The patient subsequently underwent sternotomy with excision of cardiac vegetation. Surgical pathology analysis revealed a fibrinous vegetation measuring 1.8 × 1.4 × 0.4 cm and without evidence of infective organisms, consistent with nonbacterial thrombotic endocarditis (Figure 2). Chest CT was performed to search for possible malignancy but revealed no lung masses. Thrombophilia work-up was unremarkable, with negative antinuclear antibody (ANA), lupus screen (dilute Russell's viper venom time), and antiphospholipid antibodies (anticardiolipin IgG and IgM). Prothrombin time (PT) and partial thromboplastin time (PTT) were normal. The patient was continued on IV heparin, and his subsequent hospital course was uneventful. He was later discharged on warfarin therapy with a therapeutic international normalization ratio (INR), and scheduled to follow up as an outpatient.

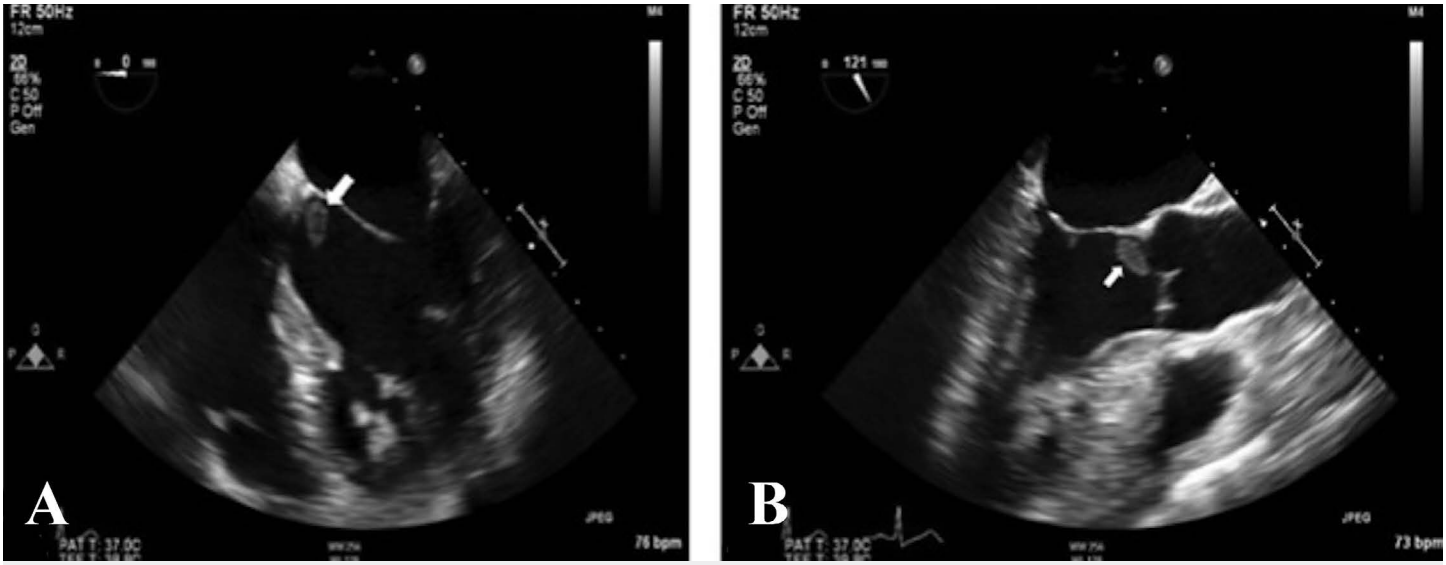

Figure 1.
Transesophageal echocardiogram. (A) Mid-esophageal (ME) apical 4-chamber view, and (B) ME aortic valve long-axis view showing a pedunculated mass (arrows) attached to interannular fibrosa of aortic valve.

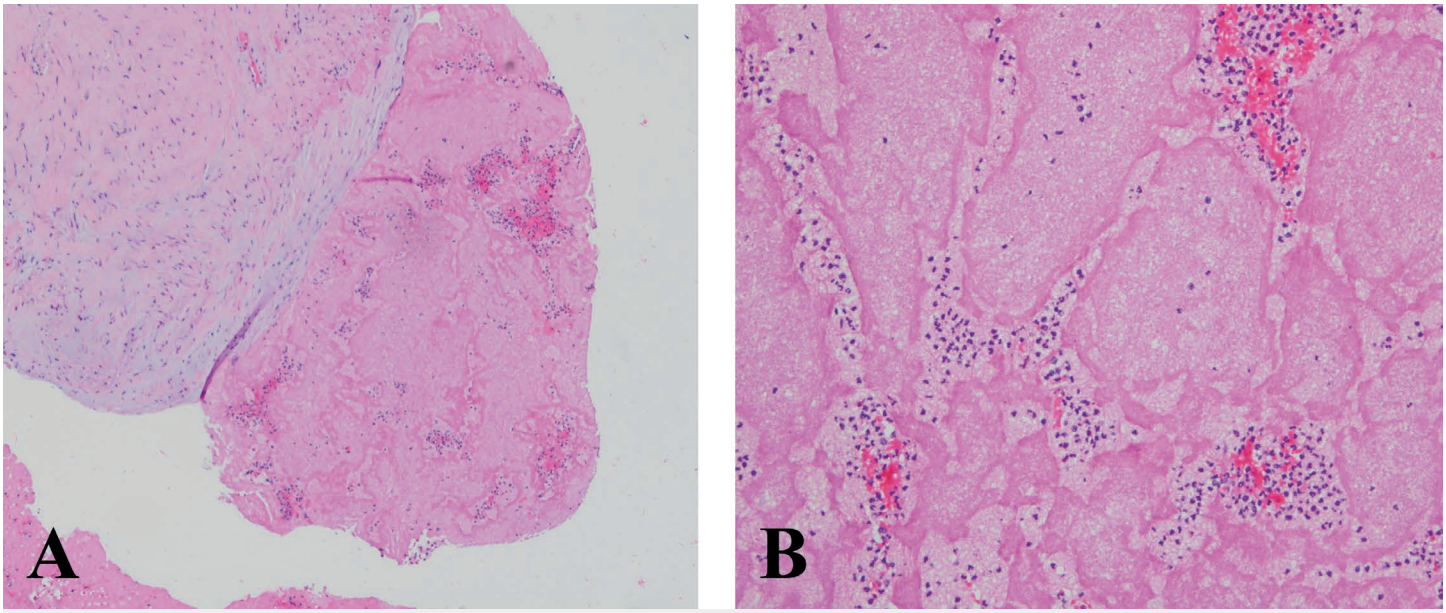

Figure 2.
(A) Histopathology of valve lesion consisted predominantly of homogeneous thrombotic material staining bright pink in routine hematoxylin and eosin stain (right); upper left shows small fragment of free edge of valve with early reactive fibrosis and lack of acute inflammation. (B) Higher power of thrombotic material that comprised most of the lesion shows typical pattern of acute thrombus; no evidence of infective organisms was seen. Original magnification: X 40 (A); X 100 (B).

DISCUSSION

Initially described by Zeigler in 1888,[1] nonbacterial thrombotic endocarditis (NBTE) is characterized by the deposition of thrombi on previously undamaged heart valves in the absence of a bacterial infection in the bloodstream. Vegetations associated with NBTE are sterile, an important distinction from infective endocarditis, and consist of interwoven degenerating platelets and strands of fibrin.[2,3] NBTE vegetations are found in approximately 1.2% of all autopsy patients, although incidence reports have ranged from 0.3% to 9.3%.[1,2,4] The precise initiating factor for NBTE has not been determined, but it involves a hypercoagulable state in the presence of endothelial injury, which results in platelet deposition and inflammatory mononuclear cell migration that forms the initial thrombi.[3]

A common complication of NBTE is valvular dysfunction, which often prompts surgical intervention before the NBTE diagnosis is made. However, it is not certain whether the valvular dysfunction results from the formed vegetations or if initial vegetation formation is stimulated by valvular dysfunction.[5] Aortic and mitral valves are the most common valves involved in NBTE, although involvement of any of the four valves has been reported.[1,6]

Antemortem diagnosis of NBTE is rare; however, it is commonly associated with hypercoagulable states such as advanced malignancies, disseminated intravascular coagulation, and autoimmune disease such as antiphospholipid syndrome and systemic lupus erythematosus.[1,6-10] Adenocarcinomas—particularly lung, gastric, and pancreatic—are the most common type of malignancy associated with NBTE.[1,2,11] Although NBTE has been reported in every age group, it is most often found in patients between their 40s and 80s. Additionally, the incidence of NBTE is the same for males and females.[1]

NBTE presentation is typically silent until complications such as embolization and valvular dysfunction occur.[3] Embolization occurs in nearly 50% of patients with NBTE, most often affecting the central nervous system and splenic, coronary, and renal circulations. Embolization to the central nervous system and coronary arteries constitute the most significant morbidity, with neurological deficits caused by embolization being the most common clinical manifestation. Valvular dysfunctions might result in new-onset cardiac murmurs, arrhythmias, and heart failure, which may also prompt investigation.[1,2,3,11]

An important step in diagnosing NBTE is differentiating it from infective endocarditis. The use of the modified Duke's criteria, laboratory tests such as antiphospholipid antibodies, and echocardiography can help make this distinction. A differential diagnosis may also include rheumatic valvular disease, degenerative valvular disease, and normal anatomic variants.[3]

Imaging studies are critical for the diagnosis of NBTE. Although transthoracic echocardiography may serve as an initial imaging technique, transesophageal echocardiography has a higher sensitivity and specificity for detecting valvular vegetations in NBTE.[3,12,13] Management currently focuses in the treatment of the underlying disease and managing the risk of embolization. Therefore, anticoagulation is key to prevent recurrent embolization. Valvular repair or replacement can be performed in patients with large vegetations, valvular dysfunction, or recurrent embolism despite anticoagulation therapy.[3,14]

CONCLUSION

To our knowledge, we describe the first reported case of NBTE presenting with bowel infarction caused by superior mesenteric artery embolization without an underlying systemic cause. We diagnosed NBTE after mesenteric infarction prompted a search for a source of emboli. After serial blood cultures failed to reveal an infective organism, NBTE vegetations were first visualized by echocardiography followed by direct observation. Once the vegetations were excised, pathological examination once again failed to find evidence of infective organisms. Although the patient had a family history of systemic lupus erythematosus, his ANA test, lupus screen, and antiphospholipid antibodies were negative. Additionally, CT scan of the chest and abdomen imaging failed to reveal any malignancy. In other published case reports of NBTE, it is commonly associated with either malignancies or autoimmune illnesses, with only one other reported case of NBTE occurring without evidence of an underlying systemic illness.[15-20] In our literature search, the only other reported case of "primary" NBTE was in a patient who presented with mesenteric vein thrombosis.[15]

Our case demonstrates a unique presentation of NBTE in a formerly healthy patient. As imaging techniques continue to develop and detection of NBTE vegetations increase, we highlight the importance of further investigation into the possible underlying causes of NBTE since it can manifest without any apparent systemic factors.

Keywords:
nonbacterial thrombotic endocarditis, cardiac mass, bowel infarction, mesenteric artery occlusion

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