

A Case Report: Mixed Thrombus Formation in a Previously Sutured Right Atrium

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ABSTRACT

We describe the case of a 19-year-old Chinese woman who nine months prior underwent repair of an atrial septal defect and came to our hospital with a right atrial mass attached to the anterior wall of the right atrium on transthoracic echocardiography. Pathologic examination revealed the mass was a mixed-type thrombosis with some unusual organization, which previously was not described in literature.

INTRODUCTION

Several studies describe thromboses in the right atrium, but the origins of these thromboses are different. Thrombosis is a common complication in 11% to 17% of patients with a central venous catheter [Fuchs 1999]. Deep vein thrombosis occurs in 50% of patients, and thrombosis of the vena cava occurs in 22% of patients with intracardiac thrombi. Some patients with Behçet Syndrome who undergo cardiac surgical intervention have thromboses of the right atrium and ventricle [Louali 2010]. Pacemaker use and constrictive pericarditis also cause right atrial thrombi [Coleman 2004; Katagiri 1990]. However, few reports describe thrombosis after simple cardiac surgery [Dinckal 2003; Rodriguez 2001]. In this study, we present a case of thrombosis in a previously sutured right atrium.

CASE REPORT

A 19-year-old woman diagnosed with an atrial septal defect (ASD) measuring 32 mm × 33 mm × 36 mm nine months prior was admitted to our hospital. To repair the ASD, we used a Dacron graft with 4-0 Prolene sutures (Ethicon Inc., Cincinnati, Ohio, USA). We used 5-0 Prolene sutures (Ethicon Inc.) to close the incision in the right atrium. The patient was successfully extubated on the first postoperative day and the central venous catheter was removed on the second postoperative day. Three days later, the patient was discharged without major complications.

During a routine follow up nine months after surgery, transthoracic echocardiography (TTE) revealed a right atrial

mass attached to the anterior wall of the right atrium. The patient had no history of recurrent buccal aphthous, genital ulcers, or uveitis with hypopyon, excluding Behçet Syndrome. Laboratory tests revealed the following values: C-reactive protein level, 2.88 mg/L; erythrocyte sedimentation rate, 44 mm/h; white blood cell count, $6.95 \times 10^9/L$; and platelet count, $262 \times 10^9/L$. Blood culture was negative. Electrocardiography revealed sinus rhythm and incomplete right bundle branch block. On TTE (Figure 1), no residual shunt was evident, and the pedunculated mass attached to the anterior wall of the right atrium measured approximately 21 mm × 22 mm. Magnetic resonance imaging (Figure 1) showed enlargement of the right ventricle and atrium. The mass was swinging with each heartbeat.

None of these observations revealed the nature of the mass; therefore, we performed a secondary surgery to resect it. Our surgical findings (Figure 2) revealed the mass was attached to the anterior wall of the right atrium by a peduncle located on the previously sutured side of the right atrium. Culture of the mass was negative, and histopathological examination identified the mass as a mixed thrombosis with some organization

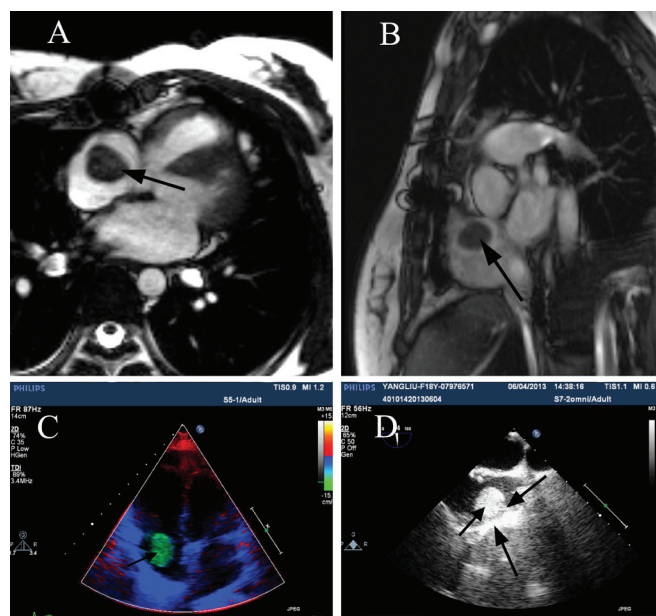


Figure 1. Imaging results demonstrating the mass in the right atrium: (A, B) magnetic resonance imaging; (C) transthoracic echocardiography; (D) transesophageal echocardiography.

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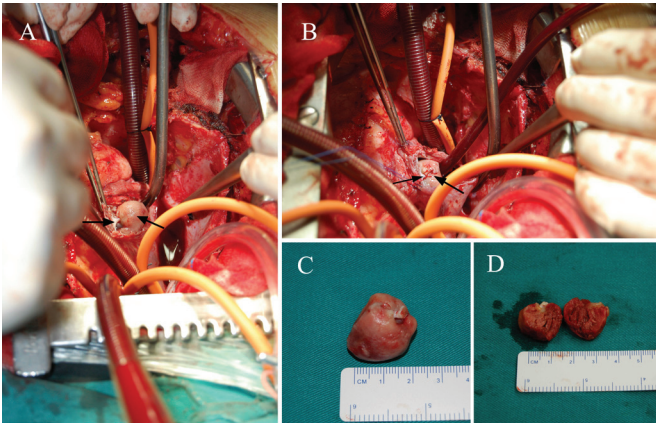


Figure 2. Surgical view: (A, B) the mass at the suture site of the primary sutured atrial septal defect; (C) resection of the mass from the right atrium; (D) the slitted mass.

(Figure 3). The patient received aspirin therapy after surgery, and no thrombus was detected during follow up.

DISCUSSION

The presence of a mass in the right atrium has been reported in several studies. Such masses sometimes represent myxoma, other tumors, or thrombi of the heart and are potentially fatal if left untreated [Kuwahara 2002]. It is difficult to determine the nature of a mass, particularly in patients with negative clinical manifestations and laboratory examinations. Despite the information provided by magnetic resonance imaging, TTE, and transesophageal echocardiography (TEE), histopathological examination is often the best way to confirm the nature of a mass.

Stable thrombi of the right atrium are difficult to discover, particularly when patients show no signs and symptoms of pulmonary embolism and have no underlying diseases such as Behçet Syndrome [Louali 2010]. However, central venous catheters are a known cause of right intracardiac thrombi and thrombi in the right heart chambers, often termed “emboli in transit” [Dinckal 2003]. Incision of the right atrium is the conventional procedure for exploring intracardiac malformations in patients undergoing cardiac surgery. When cardiac surgery is completed, Prolene sutures (Ethicon Inc.) are used to close the incision in the right atrium. Primary suturing, artificial patches, or occluder devices are used to close the defect. Although artificial patches and occluder devices are used to prevent paradoxical embolism, they can become a cardiac source of emboli [Dinckal 2003]. To the best of our knowledge, no studies describe the phenomenon of primary sutures closing an incision in the right atrium becoming a cardiac source of thromboses. Such masses arise in the right atrium a short time after cardiac surgery, when we can exclude other underlying diseases such as Behçet Syndrome and other reasons for mass formation, thrombosis is the likely explanation.

The site, size, and composition of thrombi formed within the circulatory system are determined by alterations in blood flow, the thrombogenicity of cardiovascular surfaces, the

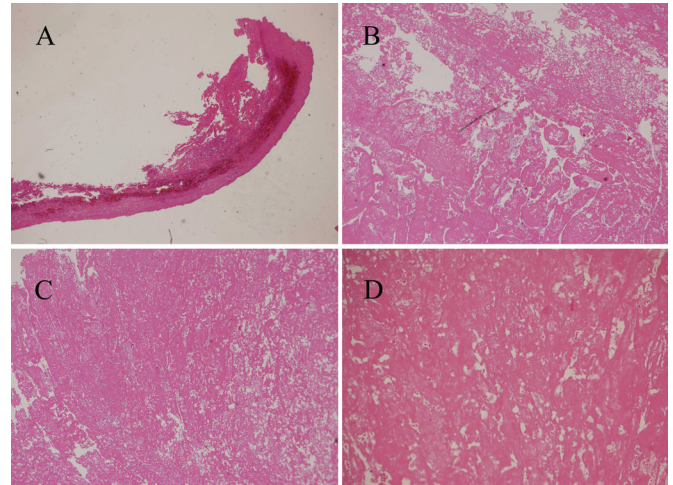


Figure 3. Pathologic sections: (A) 2 X magnification; (B) 5 X magnification; (C) 10 X magnification; (D) 20 X magnification.

concentration and reactivity of plasma cellular components, and the effectiveness of physiologic protective mechanisms. The luminal surface is smooth and devoid of electron-dense connective tissue [Dinckal 2003]. The luminal membrane adds significant thromboresistant properties to vessels, carrying a negative charge that repels similarly charged circulating blood cells. In contrast, the subluminal surface has adhesive properties. Any procedure or event that exposes the subluminal surface may induce thrombosis [Dinckal 2003; Rodriguez 2001; Kuwahara 2002; Ikeh 1979]. Mixed thrombosis formed because of alterations in blood flow and irritation of the anterior wall of the right atrium.

There are a few ways to avoid the thrombus formation in a previously sutured right atrium. First, TTE should be performed three months after surgery. If we find the thrombus earlier and it is not large, we may consider giving an anticoagulant over reoperating. Second, an everting suture line may be adopted to keep the inner cavity surface smooth so it is not easy for thrombus formation. Finally, anticoagulation for three months might be reasonable.

The management strategy for life-threatening right heart thrombi remains controversial. Thrombolysis is the standard treatment for such masses, particularly when they are associated with acute massive pulmonary embolism, although thrombolysis carries a high risk of recurrent pulmonary embolism and major hemorrhage. However, if the mass is large, we prefer surgical resection to thrombolysis.

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