

Large Calcified Thrombus Attached to the Eustachian Valve: A Case Report



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INTRODUCTION

The eustachian valve (EV) is a membrane in the right atrium of the human fetal heart that helps direct blood flow from the right atrium across the intra-atrial septum at the foramen ovale and into the left atrium. This membrane usually regresses and is absent in the adult heart. A residual, prominent EV in an adult is occasionally seen on echocardiography. Case reports of thrombosis and endocarditis have been described in the literature in individuals with persistent prominent EVs. We present an unusual case of a large calcified thrombus attached to the EV in an asymptomatic 44-year-old woman who underwent echocardiography as a part of a preoperative evaluation for abnormal findings on electrocardiography.

CASE PRESENTATION

A 44-year-old woman with morbid obesity was referred to our clinic for preoperative cardiologic evaluation because of abnormal findings on electrocardiography. She was scheduled for elective bariatric surgery. She reported no cardiac or respiratory symptoms other than marked limitation in functional capacity because of morbid obesity (body mass index 51.5 kg/m²). Her cardiac examination was normal, with no audible murmurs or extra heart sounds.

Her only medical history before the current presentation included a remote history of unprovoked deep venous thrombosis in her left lower extremity 8 years prior. She had then undergone a workup for hypercoagulability at an outside state hospital, whose results were reportedly normal. She was treated with warfarin for 2 years.

Electrocardiography performed in the office showed sinus tachycardia with diffuse T-wave inversions (Figure 1). The patient was referred for transthoracic echocardiography that showed a large mobile mass in the right atrium. The point of attachment of the mass could not be determined by that study. The patient was subsequently referred for transesophageal echocardiography that showed a large mobile echogenic mass attached to a thickened EV at the junction of the inferior vena cava and the right atrial wall and a thickened lipomatous intra-atrial septum (Video 1, Figure 2). Computed tomography of the chest with contrast revealed a left subsegmental pulmonary embolism along with filling defect in the right atrium

VIDEO HIGHLIGHTS

Video 1: Transesophageal echocardiogram showing a large mobile echogenic mass attached to a thickened EV at the junction of the inferior vena cava and the right atrial wall.

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(Figure 3). Venous ultrasonography of the legs was negative for deep venous thrombosis.

The patient was referred to cardiac surgery for excision of the mass. Preoperative laboratory results, including complete blood count and complete metabolic panel, were within normal ranges. Serum calcium level was 9.9 mg/dL (reference range, 8.5–19.1 mg/dL). Intraoperatively, the mass was found to be tightly adherent to the EV and was prolapsing through the tricuspid valve. The septal leaflet of the tricuspid valve was thickened and was tethered to the right side of the intraventricular septum. The mass was excised, and an annuloplasty ring was placed at the tricuspid annulus to prevent the occurrence of postoperative tricuspid regurgitation. On pathologic evaluation, the mass was found to be a calcified thrombus (Figure 4). The patient's postoperative course was uncomplicated, and she was discharged on postoperative day 4. Her medications on discharge included chronic anticoagulation.

DISCUSSION

The EV is an embryonic membrane whose function is to divert oxygenated blood in the right atrium to the left atrium through the intra-atrial septum at the foramen ovale. About 4.18% of adults have elongated, persistent EVs.¹ Persistent EV is usually a benign structure with no pathologic significance. In rare cases, EVs have been found to be associated with thrombosis and endocarditis.

Case reports of embolic as well as in situ thrombi in the right atrium have been presented. In situ thrombi have been described as laminated, nonhomogenous, immobile, and attached to the right atrial wall. Embolic thrombi have been described as free-floating masses in the right atrium. In a retrospective study by Vale *et al*,² they described an elongated EV as an independent risk factor for stroke in the setting of patent foramen ovale. This is thought to be due to redirection of the thrombi by the EV. Similarly, De Keyser *et al*³ described mobile right atrial thrombi that were entrapped in the EV and proposed that the elongated EV entrapped large thrombi and prevented pulmonary embolism. The origin of the EV thrombus in our patient was unclear. The EV in our patient was abnormally thickened. The intra-atrial septum was also thickened with lipomatous fat. We postulate that the patient might have had a deep venous thrombus that embolized and became entrapped onto the thickened EV

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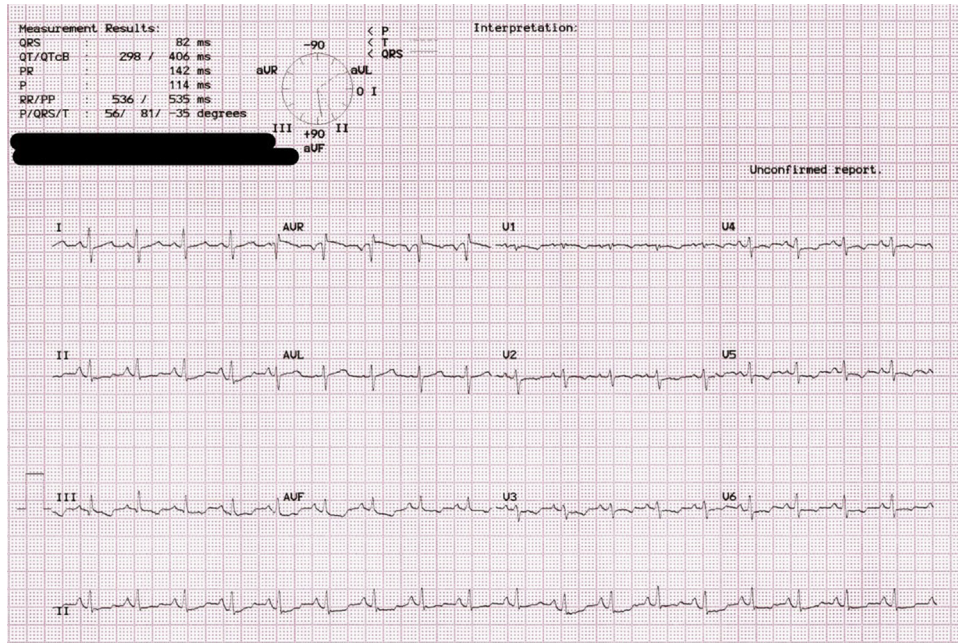


Figure 1 Electrocardiogram obtained in the office showing sinus tachycardia with diffuse T-wave inversions.

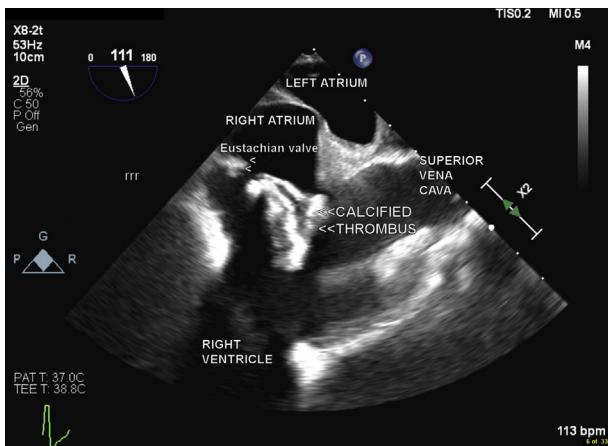


Figure 2 Transesophageal echocardiogram showing a large mobile echogenic mass attached to a thickened EV at the junction of the inferior vena cava and the right atrial wall.

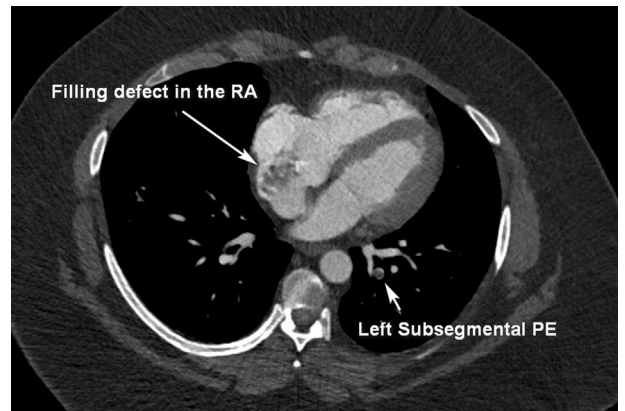


Figure 3 Computed tomography of thorax with intravenous contrast showing left subsegmental pulmonary embolism and filling defect in the right atrium.

because of slow blood flow at the junction of the EV, thickened intra-atrial septum, and the inferior vena cava. The thrombus progressively increased in size. The extensive calcification seen in the thrombus on echocardiography and pathologic examination suggests a chronic process. Thrombi in the right atrium have been successfully treated with fibrinolytics and anticoagulation, but a thrombus of this size and extensive calcification would most likely not have responded to these treatments. Therefore, surgical resection was appropriate for definitive diagnosis and the prevention of recurrent pulmonary emboli.

The recurrence rate of EV thrombi is unknown. No specific guidelines exist for type and duration of anticoagulation. We opted for lifelong anticoagulation with a factor Xa inhibitor. We plan to obtain subsequent echocardiograms at 3 months, 6 months, and 1 year, but no guidelines exist for the duration and frequency of follow-up at this time.



Figure 4 Excised thrombus with extensive calcification.

CONCLUSION

This report highlights a rare case of a large calcified thrombus attached to a thickened EV. Transthoracic echocardiography revealed a mobile mass in the right atrium, but the point of attachment was unclear. Transesophageal echocardiography clearly demonstrated that the mass was attached to the EV, making the diagnosis of cardiac tumor less likely. Surgical excision of the mass was both diagnostic and therapeutic. The rate of recurrence is unclear. We recommend lifelong systemic anticoagulation after excision.

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