

Mobile Thrombus in the Ascending Aorta Associated With Acute Myocardial Infarction

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Abstract

The presence of thrombus in the ascending aorta is uncommon but it has been implicated in systemic thromboembolism. The rarity of thrombus in the ascending aorta is presumably secondary to high blood flow velocity in the location; however, its presence is of concern given the risk of embolization to the brain and potential for cerebral infarction. Furthermore, thrombus in the proximal aorta may embolize into the coronary artery or occlude the coronary ostium and result in myocardial infarction.

Keywords: Thrombus; Myocardial infarction; Ascending aorta

Introduction

The presence of thrombus in the ascending aorta is uncommon but has been implicated in systemic thromboembolism [1]. The rarity of thrombus in the ascending aorta is presumably secondary to high blood flow velocity in this location; however, its presence is of concern given the risk of embolization to the brain and potential for cerebral infarction [2]. Furthermore, thrombus in the proximal aorta may embolize into a coronary artery or occlude a coronary ostium and result in myocardial infarction. This is an exceedingly rare clinical occurrence. We present a case of myocardial infarction (MI) caused by occlusion of the left coronary ostium by a mobile aortic thrombus in the absence of associated aortic pathology. We then compare our patient to other cases in the literature.

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Case Report

A 46-year-old Mongolian female presented with syncope secondary to self-limited episodes of ventricular tachycardia observed in the field. She was a long-standing one-half pack-per-day cigarette smoker without medical comorbidities. Her family history was notable for her mother having a deep venous thrombosis and dying suddenly in her forties. In the emergency room, she was hemodynamically stable with complaints of substernal chest pain. Initial EKG revealed atrial fibrillation with an acute septal infarct and marked inferior ST-depressions. She underwent cardiac catheterization which revealed normal coronary arteries. On exam, she had right lower extremity ischemia with occlusion of the common iliac and popliteal arteries demonstrated on computerized tomography scan.

Her initial echocardiogram revealed severe hypokinesis to akinesis of all myocardial segments except for the basal and mid inferior walls. These findings were confirmed by cardiac magnetic resonance imaging which showed transmural infarction with delayed contrast enhancement of much of the left coronary artery territory. In addition, a 0.4×1 cm pedunculated filling defect in the left coronary cusp was identified. The

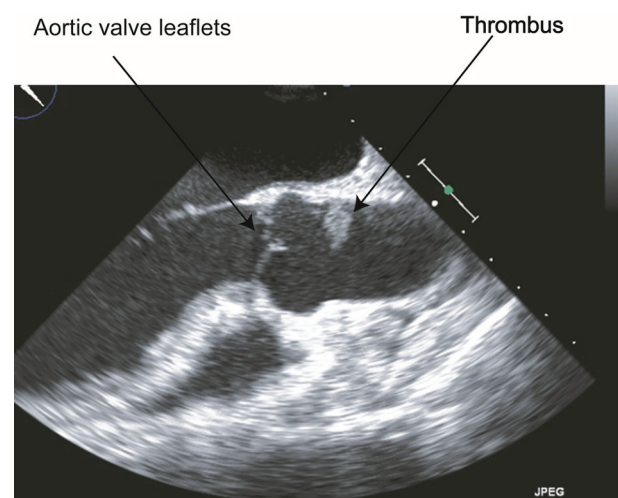


Figure 1. An intraoperative transesophageal echocardiogram view of the aortic thrombus.

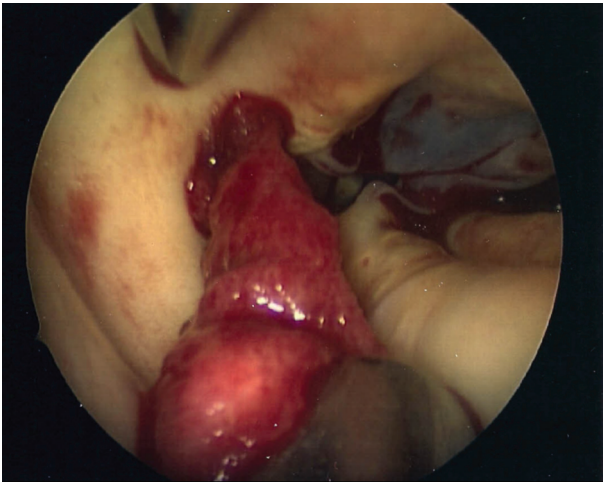


Figure 2. Thrombus within the ascending aorta.

patient's initial ventriculogram was re-evaluated and a mobile mass was noted above the sinotubular junction unrelated to the aortic valve and close to the ostium of the left main coronary artery.

The mass was presumed to be a thrombus and a cardiothoracic surgical consultation was requested for thrombectomy. The patient was taken to the operating room and an intraoperative echocardiogram demonstrated a mobile mass (Fig. 1). A transverse aortotomy was made in the proximal aorta and an irregular mass was found attached by a thin stalk to the posterior surface of the aorta proximal to the sinotubular junction (Fig. 2). The ascending aorta was otherwise normal without intimal defect or atheroma. The patient was weaned from cardiopulmonary bypass and recovered well postoperatively. Pathology confirmed a pink-red 2.0×0.5 cm benign organizing thrombus (Fig. 3). The patient later underwent surgical thrombectomy of her right common iliac and popliteal arteries. She was ultimately discharged in stable condition on standard heart failure medications.

Discussion

Our patient suffered an acute MI in the territory supplied by the left main coronary artery. Immediate cardiac catheterization demonstrated TIMI III blood flow without evidence of atherosclerosis or coronary embolus. Therefore, there was likely temporary occlusion of the left coronary ostium by the mobile aortic thrombus. Aortic thrombosis of the descending aorta is fairly common and usually associated with underlying atherosclerosis or aneurysm. Acute MI secondary to coronary occlusion by a free floating thrombus in the ascending aorta is uncommon. A search of the literature identified only 18 previously reported cases in the absence of other aortic pathology [3-18]. These cases demonstrate that primary thrombus formation can occur in high-flow vascular areas in the absence of obvious aortic pathology. A hypercoagulable workup was performed and significant for an elevated lipoprotein-A level. Of unclear significance, her ANA titer was elevated (1:2,560).



Figure 3. Aortic thrombus specimen.

MI secondary to free floating aortic thrombus seems to be more common in young female smokers like our patient. Out of 18 cases identified in the literature, 13 (72%) were female with a mean age of 45 years old, and 57% had a history of cigarette smoking [3-6, 9-11, 13, 15, 16, 18]. Similar to our patient, one other female was found to have an elevated lipoprotein-A level [16]. One male patient was found to have protein S deficiency [12]. Amongst the female patients, one was pregnant [3], and three were known to have been on oral contraceptive or hormone replacement therapy [6, 9, 10]. Like our patient, two others additionally had acute limb ischemia [8, 14].

The mortality associated with MI secondary to free floating aortic thrombus is high (42% in the reviewed cases). The treatment options include anticoagulation with heparin and warfarin [19], thrombolysis [20], and surgical thrombectomy. In this case, we chose surgical intervention to prevent embolization and further occlusion of the coronary ostia.

Conclusion

The presence of aortic thrombus is a rare occurrence and the potential complications from it are severe. In this patient, the thrombus was associated with MI; however, the additional risks include cerebral and/or peripheral embolization. The treatment options are varied but careful management is critical in these patients.

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