Management of Free-Floating Thrombus in the Arch of the Aorta in a Case of Upper Limb Ischemia

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Abstract

Floating thrombus in a nonaneurysmal and nonatherosclerotic arch of the aorta is an extremely rare event with potential catastrophic complications. There is a risk of both systemic and cerebral embolization. We present a case of floating thrombus in the arch of the aorta who presented with left upper limb advanced ischemia. Confirmation of the diagnosis was done by computed tomography angiogram. His upper limb symptoms were relieved with thrombectomy, supported by medical line of treatment. For floating thrombus in the arch of the aorta, he was started on aggressive anticoagulation therapy, and there was significant resolution after 4 weeks and complete resolution after 3 months of the treatment. We report our experience with a very rare condition and make a proposal for therapeutic interventions.

Keywords: Arch of the aorta, floating thrombus, medical therapy

Introduction

Mural aortic thrombi can occur anywhere in the aorta and are important causes of distal embolization. A review of the English-language medical literature shows that there are few reported cases of floating thrombus in the aortic arch.\textsuperscript{[1,2]}

Formation of friable floating thrombus, especially in the proximal aortic arch, creates a life-threatening risk of stroke, as well as peripheral embolization. Treatment is mandatory, once the diagnosis is established. The treatment of the patient with free-floating thrombus in the arch of the aorta is still controversial and includes surgical removal, thrombolysis, or anticoagulation. We present a case in which a large mobile thrombus in the arch of the aorta resolved with anticoagulation therapy.

Case Report

We report the case of a 42-year-old male admitted in emergency with left upper limb ischemia. He was complaining of rest pain and had discoloration of fingertips, for 1 day. His left upper limb was cold, numb, with discoloration of fingertips, and grossly restricted movements. None of the pulses were felt in the left upper limb. Urgent duplex scan revealed triphasic flow in the first part of subclavian and no flow in remaining subclavian and distal arterial system, suggestive of thrombosis.

As his serum creatinine was 1.5, an angiography was kept on hold. His initial ECHO ruled out any cardiac source; however, transesophageal echocardiography (TEE) was not done at the first go. In view of his pain and advanced ischemia, he was subjected to emergency left transbrachial embolectomy. Fresh and old thrombus was extracted and blood circulation was restored. Pulses appeared after the procedure, and the hand was warm. In view of good recovery, intraoperative DSA was not considered and even thrombolysis was not thought of. He was started on medical management, which consisted of adequate anticoagulation, antiplatelets, and vasodilator. However, pulses disappeared after 12 h. Reexploration and thrombectomy was attempted. Pulses again appeared and then disappeared after few hours. In view of repeated thrombosis and distal disease, he was started on prostaglandin infusion along with anticoagulation, antiplatelets, and vasodilator.

The patient was further evaluated to find out the origin of the thrombus since now his serum creatinine was within normal range after good hydration. His computed tomography (CT)
angiography revealed a large floating thrombus of about 6 cm × 4 cm in the arch of the aorta [Figures 1 and 2], with total occlusion of axillary, brachial, and distal vessels. His cardiac assessment was normal. All the relevant hematological and biochemical reports were within normal limits. The diagnosis of hypercoagulation state was excluded by the negative complete coagulation profile and lack of previous unexplained arterial or venous thrombosis in his or his family members. His vasculitis work-up was also negative. We planned for 4-week aggressive medical management followed by surgery. We started the patient on continuous heparin infusion 1000 units/h initially with the aim of maintaining activated partial thromboplastin time levels double the normal and then shifted her to intermittent intravenous therapy alone with oral anticoagulation. He was discharged on oral anticoagulant, once attaining his international normalized ratio (INR) between 2 and 4. Clinically, his upper limb symptoms improved, had minimum pain at discharge, and he was able to hold objects. After 4 weeks, we repeated the transesophageal echocardiogram, which shows significant reduction of the thrombus in the arch of the aorta. He is now on oral anticoagulant and maintaining his INR in between 2 and 4. After 3 months of his anticoagulation therapy, CT angiogram of the neck showed complete resolution of the thrombus from the arch of the aorta [Figures 3 and 4].

**DISCUSSION**

Most systemic embolisms are caused by thrombi in the left side of the heart. Aortic thrombi, however, are another important cause of arterial thromboembolism. Factors related to an arterial thrombus are arteriosclerosis, arterial dissection, trauma, malignant tumor, and hemostatic disorder.[3]

The presence of free-floating thrombi in the aortic arch as in this case is rare. The incidence of embolic events from mobile aortic thrombi is 73%. [4] In this case, the patient had a thrombus in his left arm. We believe that it originated in the aortic arch. Sometimes, aortic thrombi could be asymptomatic, and their natural course is unknown.[5] The pathophysiology of aortic thrombi is not well defined. They occur more commonly in patients of advanced age and those with several cardiovascular risk factors.

CT and echocardiography can be used for the diagnosis of aortic thrombi. In particular, transthoracic and TEE have high diagnostic accuracy and allow the assessment of the size, morphology, and anchoring site of the thrombus, as well as the characteristics of the aortic wall.[6] Further, to determine the cause of the thrombus, we
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should consider a survey for hypercoagulable disorder. A definite diagnosis requires histological and immunohistochemical studies. In a differential diagnosis with other mass lesions, such as tumors, it is useful to consider magnetic resonance images.

The ideal treatment of mobile aortic thrombi without atheromatosis is still controversial. Some authors have suggested an aggressive surgical approach because of the potential hazard of emboli.[7,8] However, Soyer et al. have shown that in spite of the surgical removal of the thrombus from the aorta, recurrent aortic thrombi and subsequent fatal embolization may still occur.[9] Others have reported complete resolution of the floating thrombi following either thrombolysis or anticoagulation.[10,11] Exclusion by endovascular stent graft has been recently suggested, however, needs more data to recommend for the treatment.[12]

In the case we discussed, despite the clinical history of recurrent emboli that indicated a surgical approach, we had the complete resolution of the pathological and clinical status with only anticoagulant therapy. We excluded thrombolysis because of the potential risk of repeat embolization that could result from a partial lysis of the clot. Regarding the INR target between 2 and 4, this has been chosen because the thrombus was in the arterial and not in the venous bed. The appropriateness of this treatment has been confirmed by the absence of recurrences. To prevent the recurrence of thrombi, we suggest, in these cases, that the treatment is maintained for long or life. In conclusion, we believe that a clinical approach including aggressive anticoagulation should be the treatment of choice in these patients. It should be begun as early as possible because of the potential source of cerebral and peripheral arterial embolism and because of the significant risk of lysis of the thrombus. Considering the high risk of recurrence even after surgery, this has to be reserved only to those cases in which there are recurrent embolic events despite adequate intravenous anticoagulation. Once discharged, oral anticoagulants should be maintained for long or life in view of large thrombus at unusual site potentially life- and limb-threatening.

Declarations of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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