

Floating thrombus in the distal part of the aortic arch – a rare source of systemic embolism

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Abstract

Background

Floating thrombus in a non-atherosclerotic and non-aneurysmal aortic arch is a rare event. The risk of potentially catastrophic embolization is high, especially in the younger population.

Material and methods

Transesophageal echocardiography is the diagnostic method of choice.

Introduction

A mobile, large thrombus in the aortic arch is rare, but can lead to embolism to the central nervous system with potential tragic consequences or to peripheral embolism^[1-3]. A thrombus at this location is usually diagnosed during transesophageal echocardiography (TEE) performed to search for sources of systemic embolism^[4]. Treatment of patients with thrombus in the aortic arch is controversial. It is proposed to perform both surgery and thrombolysis or anticoagulation^[1-4].

Results

The treatment of this pathology is still controversial and includes medical, surgical and endovascular options. We report a 55-year-old female patient and present a review of the literature.

Conclusions

Regardless of the method of thrombus removal from the aortic arch, a permanent anticoagulant is indicated to prevent recurrence of clots.

Case description

A 55-year-old non-smoking woman, with a history of systemic embolism, was admitted to undergo transesophageal echocardiography (TEE). The patient had been treated for 11 years for rheumatoid arthritis (including sulfasalazine, chloroquine, methotrexate and prednisone). In the years 2000-2004 the patient was operated on several times because of gallstones, hiatal hernia, umbilical hernia and pyloric stenosis. The postoperative course was complicated by an abscess in the peritoneal cavity, which was treated conservatively. In May

2004, a sudden intermittent claudication occurred. Doppler ultrasound of the lower extremities showed a correct picture of the abdominal aorta, iliac and femoral arteries, and the left popliteal artery, but closure of the right popliteal artery 2 cm above the knee was revealed. In the tibial arteries, both the left and right flows were visible fragmentarily. In October 2004, the patient was hospitalized due to acute left upper limb ischemia. Subclavian artery embolectomy was performed and enoxaparin in a dose of 60 mg/day and aspirin 150 mg/day were applied. Laboratory tests performed in ambulatory primary care nine days before the subclavian artery embolism showed: high level of total cholesterol (7.26 mmol/L), triglycerides (5.87 mmol/L), low-density cholesterol (LDL) (4.63 mmol/L) and rheumatoid factor (727 IU/ml with standard 0-20 IU/ml), besides shortening of prothrombin time (11.4 s, the standard 12-16 s, INR 0.85) and activated partial thromboplastin time (aPTT) (23.5 s, the standard 26-40 s) and normal morphology, including platelets $339 \times 10^3/\mu\text{l}$. Erythrocyte sedimentation rate (ESR) was 36 mm. Physical examination of the chest, ECG and chest X-ray were normal.

Transthoracic echocardiography and TEE did not reveal the presence of thrombotic material and favorable conditions of thrombosis in the cavities of the heart and the ascending aorta.

In TEE, in the aortic arch at the level of the left subclavian artery, a protruding thrombus size 13/6 mm was visualized. At the height of the isthmus the presence of a spindle-shaped, pedunculated (stalk diameter 2.5 mm) thrombus of about 25 and a diameter of 13 mm was revealed, showing mobility dependent on blood flow (Figure 1). According to the Heart Team the patient was qualified for conservative treatment with initially applied unfractionated heparin (UFH), then enoxaparin at a daily dose of 120 mg. Control TEE performed after 4 weeks showed no disappearance or reduction of the thrombi, but in view of the high operational risk the patient received conservative treatment continuation. The further course of the 68 months of observation was not complicated, and control TEE (last in July 2010) did not show the presence of thrombi.

Discussion

Mural thrombi in the thoracic aorta are relatively common in patients with generalized atherosclerosis, aortic aneurysm, aortic dissection, after chest trauma, in cancer and coagulopathies^[5]. The presence of mobile thrombi in the aortic arch has been reported in a few publications^[1-4]. The most common locations of floating thrombi are the aortic isthmus and arterial ligament^[6]; they were also described in the proximal aortic arch^[7].

In the case described above, the thrombi were located in the distal aortic arch, in the immediate vicinity of the left subclavian artery. Confounding factors may be thrombogenic atherosclerotic plaques (Figure 1), and one cannot exclude aortic wall inflammation and endothelial dysfunction^[8], which can lead to chronic use of steroids^[9], especially in women treated for rheumatoid arthritis^[10]. Factors contributing to thrombogenesis might be atherosclerotic plaques (Figure 1); also aortic wall inflammation and endothelial dysfunction cannot be excluded^[8], especially in women treated with steroids for rheumatoid

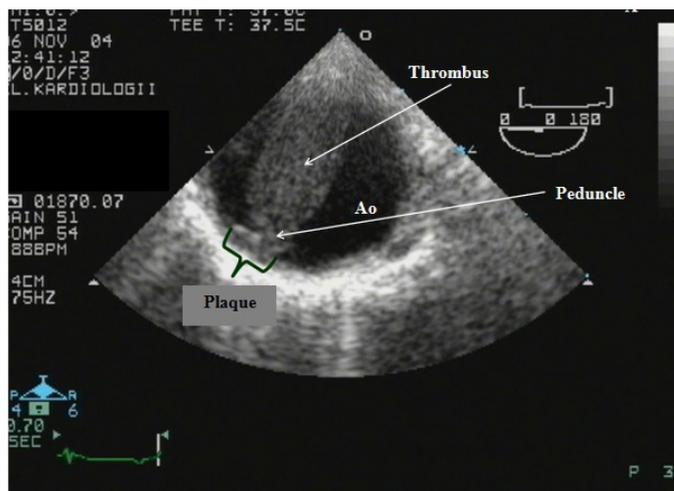


Figure 1. Transesophageal echocardiography – short axis, 0°. Presence of the floating thrombus (length – 32 mm, diameter – 12 mm) in the distal part of aortic arch with high, depending on blood flow, mobility.

arthritis^[9, 10]. Transesophageal echocardiography still seems to be the gold standard to find sources of systemic embolism^[3-4]. In our case description, both the clinical assessment and ECG and transthoracic echocardiography showed no deviation from the normal condition and the decision to perform TEE was obvious. The most likely condition leading to embolism seemed to be a persistent foramen ovale (PFO). The mobile thrombus in the distal aortic arch was quite a surprise and the only pathology found during transesophageal study.

It is the only case of a floating thrombus at this location in the material of our Echocardiography Laboratory including more than 1,000 tests performed in order to seek sources of systemic embolism. Opinions on the treatment of patients with a pedunculated, mobile thrombus in the aorta are not clear. Thrombolysis is a promising method for treatment of thrombi in the aortic arch^[1]. Complete lysis of the thrombus after 3 months of oral anticoagulation with UFH pretreatment was also described^[10, 11]. This form of treatment, however, is associated with an increased risk of systemic embolism caused by partial lysis of the thrombus^[11]. Some authors suggest surgical removal of the thrombus from the aortic arch^[4, 12], especially in patients with low operative risk. Depending on the location of the thrombus in the proximal, middle or distal aortic arch, cannulation is discussed as well as operation in normothermia or hypothermia.

Choukroun et al.^[4], who presented the material of 9 patients with a mobile thrombus in the thoracic aorta, offer UFH as first-line treatment. In the case of persistence of the thrombus in patients with a low risk, surgical treatment should be considered, which in addition to removal of the thrombus should also include the exchange of the pathologically changed part of the aorta. For several years, it has also been proposed to use an endovascular stent graft in patients with a floating thrombus in the descending aorta^[13, 14].

Regardless of the method of thrombus removal from the aortic arch, a permanent anticoagulant is indicated to prevent recurrence of clots.

In the case described above, relating to the suspected aortic pathology at the mouth of the left subclavian artery, any

surgery could be performed only in deep hypothermia and would result in a large, difficult to accept risk. In our patient, during the nearly 6-year follow-up, there were no further embolic complications.

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