Management of floating thrombus in the aortic arch

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ABSTRACT

Objective: Floating aortic thrombus is an underrecognized source of systemic emboli and carries a life-threatening risk of stroke when located in the aortic arch. Optimal treatment is not established in available guidelines. We report our experience in managing floating thrombi in the aortic arch.

Methods: Consecutive patients diagnosed with a floating aortic arch thrombus at a tertiary referral center between January 2008 and December 2014 were reviewed. Perioperative and midterm outcomes were assessed.

Results: Ten patients (8 female) with a median age of 56 years (range, 47-82 years) were identified. Eight patients presented with a symptomatic embolic event, and 2 patients were asymptomatic. One patient presenting with stroke due to embolic occlusion of all supra-aortic vessels died 2 days after admission. Three patients (2 asymptomatic and 1 unfit for surgery) were treated conservatively by anticoagulation, leading to thrombus resolution in 2 patients. In the third patient, the thrombus persisted despite anticoagulation, resulting in recurrent embolic events. The remaining 6 patients underwent open thrombectomy of the aortic arch during deep hypothermic circulatory arrest. All patients treated by surgery had an uneventful postoperative course with no recurrent thrombus or embolic event during follow-up. Median follow-up of all patients was 17 months (range, 11-89 months).

Conclusions: Floating aortic arch thrombus is a dangerous source of systemic emboli. Surgical removal of the thrombus is easy to perform and followed by good clinical results. Conservative treatment with anticoagulation may be considered in asymptomatic, inoperable or high-risk patients. (J Thorac Cardiovasc Surg 2016;152:810-7)

Floating aortic arch thrombus.

Central Message

Floating aortic arch thrombus is a dangerous source of emboli. Surgical removal of the thrombus is easy to perform and followed by good clinical results.

Perspective

Optimal treatment of floating aortic arch thrombus is not well established. Evidence concerning aortic arch thrombectomy for floating thrombi is scarce. With this study, we add a series of patients to the literature and demonstrate that aortic arch thrombectomy can be performed easily and with good clinical results in terms of prevention of further embolic events in these patients.

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Floating aortic thrombus is rare, but with the more frequent use of imaging modalities over the past decades, it has increasingly been identified as a source of systemic emboli.[1] In a study of 10,671 consecutive autopsies, the incidence of aortic mural thrombus was 0.45%.[2] The most common location reported in clinical studies[3] is the descending thoracic aorta and the aortic arch. Detailed pathophysiologic mechanisms are not yet fully understood. Some authors reported mobile thrombi on aortic arch atheroma in predominantly elderly patients with atherosclerotic disease.[4] However, floating aortic thrombus often is seen in relatively young patients without severe atherosclerosis, and many authors agree that it is a distinct clinical entity that has to be distinguished from atheromatous debris,[1,3,5] although atherosclerotic processes may contribute to its pathogenesis.[1] A high prevalence of hematologic disorders and other hypercoagulable conditions (eg, malignancy) has been reported in other series, suggesting these also may be causative factors for thrombus

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Abbreviations and Acronyms
ASA = acetylsalicylic acid
CT = computed tomography
DHCA = deep hypothermic circulatory arrest
TEE = transesophageal echocardiography

formation.[3] Treatment options include anticoagulation,[6,7] surgical thrombectomy,[8-10] and, in some cases, endovascular treatment.[11,12] However, comparative data are scarce, and available guidelines[13] lack treatment recommendations.

Thrombus localization in the aortic arch is particularly challenging, because cerebral embolization is an impending risk with substantial morbidity and mortality. Surgical treatment of aortic arch thrombus requires extracorporeal circulation and circulatory arrest. It is unclear whether the benefits of open thrombus removal outweigh the perioperative risks of aortic arch surgery. For aortic arch atheroma (with or without mobile components), current stroke guidelines do not recommend surgical treatment to prevent cerebral embolization.[14] This is based on a study by Stern and colleagues,[15] who analyzed stroke risk during cardiac surgery in patients with arch atheroma and reported an unproportionally high incidence of intraoperative stroke (34.9%) in patients who underwent arch endarterectomy in addition to another cardiac procedure.

The aim of this study was to assess detailed narrative data including risk factors, clinical presentation, treatment modality, and midterm outcome of patients with floating aortic arch thrombus. Our hypothesis was that surgical management has a favorable outcome and effectively prevents further embolic events in patients with floating aortic arch thrombus.

MATERIALS AND METHODS

Consecutive patients treated for floating aortic arch thrombus at a Swiss tertiary referral center (University Hospital Bern) between January 2008 and December 2014 were identified. Individual patient consent was obtained, and the study was performed according to the requirements of the local ethics committee.

Floating aortic arch thrombus was defined as a homogenous mass on computed tomography (CT) or transesophageal echocardiography (TEE) images, attached to the aortic wall and protruding into the lumen of the aortic arch with a mobile aspect (Figure 1). Information on size, exact localization, and quality of the attachment site of the thrombus was retrieved from contrast-enhanced CT scans (1-mm slice thickness). Data including patient demographics, cardiovascular and thrombotic risk factors, embolization site, treatment method, and postoperative complications were collected from hospital records. Patient follow-up included regular visits in our outpatient clinic and was completed by a telephone interview of all patients or their general practitioner at the end of June 2015 to assess for death, recurrent embolism, continuation of anticoagulation, and subsequently diagnosed malignant disease.

RESULTS

Patient Characteristics and Clinical Presentation

Over a period of 7 years, a total of 10 patients were identified. Eight patients were female, and the median age was 56 years (range, 47-82 years). All patients had 2 or more cardiovascular risk factors, mainly hypertension (n = 8), smoking (n = 7), or a body mass index 30 kg/m^2 or greater (n = 7). Other previously described predisposing factors for aortic thrombus formation[7] were steroids (n = 2), hormone replacement therapy (n = 1), and malignancy (n = 1, high-grade undifferentiated pleomorphic sarcoma of the pelvic bone). Two patients had a personal or a family history of venous thromboembolism. Thrombophilia testing was performed in 6 patients and revealed procoagulant abnormalities in 4 (Table 1). One patient had a patent foramen ovale. None had atrial fibrillation or any other identifiable embolic source. The diameter

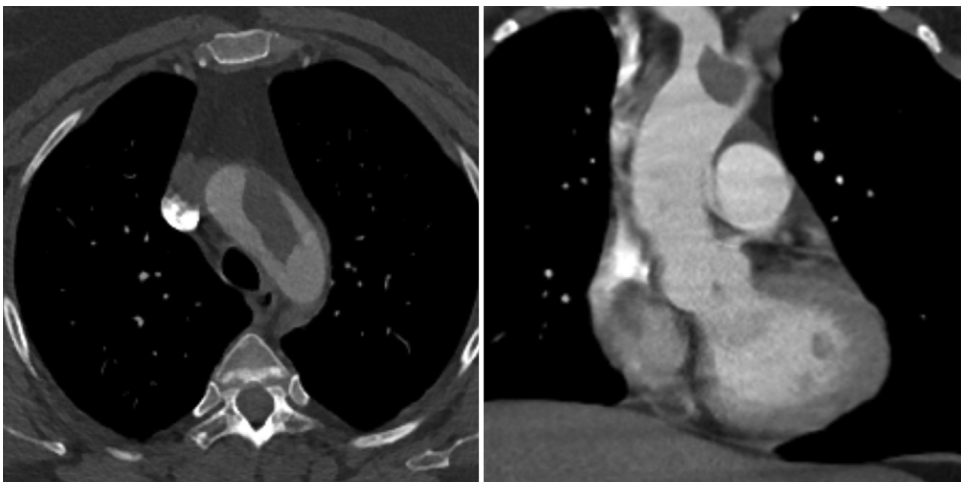

FIGURE 1. CT images of floating aortic arch thrombus (patient number 7).