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Thrombus in the Non-aneurysmal, Non-atherosclerotic Descending Thoracic Aorta – An Unusual Source of Arterial Embolism CME

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Abstract *Introduction:* Mural thrombus of the thoracic aorta is a rare clinical finding in the absence of aneurysm or atherosclerosis.
Methods: The medical records of all patients diagnosed with a thrombus of a non-aneurysmatic and non-atherosclerotic descending thoracic aorta (NAADTA) and treated by the senior author between 04/1997 and 04/2010 were reviewed.
Results: Eight patients with mural thrombus of the NAADTA were identified. Arterial embolism was the main clinical finding in all cases and involved the lower extremities ($n = 6$), mesenteric ($n = 3$) or renal arteries ($n = 2$). Hypercoagulable disorders were present in 3 cases and a concurrent malignancy in another 3. Two patients underwent open surgery while 4 patients were treated conservatively with anticoagulation. Of the remaining 2 patients, one was treated with a thoracic stent-graft and aorto-biiliac bypass and the other one with transfemoral thrombectomy. Technical success was achieved in all surgical cases and thrombus resolution or stable disease in the conservative management group. No thrombus recurrence was observed during a mean follow-up of 49 months.
Conclusion: The management of mural thrombus in NAADTA represents a challenge, especially in case of malignant disease or hypercoagulable disorder as a potential underlying pathology

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and should be individualized. Although no consensus exists in the literature, therapeutic anticoagulation is proposed as first-line therapy. The indication for surgical intervention results from contraindication to anticoagulation, mobile thrombus or recurrent embolism. Whenever possible, endovascular therapy should be preferred.

Introduction

Distal arterial embolism is a relatively common problem that carries increased morbidity and, potentially, mortality. The amputation rate following acute limb ischaemia is estimated at 13—14% while mortality is at 9—12%.[1] Over 80% of all peripheral and visceral emboli originate from disturbances of cardiac function itself such as atrial fibrillation, myocardial infarction, endocarditis and prosthetic heart valves. Non-cardiac causes include aortic pathologies such as aneurysmal lesions, dissections, penetrating ulcers or traumatic lesions.[2]

Since 1967 when Oliver et al.[3] published the first described case of thrombo-embolism from the thoracic aorta, few case reports and small series of patients with thrombus in a non-aneurysmal thoracic aorta have been published.[4—8] In most of these cases, peripheral embolism was the initial clinical manifestation. The expanding availability of advanced diagnostic modalities such as computed tomography (CT), trans-esophageal echocardiography (TEE) and magnetic resonance imaging (MRI) increasingly made possible the accurate diagnosis of this aortic pathology over the past decade.[5,9,10]

The optimal management of these patients is still controversial and depends on the location and morphology of the thrombus, the symptoms and the general condition of the patient. The presence of a floating thrombus in the thoracic aorta is associated with a high risk of peripheral embolism.[5] The primary objective of this study is to report our experience regarding the diagnosis and management of thrombus in the non-aneurysmal, non-atherosclerotic descending thoracic aorta (NAADTA).

Patients and Methods

The medical records of all patients diagnosed with thrombus in an NAADTA and treated by the senior author were reviewed retrospectively. For the descending thoracic aorta, aneurysmal dilatation was defined as an aorta at least twice the diameter of the patient's contiguous normal aortic calibre. The presence of atherosclerosis was graded based on the amount of calcification identified on the CT scan. Data collection included patient demographics, risk factors for vascular disease, symptoms leading to diagnosis, relevant co-morbidities, diagnostic and therapeutic management and outcome. Treatment complications and the follow-up outpatient-clinic evaluations were reviewed. All imaging studies were evaluated independently by vascular radiologists.

Results

In a period of 12 years, 8 patients (7 female, 1 male) were identified with thrombus in an NAADTA. The mean age of the patients was 55 years (range, 45—68). Further demographic data and clinical findings of the patients are summarised in Table 1.

Diagnostic management

The diagnostic work-up that revealed intraluminal aortic thrombus was prompted by lower extremity embolism in 6 cases and mesenteric embolism in 1 case. In an additional case, it was an incidental finding in a staging CT scan for malignant melanoma. Imaging modalities included multi-detector CT scan alone or in conjunction with magnetic resonance angiography (MRA) and TEE in all cases, while digital subtraction angiography (DSA) was performed on demand. Screening for hypercoagulable disorders was performed in all cases prior to initiation of treatment.

The thrombus was localised in zone III of the thoracic aorta in 5 patients and extended to the visceral abdominal aorta in three cases. The sites of arterial embolism involved primarily the lower extremity arteries and, less frequently, the visceral arteries (Table 1).

Characteristics of aortic lesions — underlying pathologies

None of the patients had concomitant aortic or cardiac pathologies such as aneurysm, penetrating aortic ulcer, severe atherosclerosis or calcification of the thoracic aortic wall or intracardial thrombus. One patient had an aortic wall angiosarcoma, which was associated with mural thrombus formation. The abdominal aorta, as well as the iliac arteries, was free of aneurysmal disease or other pathology, which could account for peripheral embolism. Minimal calcification of the abdominal aorta was present in 3 out of 8 patients.

The screening for hypercoagulable disorders revealed anti-phospholipid syndrome in 1 patient and heparin-induced thrombocytopenia (HIT) type II in another. Although not diagnosed primarily, one patient underwent repeated extensive work-up for thrombophilia during follow-up, which eventually revealed elevated serum levels of plasminogen activator inhibitor-1 (PAI-1), positive antinuclear antibodies (ANAs) and anti-neutrophil cytoplasmic antibodies (ANCAs), suggesting the diagnosis of sub-clinical vasculitis. Concurrent malignancies were present in three patients and included stage IV malignant melanoma, myeloproliferative malignancy and intimal sarcoma of the thoracic aorta.[11]

The thrombus was sessile in 5 cases and pedicled in 3.

Therapeutic management

Four patients were treated conservatively. Two were placed on intravenous heparin followed by oral anticoagulation with coumadin derivatives, while one patient with Rutherford class I chronic limb ischaemia due to