Reviews in Vascular Medicine 2 (2014) 48–57

Contents lists available at ScienceDirect

Reviews in Vascular Medicine

journal homepage: www.elsevier.com/locate/rvm

Review

Diffuse aneurysmal disease – A review

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ARTICLE INFO

Article history:
Received 18 September 2013
Accepted 21 November 2013

ABSTRACT

Aneurysmal disease in isolated vascular territories such as the aorto-iliac, cerebral, and peripheral systems is a well-described and frequent phenomenon. However, there is a paucity of literature addressing diffuse aneurysmal disease, a clinical entity involving simultaneous aneurysmal changes in multiple vascular territories. We present an illustrative case of a patient discovered to have aneurysmal disease in the aortic, peripheral, cerebral, and coronary vascular territories and review the available literature. We use this case to share insights into the diagnosis and management of this condition, and also to propose a rational diagnostic approach for similar patients.

Contents

Abbreviations: AAA, abdominal aortic aneurysm; CT, Computed Tomography; EVAR, endovascular aortic aneurysm repair; MMP, matrix metalloproteinase; CFD, computational fluid dynamics; SNP, specific nucleotide polymorphism; IA, intracranial aneurysms; TGF-β, transforming growth factor-beta; FIA, familial intracranial aneurysm; LDS, Loeys–Dietz syndrome; AOS, aneurysms–osteoarthritis Syndrome; CRP, C-Reactive Peptide; ESR, Erythrocyte Sedimentation Rate; PAN, polyarteritis nodosa; SAM, segmental arterial mediolysis

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http://dx.doi.org/10.1016/j.rvm.2013.11.003

Introduction

Arterial aneurysmal disease is a well described phenomenon in isolated vascular systems of the body, particularly the aorto-iliac, cerebral, and peripheral vasculature. There exists a vast body of literature addressing pathophysiology, clinical features, diagnosis, and medical or surgical management in each territory. However, there remains a paucity of literature addressing the clinical situation of when multiple vascular territories are simultaneously affected by aneurysms. There are a number of rare systemic conditions that could potentially cause such a presentation. These diverse etiologies have been described in case reports or case series, but are scattered across a breadth of medical and surgical literatures. To date, there are no manuscripts that collect these descriptions into a single, succinct publication. We reviewed the literature with the aid of specialist authors from rheumatology, vascular surgery, cardiology, and neurosurgery, making use of an illustrative case encountered at our institution to propose a rational diagnostic approach to such patients.

Illustrative case

A 58 year old man was referred to vascular surgery clinic by his primary care physician for a newly found infra-renal abdominal aortic aneurysm (AAA), measuring 4.9 cm on abdominal ultrasound. This patient had a past medical history significant for hypertension, hypercholesterolemia, non-ischemic dilated cardiomyopathy, atrial fibrillation for which he was on anticoagulation, and a stroke several years prior without residual neurologic deficits. He reported a 36 pack-year history of smoking, but denied alcohol and recreational drugs. He denied a family history of vascular aneurysms. On exam, the patient had normal stature with no features of Marfanoid body habitus. His mucosal membranes were unremarkable with no ulcerations or noticeable strawberry tongue. Cardiopulmonary examination disclosed an irregular rhythm with normal rate. Vascular examination revealed a pulsatile abdominal mass and bounding popliteal pulses. No abnormal skin lesions were present. A Computed Tomography (CT) aortogram revealed a 5.6×5.5 cm^2 fusiform aneurysm containing thrombus just superior to the aortic bifurcation, bilateral common iliac aneurysms, both 1.9 cm in diameter, a 2.2 cm left internal iliac aneurysm, and bilateral popliteal artery aneurysms, measuring 1.6 cm and 1.8 cm, respectively (Fig. 1, Panels A and B). The decision was made to undergo endovascular grafting of this AAA, and a date for surgery was scheduled.

Prior to his surgical appointment he was brought to the Emergency Room for acute-onset dysarthria and blurry vision. A CT Head revealed two foci of hyperdensity in the pons and right thalamus and old lacunar infarcts involving the cortico-medullary junction of the right and left cerebral hemispheres. A CT angiogram of the head and neck revealed marked dolichoectasia of the

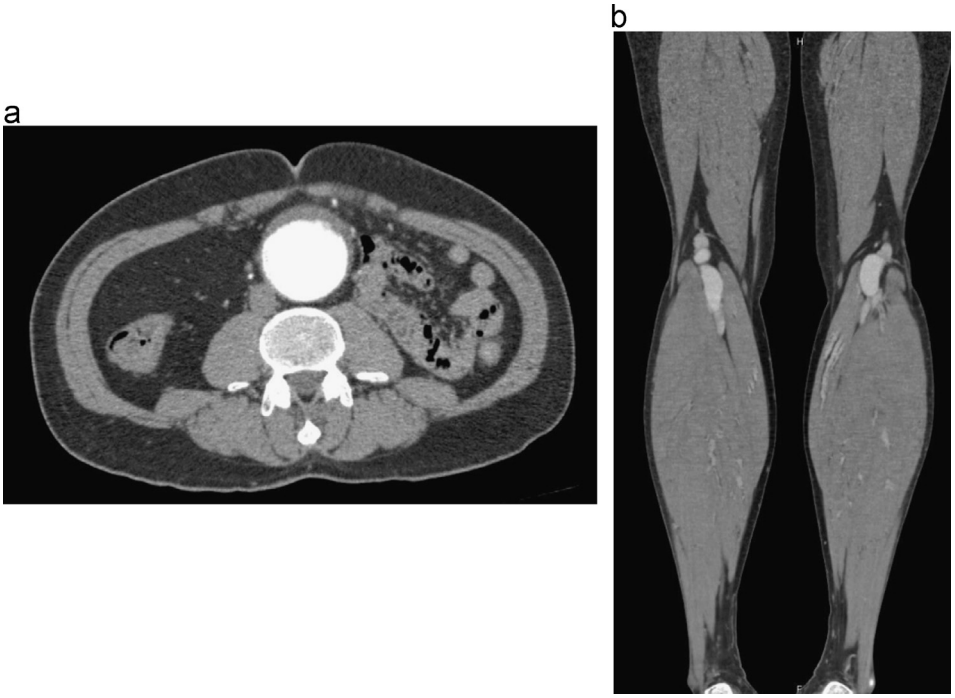

Fig. 1. Axial Computed Tomography (CT) image of abdomen showing infra-renal abdominal aortic aneurysm with mural thrombus (Panel A); coronal CT of lower extremities showing bilateral popliteal artery aneurysms (Panel B).