

## Aortic aneurysm: a case report with emphasize on microscopic and surgical anatomy

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### Abstract

We report a case of fusiform type of abdominal aortic aneurysm which was found during the routine dissection of a cadaver, done for teaching the undergraduate medical students. The aneurysm was seen unruptured and positioned below the renal arteries, just above the aortic bifurcation. This study illustrates the microscopic and surgical anatomy of the aneurysm with added literature review and clinical implications. We believe that the knowledge of this vascular pathology will be enlightening for broad specialties of medicine and medical science researchers alike. *Clin Ter 2011; 162(5):427-429*

**Key words:** anatomy, aneurysm, aorta, atherosclerosis, fusiform, microscopic, surgical

### Introduction

An aneurysm is defined as a focal dilation of the aorta. It can occur in any artery or vein, the most common and serious aneurysms occur in aorta (1). The abdominal aortic aneurysm (AAA) has been referred to as the most common

potentially life-threatening finding (2). Risk factors for AAA include male sex, increasing age, tobacco use, family history and probably hypertension. The literature cites several cases of abdominal aortic aneurysms in clinical studies (3, 4). The morbidity and/or mortality of AAA are undisputed. In this study we report a fusiform variety of abdominal aortic aneurysm encountered in a male cadaver. The surgical and microscopic anatomy of this condition is emphasized.

### Case report

During routine cadaveric dissection of the abdomens done for the teaching of undergraduate medical students, this pathological finding was encountered in a 65-year-old Indian male at the anatomy laboratory. The aneurysm was fusiform shaped (Fig. 1A) and found unruptured. It was measuring 59 mm in length, 37 mm in diameter and 31 mm in thickness. There were no surrounding pressure effects seen due to this aneurysm. The aorta showed plen-

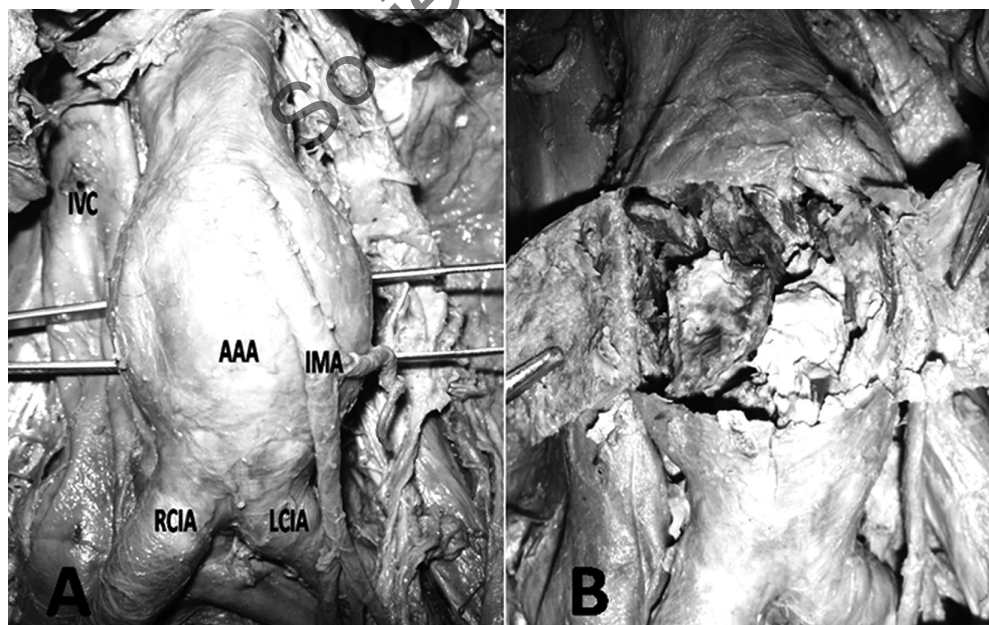


Fig. 1  
**A.** Photograph showing the fusiform shaped abdominal aortic aneurysm (AAA) located just above the aortic bifurcation.  
**B.** Aorta cut opened and showing the intraluminal multiple thrombi. (IVC – inferior venacava, IMA – inferior mesenteric artery, RCIA – right common iliac artery, LCIA – left common iliac artery).

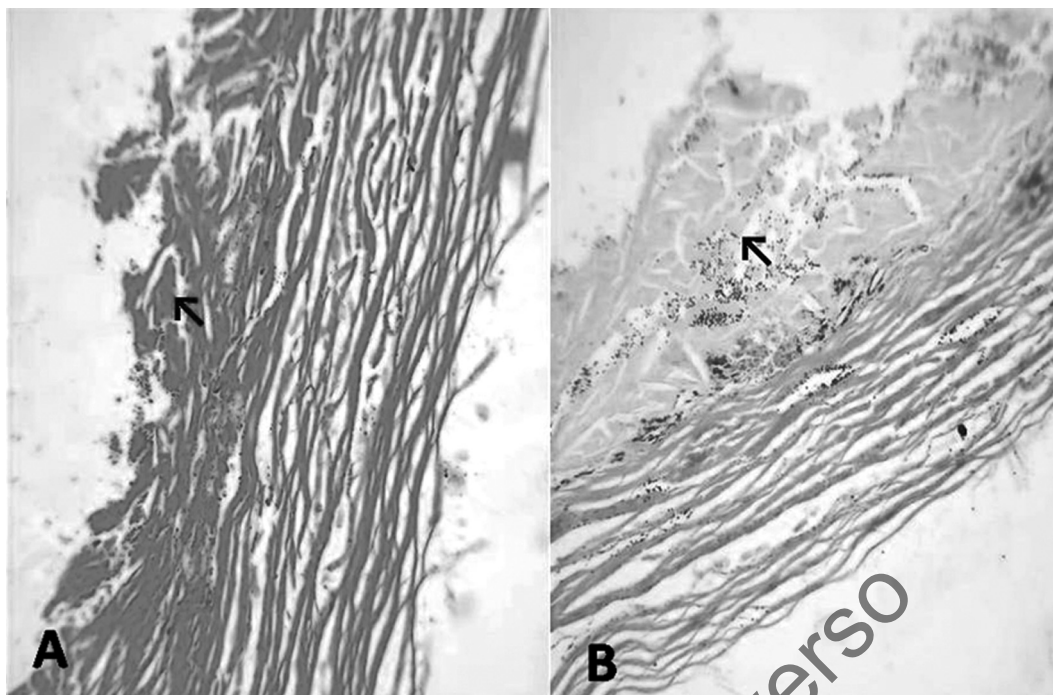


Fig. 2 The section of aorta showing thinned out arterial wall with multiple atheromatous plaques in the intima ( $\blacktriangleright$ ). The plaques showing foci of calcification. A. Stain: hematoxylin-eosin.10X; B. Stain: Verhoeff's elastin stain and Van Gieson's.10X.

ty of intraluminal thrombi after opening the arterial wall (Fig. 1B). The section was stained with hematoxylin-eosin (Fig. 2A), Verhoeff's elastin and Van Gieson's methods (Fig. 2B), showed thinned out arterial wall with multiple atheromatous plaques in the intima. The plaques showed foci of calcification. The other arteries of the body like femoral, popliteal, etc were examined and there were no aneurysms detected. The cause of death of the person was not found and was assumed that the atherosclerosis may be the reason for this aneurysm, since the person was aged around 65 year and was a male.

## Discussion

The pathogenesis of AAA has been frequently associated with atherosclerosis (5). However, Ernst (6) feels that this view is restricted, as atherosclerosis may only represent a secondary response to pre-existing vessel wall injury. Others have attributed AAA to arteriosclerosis (3). Arteriosclerosis is a group of diseases characterized by thickening and loss of elasticity of the arterial walls. Atherosclerosis is a form of arteriosclerosis in which atheromas containing cholesterol, lipid material and lipophages are formed within the intima and inner media of a large and medium sized artery. Hypertension is considered to be a predisposing factor to AAA (1). Infection (syphilitic and mycotic), inflammation, trauma, auto-immune disease, cystic medial necrosis, Marfan's syndrome, genetic predisposition and hemodynamic mechanical factors have also been implicated in the pathogenesis of AAA (5, 6). It was reported that the percentage of anatomical variants of

aorta in India are less, compared to other nations (7). But it is surprising to note that the pathological lesions of the aorta, like aneurysms are very common in India. This may be because of risk factors like smoking, sedentary life style, obesity and atherosclerosis playing the role.

AAA's are most often found between the renal arteries and the iliac bifurcation (2, 5). The most common location of AAA's is at the bifurcation of the aorta into the common iliac arteries (5). Occasionally, the ascending arch and descending thoracic aorta are affected (1). AAA commonly occurs in adults 60 years of age or older and has been reported to be four times more frequent in males (2). Some authors suggest that AAA may occur in individuals as early as 50 years of age (8).

In the present study, the aneurysm was found between renal arteries and the aortic bifurcation. It was found just above the bifurcation of the aorta and is similar to previous descriptions with respect to age, sex and location. The aorta showed plenty of intraluminal thrombi after opening the arterial wall. The section stained with hematoxylin-eosin and Verhoeff's elastin, Van Gieson's methods, showed thinned out arterial wall with multiple atheromatous plaques in the intima. The plaques showed foci of calcification.

Many AAAs will present only as low back pain of insidious onset prior to rupture. Observation may reveal a pulsating abdominal mass (5). Clinical signs of potential rupture include pain, a pulsatile mass in the abdomen and hypotension. This presentation may be considered as a surgical emergency. Adjacent structures may be affected by aneurysms resulting in their respective symptomatology including: compression of ureters, erosion of the anterior vertebral bodies, occlusion of blood supply to the spinal

cord, rupture into the peritoneal cavity, and emboli (1). In the present case no such pressure effects were found.

According to Imperato (9), aneurysms measuring greater than 5 cm have a tendency to continue growing and to rupture. At 6 cm there is a 25% chance of death due to rupture in one year and more than 50% chance of rupture in 5 years. At measures greater than 6 cm the chance of death due to rupture is 50% within the first year. The risk of rupture within 2 years is 75%, and within 5 years is 90% (9). In the present case the aneurysm was measuring 59 mm in length, 37 mm in diameter and 31 mm in thickness and was found unruptured. Clinically, the most common catastrophe resulting from AAA is acute aortic dissection. Aortic dissection occurs 50% more often than rupture of aortic aneurysms (10). While surgical intervention has been reported to be an effective treatment, as many as 62% of patients with ruptured aneurysms die prior to reaching a hospital (6). Abdominal aneurysms are usually repaired surgically via prosthetic grafts (2). It is advised that the healthy lifestyle, as well as a low-fat diet, a regular exercise and an abstinence from smoking can help prevent or slow down the course of atherosclerosis, a predisposing factor in the development of aneurysms. Hypertension should be carefully controlled to prevent aneurysm formation or extension. We believe that this report emphasizes the microscopic and surgical anatomy of the AAA in detail with added review of literature and clinical implications. The report will be enlightening for the various fields of medicine and medical science researchers in day to day practice.

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