

The Review Article Explains The AAA (Abdominal Aortic Aneurysm)

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Abstract- *The first historical records about AAA are from Ancient Rome in the 2nd century AD, when Greek surgeon Antyllus tried to treat the AAA with proximal and distal ligation, central incision and removal of thrombotic material from the aneurysm. However, attempts to treat the AAA surgically were unsuccessful until 1923. In that year, Rudolph Matas (who also proposed the concept of endoaneurysmorrhaphy), performed the first successful aortic ligation on a human.[1] Abdominal aortic aneurysm (AAA)[2] is a localized enlargement of the abdominal aorta such that the diameter is greater than 3 cm or more than 50% larger than normal diameter.[2] They usually cause no symptoms except when ruptured.[3] Occasionally, abdominal, back, or leg pain may occur.[4] Large aneurysms can sometimes be felt by pushing on the abdomen.[3] Rupture may result in pain in the abdomen or back, low blood pressure, or loss of consciousness, and often results in death.[3][5] AAAs occur most commonly in those over 50 years old, in men, and among those with a family history.[3] Additional risk factors include smoking, high blood pressure, and other heart or blood vessel diseases.[6] Genetic conditions with an increased risk include Marfan syndrome and Ehlers-Danlos syndrome. AAAs are the most common form of aortic aneurysm.[7] About 85% occur below the kidneys with the rest either at the level of or above the kidneys.[3] In the United States, screening with ultrasound is recommended for males between 65 and 75 years of age with a history of smoking.[8]*

Keywords- AAA(abdominal aortic aneurysm)

I. INTRODUCTION

The aorta is the largest blood vessel in the human body. It carries blood from your heart down to your abdomen, legs, and pelvis. The walls of the aorta can swell or bulge out like a small balloon if they become weak. This is called an abdominal aortic aneurysm (AAA) when it happens in the part of the aorta that's in your abdomen. AAAs don't always cause problems, but a ruptured aneurysm can be life-threatening. Therefore, if you're diagnosed with an aneurysm, your doctor will probably want to monitor you closely, even if they don't intervene right away. AAAs are usually classified by their size and the speed at which they're growing. These two factors can help predict the health effects of the aneurysm. Small (less than 6 centimeters) or slow-growing AAAs generally have a much

lower risk of rupture than larger aneurysms or those that grow faster. Doctors often consider it safer to monitor these with regular abdominal ultrasounds than it is to treat them. Large (greater than 7 centimeters) or fast-growing AAAs are much more likely to rupture than small or slow-growing aneurysms. A rupture can lead to internal bleeding and other serious complications.

Causes:

1. Tobacco smoking: More than 90% of people who develop an AAA have smoked at some point in their lives.[35]
2. Alcohol and hypertension: The inflammation caused by prolonged use of alcohol and hypertensive effects from abdominal edema which leads to hemorrhoids, esophageal varices, and other conditions, is also considered a long-term cause of AAA.
3. Genetic influences: The influence of genetic factors is high. AAA is four to six times more common in male siblings of known patients, with a risk of 20-30%.[35]

Types Of AAA:

Aortic aneurysms are classified by their location on the aorta.

- An aortic root aneurysm, or aneurysm of the sinus of Valsalva.
- Thoracic aortic aneurysms are found within the chest; these are further classified as ascending, aortic arch, or descending aneurysms.
- Abdominal aortic aneurysms, "AAA" or "Triple A," the most common form of aortic aneurysm, involve that segment of the aorta within the abdominal cavity. Thoracoabdominal aortic aneurysms involve both the thoracic and abdominal aorta.(35)

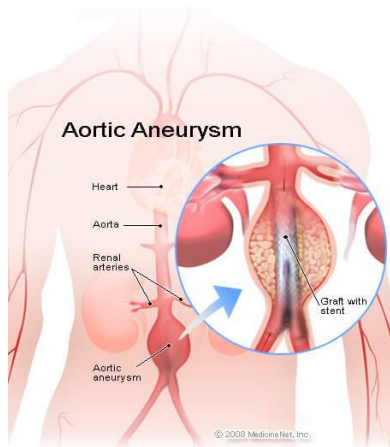
Other Predisposing Factors:

AAAs are more common in patients with atherosclerosis, with a prevalence of approximately 5% in patients with coronary artery disease, and approximately 10% in those with arteriosclerosis obliterans(11,12). Hypertension has also been found to be associated with AAA (10). A positive family history is another potential factor that

significantly increases the risk of AAA (13). A family history of surgical intervention for an AAA in a first-degree relative may increase the risk fourfold (14). AAA has been found to be less common in patients with diabetes (9).

Pathophysiology Of AAA:

The most striking histopathological changes of aneurysmatic aorta are seen in tunica media and intima. These include accumulation of lipids in foam cells, extracellular free cholesterol crystals, calcifications, thrombosis, and ulcerations and ruptures of the layers. There is an adventitial inflammatory infiltrate. [25] However, the degradation of tunica media by means of proteolytic process seems to be the basic pathophysiologic mechanism of the AAA development. Some researchers report increased expression and activity of matrix metalloproteinases in individuals with AAA. This leads to elimination of elastin from the media, rendering the aortic wall more susceptible to the influence of the blood pressure.[24] Others reports have suggested the serine protease granzyme B may contribute to aortic aneurysm rupture through the cleavage of decorin leading to disrupted collagen organization and tensile strength of the adventitia.[26][27] There is also a reduced amount of vasa vasorum in the abdominal aorta (compared to the thoracic aorta); consequently, the tunica media must rely mostly on diffusion for nutrition which makes it more susceptible to damage.[28]



Hemodynamics affect the development of AAA. It has a predilection for the infrarenal aorta. The histological structure and mechanical characteristics of infrarenal aorta differ from those of the thoracic aorta. The diameter decreases from the root to the bifurcation, and the wall of the abdominal aorta also contains a lesser proportion of elastin. The mechanical tension in abdominal aortic wall is therefore higher than in the thoracic aortic wall. The elasticity and distensibility also decline with age, which can result in gradual

dilatation of the segment. Higher intraluminal pressure in patients with arterial hypertension markedly contributes to the progression of the pathological process.[25] Suitable hemodynamics conditions may be linked to specific intraluminal thrombus (ILT) patterns along the aortic lumen, which in turn may affect AAA's development.[23]

II. SCREENING

The decision to screen for AAA is difficult to make because it would expose many previously undiagnosed small aneurysms that are unlikely to rupture, resulting in needless disease labelling(19). This results in unnecessary psychological distress to patients, which manifests as lower quality of life scores (20), and transiently mildly higher anxiety scores and lower self-rated perception of health (21). Only aneurysms of a certain size are considered for surgery, with smaller aneurysms subject to watchful waiting. Various studies analyzing the effectiveness of population-based screening for AAAs with abdominal USG in people older than 65 years of age (16) concluded that screening for AAA significantly reduces the risk of AAA-related mortality by approximately 50% in men. Another study (22) indicated a significant reduction in AAA-related mortality in men 65 to 74 years of age but not in men 75 to 83 years of age. However, no significant benefit to AAA-related mortality or all-cause mortality was achieved in a study that involved population-based screening in women (16). A model study (17) that involved only men between 65 to 74 years of age with a history of smoking reported an 89% anticipated reduction in AAA-related mortality.

Various guidelines have been issued regarding screening for AAA. The United States Preventive Services Task Force (USPSTF) makes the following recommendations (18):

- Men between 65 to 75 years of age who have ever smoked should be screened once for AAAs by abdominal USG. The USPSTF found little benefit to repeat screening in men who have a negative USG and who are older than 75 years of age.
- The USPSTF does not make any recommendation for men 65 to 75 years of age who have never smoked.
- The USPSTF recommends against screening women for AAA.

III. CASE STUDIES

- (1) The American College of Cardiology/American Heart Association (ACC/AHA) guidelines issued in 2005 (15) regarding screening of patients for AAA recommended that men 60 years of age or older who are either siblings

or offspring of patients with AAAs should undergo a physical examination and USG screening for the detection of AAA. As well, the guideline recommended that men 65 to 75 years of age who have ever smoked should undergo a physical examination and one-time ultrasound screening for detection of AAAs.

- (2) The Canadian Society for Vascular Surgery recommended screening for men 65 to 75 years of age who are potential candidates for surgery, and not to screen women older than 65 years of age on a population basis, but to individualize screening for women with multiple risk factors (smoking, cerebrovascular disease and family history) (23).

IV. PREVENTION AND RISK REDUCTION

Smoking cessation:

The initial, and by far the most significant, lifestyle change for patients at risk for AAA is to stop smoking. (33)The American Lung Association (ALA) estimated in 2009 that nearly 47 million adults in the United States smoke.(34)At every visit, encourage patients to consider smoking cessation as a significant investment in their overall health. Although many clinicians consider discussing smoking cessation both futile and time-consuming, 40% of smokers have tried to quit in the past and 70% persist in their desire to quit.(35)Talking to a patient about smoking cessation can be done in as little as 3 to 5 minutes and can have an overwhelming effect on patient's health and risk reduction.The ALA endorses combining pharmacotherapy and counseling for optimal success because smokers may make many attempts to quit before being successful.(35)

V. PROGRAMS

Abdominal aortic aneurysm (AAA) screening summary



- The aorta is the main blood vessel that supplies blood to the body. Sometimes the wall of the aorta in the abdomen can become weak and stretch to form an aneurysm. When this happens there is a risk that the aorta may split or tear (rupture).

- We will invite 65 year old men who live in Wales and who are registered with a GP practice.
- The aim of the screening programme is to reduce the number of ruptured AAA and deaths.
- AAA screening involves a simple ultrasound scan to measure the abdominal aorta.
- The scan is usually painless but may be slightly uncomfortable due to pressure on the abdomen.
- It is a free NHS screening test.
- A person who is not in the screening age group and are concerned that they may have an AAA or are worried about a family history of AAA; they should speak to their GP.
- Like all medical tests, AAA screening is not 100% accurate.

VI. RESEARCH WORK

- Study suggests calorie-restricted diet can protect mice from abdominal aortic aneurysms
- Endovascular aneurysm repair procedure can extend lives even in high-risk patients: Study
- Lombard Medical exhibits Aorfix system at Critical Issues in Aortic Endografting symposium

VII. EPIDIMIOLOGY

Epidemiology — Previous ultrasound screening studies show that among males aged between 65 and 80 years, the prevalence of abdominal aortic aneurysm (AAA) is 4 to 8 percent [30]. AAA prevalence in 65- to 80-year-old women is four to six times lower compared with their male counterparts, at approximately 1.3 percent [31]. However, AAAs found on screening are generally small; those measuring ≥ 5.5 cm or greater are found in only 0.4 to 0.6 percent of those screened [32]

VIII. CONCLUSION

AAA is a complex,(AAA is a late-age-at-onset and deadly disease,) multifactorial disease with a strong genetic component About 10–20% of AAA patients have at least one relative with this condition and formal segregation analyses have favored genetic models in explaining this familial aggregation and Patients must be encouraged to know their personal and family health risk factors and to visit their primary care provider for regular examinations, including BP and cholesterol screenings. Patients at risk for AAAs should be encouraged to make lifestyle changes to deal with modifiable risk factors, particularly smoking. Through lifestyle changes and medications, patients at risk for AAAs

can significantly reduce their risk.

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