

Abdominal Aortic Aneurysm and Atherosclerosis- A Double-Edged Sword

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1. Abstract

1.1. Back ground

An abdominal aortic aneurysm (AAA) is a weakened and bulging section of the aorta. While most AAAs are asymptomatic until they rupture, which is a life-threatening emergency causing severe pain and internal bleeding, they are often detected through imaging tests like ultrasound. The risk factors for AAA include smoking, high blood pressure, male sex, older age, family history which are also same for causing atherosclerosis. Treatment options range from monitoring for small AAAs to surgical or endovascular repair for larger or symptomatic ones.

1.2. Case Report

A sixty-five-year-old male, nonsmoker, non-alcoholic, a known case of inferior wall myocardial infarction three years back and underwent successful angioplasty for the same. He presented with vague pain abdomen, intermittent diarrhea and some pulsatile mass in abdomen for last one year. The pain abdomen had no association with meals, there were no aggravating or relieving factors. There was no history of nausea, vomiting, hematemesis or melena. All his baseline biochemical labs were normal except for mild anemia. The electrocardiogram showed previous changes of inferior wall myocardial infarction and chest x-ray showed mild cardiomegaly. The ultrasonogram abdomen showed abdominal aortic aneurysm which was confirmed on aortogram which confirmed abdominal aortic aneurysm of 3 x 3 cm at level of common iliac arteries with diffuse atherosclerotic changes in changes in abdominal aorta, common iliac, external and internal iliac arteries. The patient and family members were counselled for surgical options which was advised by cardiothoracic vascular surgeon but still they have not made up their mind, in view of high risk associated with surgery.

1.3. Conclusion

Abdominal atherosclerosis and aneurysm can exist together without causing any significant symptoms and can be incidental detec-

tion. Hence, index of suspicion should be very high in patients above 65 yrs of age and risk factors for timely detection and treatment for decreasing morbidity and mortality associated with these life-threatening diseases.

2. Introduction

An abdominal aortic aneurysm is an abnormal dilatation of the abdominal aorta and is formed when the aorta's wall weakens and can no longer withstand the pressure of blood flow, causing it to expand and grow over time. An aneurysm is typically diagnosed when the aorta's diameter is at least 50% larger than its normal size (around 3 cm). The risk factors include smoking which is major contributor causing the weakening of the aortic wall. Other factors include hypertension (which increases stress on the aorta's walls), males above sixty-year-old, dyslipidaemia, cardiovascular disease and family history of AAA indicates a genetic predisposition to the condition. Most AAAs are silent: and may be found during medical imaging for other reasons. Patients may feel pulsing sensation in the abdomen or mild abdominal or back pain. The most drastic and life-threatening emergency is rupture which present with sudden, excruciating pain in the back or abdomen, clammy skin, dizziness, nausea, and low blood pressure. The ultrasound abdomen is a common and effective way to detect an AAA. Other imaging tests like CT scans, MRIs or Aortogram can also be used to diagnose and assess the size of the aneurysm. The treatment includes monitoring small, asymptomatic AAAs with regular imaging. Medications include antihypertensive or lipid lowering drugs, if these are identified as risk factors present in any patient. Larger or expanding AAAs, or those causing symptoms, are often repaired through surgery or a less invasive procedure to insert a stent. An abdominal aortic aneurysm (AAA) with atherosclerosis is a condition where the aorta in the abdomen weakens and bulges due to atherosclerosis, which is the buildup of fatty plaque on artery walls. Atherosclerosis is a common cause and a significant risk factor for developing an AAA. While they share risk factors like smoking and

a family history, they can also be distinct diseases with different risk profiles, such as the stronger association of diabetes with atherosclerosis and the stronger association of smoking with AAA. The plaque buildup from atherosclerosis damages and weakens the walls of the aorta, making them more susceptible to bulging and forming an aneurysm. Both conditions share risk factors, including advanced age, male gender, smoking, and hypertension. They can also share common biomarkers, such as elevated levels of certain proteins like fibrinogen and C-reactive protein (CRP). While atherosclerosis is strongly associated with diabetes, high cholesterol, and obesity, AAA has stronger links to smoking, certain ethnicities, and specific genetic factors. Recent research suggests that while intertwined, AAA and atherosclerosis have distinct biological mechanisms that contribute to their development, rather than simply being one caused by the other

3. Case Report

A sixty-five-year-old male, nonsmoker, non-alcoholic, a known case of inferior wall myocardial infarction three years back and underwent successful angioplasty for the same. He presented with vague pain abdomen, intermittent diarrhea and some pulsatile mass in abdomen for last one year. The pain abdomen had no association with meals, there were no aggravating or relieving factors. There was no history of nausea, vomiting, hematemesis or melena. All his baseline biochemical labs were essentially normal except for mild anemia. On physical examination, the patient was conscious, co-operative and afebrile. The systemic examination including chest, cardiovascular, central nervous system and ophthalmological was normal. The per abdominal examination revealed soft abdomen with pulsatile lump in periumbilical area and right lumbar area of around 3 x 3 cm was appreciated. The complete hemogram revealed hemoglobin of 9.8 g/dL with microcytic hypochromic picture, white blood cell counts 5600/L with raised erythrocyte sedimentation rate (ESR) of 26. The renal function test, blood sugar, serum amylase & electrolytes, urine complete, thyroid & complete lipid profile, viral screen including hepatitis B, C, HIV were essentially normal. The electrocardiogram showed previous changes of inferior wall myocardial infarction and chest x-ray showed mild cardiomegaly. The ultrasonogram abdomen showed abdominal aortic aneurysm which was confirmed on aortogram which confirmed abdominal aortic aneurysm of 3 x 3 cm at level of common iliac arteries with diffuse atherosclerotic changes in changes in abdominal aorta, common iliac, external and internal iliac arteries. The patient and family members were counselled for surgical options which was advised by cardiothoracic vascular surgeon but still they have not made up their mind, in view of high risk associated with surgery.



Figure 1: Abdominal Aortogram Showing Aneurysm (yellow arrow) with Diffuse Atherosclerosis (green arrow) in abdominal aorta, common Iliac, internal and external iliac arteries.

4. Discussion

Abdominal aortic aneurysm (AAA) is a critical public health concern with a prevalence ranging from 12.5 in males to 5.2% in females [1]. Aneurysm rupture is associated with high morbidity and mortality rates, while can be prevented by early diagnosis and appropriate intervention [2]. An aneurysm, a localized permanent and irreversible dilatation of the artery, is most common in males >65 years of age and is associated with a number of factors, including smoking, genetic factors, positive family history, a lack of regular exercise and malnutrition [3]. If left untreated, the risk of mortality from continued dilation and thinning of the vessel wall is 80 to 90% [4]. The optimal screening method for AAA is ultrasonography, which is inexpensive, accurate, safe, rapid, non-invasive and cost-effective [1]. It is recommended that males >66 years of age be informed about the AAA screening program [5]. The Society for Vascular Surgery clinical practice guidelines recommend ultrasound screening for AAA in all males >65 years of age [6]. The American College of Preventive Medicine recommends 1-time screening in males 65 to 75 years of age who have ever been smokers; it does not recommend routine screening in females [7]. The American College of Cardiology and the American Heart

Association jointly recommend 1-time screening for AAA with a physical examination and an ultrasonography in males aged 65 to 75 years who have ever been smokers or in males ≥ 60 years who are the sibling or offspring of an individual who has suffered an AAA [8]. The rate of aneurysm enlargement is also considered when deciding on timing of intervention, with a rate of expansion of >1 cm/year considered higher risk [9]. Appropriate screening programs for AAA reduce the mortality rates and are cost-effective [10]. In our case age and previous history of myocardial infarction were risk factors and vague pain abdomen evaluation lead to diagnosis of AAA. The patient also had diffuse atherosclerosis in abdominal aorta, bilateral common iliac arteries and internal and external iliac arteries but had no symptoms of chronic mesenteric ischemia (CMI). CMI is a rare cause of abdominal pain, caused by atherosclerotic stenosis of at least two mesenteric vessels. The diagnosis is often delayed; thus, patients usually present at the time of advanced disease, subjecting them to malnutrition and bowel infarction. The symptoms like post prandial abdominal pain and unexplained weight loss which are classical of CMI [11,12] were not present in our case. CMI is more prevalent in women in the fifth to seventh decade of life and in patients predisposed to atherosclerotic diseases. Major risk factors include a history of smoking, hypertension, coronary artery disease, cerebrovascular disease and diabetes mellitus [13].

5. Conclusion

Abdominal atherosclerosis and aneurysm can exist together without causing any significant symptoms and can be incidental detection. Hence, index of suspicion should be very high in patients above 65 yrs of age and risk factors for timely detection and treatment for decreasing morbidity and mortality associated with these life-threatening diseases.

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