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RESEARCH ARTICLE

ABDOMINAL AORTIC ANEURYSM INCIDENT

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ABSTRACT

Abdominal aortic aneurysm is a common condition that may be lethal when it is unrecognized. Most aortic aneurysms are detected incidentally when imaging is done for other purposes or through screening programs. Ninety percent of these aneurysms are below the threshold for intervention at the time of detection. It has a predilection for the infra renal aorta. The histological structure and mechanical characteristics of infra renal 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.

INTRODUCTION

Abdominal aortic aneurysm, pronounced is a localized dilation (ballooning or enlargement) of the abdominal exceeding the normal diameter by more than 50 percent, and is the most common form of aortic aneurysm. Approximately 90 percent of abdominal aortic aneurysms occur infra renally (below the kidneys), but they can also occur para renally (at the level of the kidneys) or supra renally (above the kidneys). Such aneurysms can extend to include one or both of the iliac arteries in the pelvis (1).

Abdominal aortic aneurysms occur most commonly in individuals between 65 and 75 years old and are more common among men and smokers. They tend to cause no symptoms, although occasionally they cause pain in the abdomen and back (due to pressure on surrounding tissues) or in the legs (due to disturbed blood flow). The major complication of abdominal aortic aneurysms is rupture, which is life-threatening, as large amounts of blood spill into the abdominal cavity, and can lead to death within minutes (2). Mortality of rupture repair in the hospital is 60% to 90%.

Treatment is usually recommended when an AAA grows to >5.5 cm in diameter. While in the past the only option for the treatment of AAA was open surgery, today most are treated with Endovascular Aneurysm Repair (EVAR) (3). EVAR has been widely adopted, as EVAR has a lower risk of death associated with surgery (0.5% for EVAR vs. 3% for open surgery) (4).Open surgery is sometimes still preferred to EVAR, as EVAR requires long-term surveillance with CT Scans (5).

CAUSES

The exact cause of the condition is unknown. Factors that can increase your risk of developing the problem include:

- Smoking
- High blood pressure
- Male gender
- Genetic factors

An abdominal aortic aneurysm is most often seen in males over age 60 that has one or more risk factors. The larger the aneurysm, the more likely it is to break open. This can be life-threatening.

SYMPTOM

Aneurysms can develop slowly over many years, often with no symptoms. Symptoms may come on quickly if the aneurysm expands rapidly, tears open or leaks blood within the wall of the vessel (aortic dissection). Symptoms of rupture include:

- Pain in the abdomen or back. The pain may be severe, sudden, persistent, or constant. It may spread to the groin, buttocks, or legs.
- Passing out
- Clammy skin
- Dizziness
- Nausea and vomiting
- Rapid heart rate
- Shock

PATHOPHYSIOLOGY

The most striking histo-pathological changes of aneurysmatic aorta are seen in tunica media and intima. These include accumulation of lipids in foam cells, extracellular free cholesterol crystals, calcifications, thrombo sis, and ulcerations and ruptures of the layers. There is an adventitial inflammatory infiltrate (6). 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 metallo proteinases 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 (7). Others reports have suggested the serine protease enzyme B may contribute to aortic aneurysm rupture through the cleavage of decorin leading to disrupted collagen organization and tensile strength of the adventitia(8)(9).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(10).

Hemodynamic affect the development of AAA. It has a predilection for the infra renal aorta. The histological structure and mechanical characteristics of infra renal 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 tensibility 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 (10). Suitable hemodynamics conditions may be linked to specific intraluminal thrombus (ILT) patterns along the aortic lumen, which in turn may affect AAA's development (11).

TREATMENT

Here are the general guidelines for treating abdominal aortic aneurysms.

Small aneurysm

If you have a small abdominal aortic aneurysm about 1.6 inches, or 4 centimeters (cm), in diameter or smaller and you have no symptoms, your doctor may suggest a watch-and-wait (observation) approach, rather than surgery. In general, surgery isn't needed for small aneurysms because the risk of surgery likely outweighs the risk of rupture.

If you choose this approach, your doctor will monitor your aneurysm with periodic ultrasounds, usually every six to 12 months and encourage you to report immediately if you start having abdominal tenderness or back pain potential signs of a dissection.

Medium aneurysm

A medium aneurysm measures between 1.6 and 2.1 inches (4 and 5.3 cm). It's less clear how the risks of surgery versus waiting stack up in the case of a medium-size abdominal aortic aneurysm. You'll need to discuss the benefits and risks of waiting versus surgery and make a decision with your doctor. If you choose watchful waiting, you'll need to have an ultrasound every six to 12 months to monitor your aneurysm.

Large, fast-growing or leaking aneurysm

If you have an aneurysm that is large (larger than 2.2 inches, or 5.6 cm) or growing rapidly (grows more than 0.5 cm in six months), you'll probably need surgery. In addition, a leaking, tender or painful aneurysm requires treatment. There are two types of surgery for abdominal aortic aneurysms.

Open-abdominal surgery to repair an abdominal aortic aneurysm involves removing the damaged section of the aorta and replacing it with a synthetic tube (graft), which is sewn into place, through an open-abdominal approach. With this type of surgery, it will likely take you a month or more to fully recover.

Endovascular surgery is a less invasive procedure sometimes used to repair an aneurysm. Doctors attach a synthetic graft to the end of a thin tube (catheter) that's inserted through an artery in your leg and threaded up into your aorta. The graft — a woven tube covered by a metal mesh support — is placed at the site of the aneurysm and fastened in place with small hooks or pins. The graft reinforces the weakened section of the aorta to prevent rupture of the aneurysm. Recovery time for people who have endovascular surgery is shorter than for people who have open-abdominal surgery. However, follow-up appointments are more frequent because endovascular grafts can leak. Follow-up ultrasounds are generally done every six months for the first year, and then once a year after that. Long-term survival rates

are similar for both endovascular surgery and open surgery. The options for treatment of your aneurysm will depend on a variety of factors, including location of the aneurysm, your age, kidney function and other conditions that may increase your risk of surgery or endovascular repair.

CONCLUSION

AAAs appears to be local manifestations of a systemic tendency toward vessel dilatation. The pathophysiology remains unclear yet is likely due to a genetic predisposition combined with environmental factors contributing to the formation of aneurysms in anatomically vulnerable vessels. The association with vascular and biochemical changes distant from the aorta supports the argument that AAAs are a systemic disease of the vasculature. AAAs is a prevalent presentation of this weakness as a result of aging, predisposed abdominal aortic deficits, and biomechanical forces . The implications of this are relevant to research into aneurysmal disease, aneurysm screening, postoperative aneurysm surveillance, systemic biomarkers, and future pharmacotherapy.

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