

Never Presume Healthy by Physique

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Abstract: *In the field of Forensic Medicine, experts deal with not only homicidal, suicidal and accidental deaths, but also wide range of natural and sudden deaths. These deaths would be clinically unexplained, sudden or obscure without having any prior history of illness or criminal intent. Suspicion usually arises when a healthy looking individual is found dead. Investigation of sudden and unnatural deaths becomes a challenge for forensic expert to find out the cause and manner of death. In many of sudden deaths, cause of death is related to cardiac system. In cardiac related deaths, cardiac tamponade is rare but untimely life threatening cause of death where there is no clinical presentation of symptoms and is frequently diagnosed during postmortem examination. In this article, we would like to report the death of healthy individual who died due to cardiac tamponade following rupture of aortic aneurysm.*

Keywords: Thoracic aortic aneurysm, pericardial haematoma, cardiac tamponade, sudden death, postmortem examination

1. Introduction

Aneurysm is abnormal permanent dilatation of a blood vessel occurring due to congenital or acquired weakening or destruction of the vessel wall. Aortic aneurysms are well known and one of the cause for sudden death, when complicated by dissection and rupture. Most of the patients are often asymptomatic or have diverse non-specific symptoms. In sudden deaths, cardiac cause accounts for about 45% of deaths. Since, they are unexplained, medico-legal autopsy is often requested. Most common cause of deaths in case of thoracic aortic aneurysms is aortic wall dissection and rupture which leads to cardiac tamponade.

Increase in pressure due to intra pericardial fluid which exceeds a trial venous pressure thereby causes obstruction of venous return to heart. Cardiac tamponade is caused by rapid evolving (200 to 300ml) than slow evolving haematoma (500 to 2000ml).¹

Case Report

A 43 years old man suddenly collapsed while having dinner during one of his friend's house. He was taken to nearby hospital and was declared brought dead. He had no prior history of any co morbid conditions like hypertension or diabetes.

Autopsy Findings:

External examination revealed post-mortem lividity was present over back of the body. Rigor mortis is fixed and present all over the body. No ante mortem injuries were present on the body. On opening of chest cavity, about 200gms of clotted blood and 200ml of blood are present in the pericardial cavity. Heart is weight about 480g with left ventricular thickness being 2.3cms and right measured about 1.2cms. Aortic aneurysm of size 8cm x 6cm present at the base of aorta. Minute rupture of aneurysm with distribution of blood in surrounding layer of aorta up to the dia of 4cms is present.



Histopathology:

Histo-pathological findings of heart show aorta valve circumference measuring 8.6cms, grey-black and thickened. Aorta dilated with grey-black to grey-yellow areas.



Cause of Death

Based on circumstantial evidence, inquest report, post-mortem findings, forensic science laboratory report and histopathological findings, the cause of death is due to *cardiac tamponade secondary to rupture of aortic aneurysm*.

2. Discussion

Cardiac tamponade is the build-up of fluid in the pericardial cavity resulting in compression of heart. Onset may be rapid or gradual. Fluid within the pericardium puts pressure on the heart which prevents the heart to expand. This causes less amount of blood to pump out of heart leading to decrease in oxygen to reach the tissues. Eventually causes the heart to beat faster, fall in blood pressure and swollen neck veins leading to loss of consciousness and sudden death.

Out of all the causes of cardiac tamponade, rupture of aortic aneurysm leads to rapid accumulation of blood in pericardium causing sudden death. Most commonly involved sites of aneurysms are large elastic arteries, especially the aorta and its major branches. Aneurysm can cause various ill-effects such as thrombosis and thromboembolism, altering in the flow of blood, rupture of the vessel and compression of neighbouring structures. Ascending aorta aneurysm is a life threatening pathology of the aorta and if not treated in time, can cause potentially fatal complications such as aortic rupture or dissection with the incidence of 10 per 100,000 person-year.² The pooled incidence and prevalence of TAAs was 5.3 per 100,000 individuals/year (95% confidence interval [CI]: 3.0; 8.3) and 0.16% (95% CI: 0.12; 0.20), respectively. The pooled incidence of ruptured aneurysms was 1.6 per 100,000 individuals/year (95% CI: 1.3; 2.1).³

Aneurysms can be classified on the basis of various features:

- A. Depending on the composition of the wall
 - 1) True aneurysm composed of all the layers of a normal vessel.
 - 2) False aneurysm having fibrous wall and occurring often from trauma to the vessel.
- B. Depending upon the shape
 - 1) saccular having large spherical outpouching
 - 2) Fusiform having slow spindle shaped dilatation
 - 3) cylindrical with a continuous parallel dilatation
 - 4) serpentine or varicose which has tortuous dilatation
- C. Based on pathogenetic mechanisms:
 - 1) Atherosclerotic aneurysm
 - 2) Syphilitic aneurysm
 - 3) Mycotic aneurysm

4) Berry aneurysm

5) Dissecting aneurysm

Rupture of the atherosclerotic aneurysm is the most serious and fatal complication. The risk of rupture depends upon the size and duration of the aneurysm and the blood pressure. Rupture of abdominal aneurysm may occur either into the peritoneum or into the retro peritoneum resulting in sudden and massive bleeding. Occasionally, there may be slow progressive leak from the aneurysm. A ruptured aneurysm is more likely to get infected.

Patients with aortic aneurysm are asymptomatic. Symptoms develop eventually if the aneurysm enlarges and causes pressures on surrounding structures.

Signs and symptoms of un-ruptured aortic aneurysm include chest pain, neck pain, cough, shortness of breath, wheezing, hoarseness, dysphagia, abdominal pain, back pain, etc. Signs and symptoms of ruptured aortic aneurysm include sudden, intense and persistent chest pain that radiates to back or upper back, abdominal pain, difficulty in breathing, low blood pressure, paralysis or weakness of lower extremities, loss of consciousness and sudden cardiac death.

Aortic aneurysms are found incidentally during other examinations. Chest x-ray usually shows mediastinal widening, aortic knob enlargement or tracheal deviation. It may be incidentally discovered by echocardiogram, chest x ray, chest CT scan or chest MRI scan. In symptomatic patients, CTA or MRA is the choice of diagnostic tests for better characterization of aortic diameter, vessel anatomy and to identify.

Sign and symptoms in about 96% of individuals with aortic rupture present with severe pain that had a sudden onset. It may be described as tearing in nature, or stabbing or sharp in character.⁴ Less common symptoms that may be seen in the setting of aortic rupture include congestive heart failure (7%), syncope (9%), cerebrovascular accident (3-6%), ischemic peripheral neuropathy, paraplegia, cardiac arrest and sudden death.⁵

Rupture of aortic aneurysm is most likely at near the dilatation site because of reduce thickness and greater weakness of wall and because of "Laplace's law" which is tension of acting on vessel wall is greater where the luminal diameter is greater.⁵ According to osseous pinch mechanism, the aorta is crushed or pinched in between vertebral column

and inner surface of manubrium, first rib and clavicles during antero-posterior thoracic compressive deformation.⁶

3. Conclusion

Cardiac tamponade due to rupture of aortic aneurysm is rare but life threatening condition. It can mimic other conditions like hypovolaemia after any trauma or injury. Many are sudden and rapid presentation; it is identified during post-mortem examination.

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