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Non-Traumatic Spontaneous Rupture of Aortic Aneurysm with Dissection of Aorta

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Case Report

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Abstract: Aortic dissection is very serious and emergency condition where death immediately follows the tear in wall aorta. As the tear extends, blood can flow in between the wall of blood vessel called as dissection of aorta. In this article we have reported a case brought for autopsy to Government medical college. As per police investigation and Panchanama the deceased was found at roadside in a secluded place when he went for morning exercise. There was no evidence of any major external injury but internal examination shows the rupture aneurysm of arch of aorta and descending aorta with collection of 1200 cc of blood and blood clots in left thoracic cavity. There were longitudinal intimal tears present in the wall of distal part of arch of aorta and thorough out the course of descending aorta with aneurysmal dilation of size 6 cm diameter and a rupture in the antero-lateral aspect of intima of the aorta. The case is taken for discussion due to its uniqueness in creating the suspicion about death due to body found in the secluded place and suddenness in death occurring without any warning signs in a previously healthy individual.
Keywords: Dissection of aorta; Aortic aneurysm; Aortic rupture; spontaneous rupture of aorta.

INTRODUCTION

The term "aortic dissection" was introduced by the French physician J.P. Maunoir in 1802, and Rene Laennec, labeled the condition "dissecting aneurysm." The earliest documented case of aortic dissection is reported by Frank Nicholes in postmortem case of King George II of Great Britain, who had been found dead in1760[1]. Aortic dissection is relatively rare condition occurring at the rate of three cases per 100,000 population-year. It can affect anyone, in the age group between 40 to 70,with an average age group of diagnosis is 63 years, with only 10% of cases occurring before 40[2]. Without treatment, about half of people with type A aortic dissection die within three days and about 10% of people with type B aortic dissection die within a month[3].

The initiating event in an aortic dissection is the tear in intimal lining of the aorta. Due to high pressures in the aorta, blood enters the media at the point of the tear. The force of the blood entering the media causes the tear to extend further. It may extend in proximal or distal direction or both creating a false lumen in aorta. Separating the false lumen from the true lumen is a layer of intimal tissue known as the intimal flap. The vast majority of aortic dissections originate with an intimal tear in either the ascending aorta (65%), the aortic arch (10%), or just distal to the ligamentum arteriosum in the descending thoracic aorta (20%). The presence of an aneurysm is a risk for rupture of aorta, so larger the lesion, more likely the chances of its rupture and haemorrhage. Aneurysms over 6 cm have a 25% annual risk of rupture[4]. Often there is no knowledge of the presence of an aneurysm and the first sign is rupture, rapid exsanguination and death. No more than 1 in 3 patients with a ruptured aortic aneurysm will reach hospital alive, and 20% of those who do, fail to reach theatre[5]. When a tear occurs, it creates two channels in aortic wall, one in which blood continues to travel and another where blood stays still if the channel with non-traveling blood gets bigger, it can push on other branches of the aorta. This can narrow the other branches and reduce blood flow through them. An aortic dissection may also cause abnormal widening or ballooning of the aorta i.e. aneurysm.

CASE REPORT

In present case, a male aged 38 years was brought to the mortuary, department of forensic medicine, Government Medical College, for medicolegal postmortem examination. The history given by relatives and police Panchanama as, the deceased went to morning walk and exercise as usual; he used to do daily at 6 am in morning on empty road outside the city and about 20 minutes away from his home. Rarely some people used to walk on that side for morning walk near to the greenery with trees and empty place. But he doesn't return to home even after hours, but his wife thought that he may be busy somewhere with friends. At about 09.00 am morning the people going to farm informed police station that a person was lying near to road side about 20 feet from road near to a tree in prone position. The body was brought to casualty Government medical college and hospital, and declared brought dead at 10.20 am, by CMO in casualty and further body sent to forensic medicine department for medicolegal autopsy procedure.

Crime scene

The body was lying near to road side about 15 feet away from road near to a small tree in prone position. With upper limbs was folded at elbow and near to head right leg was straight and left leg was folded at knee. The plant vegetarians and soil near to body doesn't show any signs of violence and it was undisturbed, the body is well dressed with white T-shirt grey track pant and sport shoes. Cloths were intact, no signs of tear but stained with soil on anterior aspect.

External examination

On external examination, the deceased was of aged about 48 years, male, moderately built and cold to touch. Postmortem lividity was present over back and buttocks and not fixed, rigor mortis were partially present in upper part of body and small muscles. Cloths were stained with soil at anterior aspect with no signs of any tear. Mud stains was present over right side of face and nose. Skin extremely pale, teeth intact, tongue inside oral cavity, and reddish brown colored fluid oozing from mouth and nostrils. Abrasion was present over right forehead anterior aspect 3cm above supraorbital ridge of size 5x3 cm, reddish coloured, and two other abrasions present over right zygomatic region of size 2x2 cm each reddish coloured. Contusion present over upper one third region of right forearm extensor aspect of size 3x 2 cm bluish in colour. No any other major injury was noted.

Internal examination

On opening the body skull was intact, meninges and brain were intact and pale coloured, the abdominal organs were intact and pale. After opening the thoracic cavity about 1200 cc blood and blood clots present in cavity, dark red coloured, both lungs was intact and pale, heart enlarged 350 gm. in weight, fat pad was prominent, on dissection left anterior descending coronary artery and left circumflex coronary artery shows athermanous plaques with 60% to 70% blockage. On removal aorta, there were longitudinal intimal tear in the wall of distal part of arch of aorta and thorough out the course of descending aorta with aneurysmal dilation of size 6 cm diameter and a rupture in the antero-lateral aspect of the aorta from where the blood has leaked into thoracic cavity and aortic wall.

Fig-1: **Showing dark red coloured blood and blood clots collected from pleural cavity**

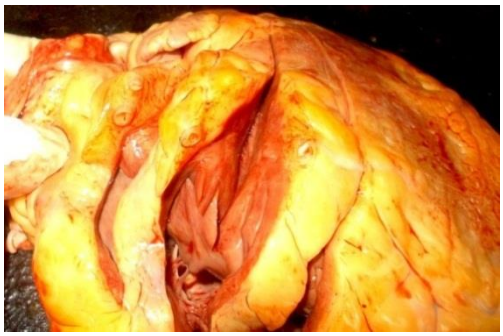

Fig-2: **Showing narrowing of lumen of left coronary artery with atheromatous plaque**

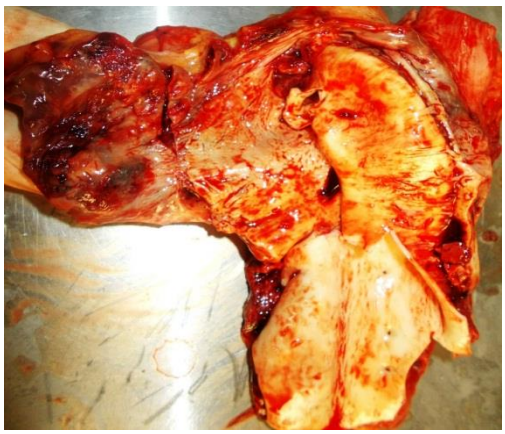

Fig-3: **Showing opened sac of aneurysm of aorta with hematoma and dissection of aorta in upper part**

Fig-4: **Showing lumen of aorta with separated intima and media along with dilated sac of aneurysm.**

DISCUSSION

The aorta or any artery carrying blood consists of three layers, intima, media, and adventitia. The intima is in direct contact with the blood and mainly consists of a layer of endothelial cells on a basement membrane; the media contains connective and muscle tissue, and the vessel is protected on the outside by the adventitia, comprising connective tissue. In an aortic dissection, blood penetrates the intima and enters the media layer, splitting the inner two-thirds and the outer one-third of the media apart [6]. Anterograde dissections may recanalise into the intravascular lumen leading to a double-barrel aorta and relieves the pressure of blood flow and reduces the risk of rupture.

The causes of dissection of aorta are aging, atherosclerosis, blunt trauma to the chest, high blood pressure, bicuspid aortic valve, Coarctation of the aorta, connective tissue disorders such as Marfan syndrome and Ehlers-Danlos syndrome. The pain may feel like a heart attack and it can be described as sharp, stabbing, tearing felt below the sternum, then radiate to shoulder blades or to back, neck, arm, jaw, abdomen, and can include anxiety and a feeling of doom, fainting or dizziness[7,8]. The risk of rupture increases with aneurysm size. Smaller than 4 cms Aneurysm have 0-2 % risk of rupture, whereas those larger than 5 cms have 22% risk[9]. Aoyagi S et.al had reported cases of spontaneous non-traumatic rupture of the thoracic aorta in a hypertensive patient. The clinical findings suggested acute aortic dissection, and a large pericardial effusion [10].

In the present case, all of the above mechanisms may have acted together to produce laceration of the wall of the aorta. There was neither history of direct trauma to the chest nor any other past history. The victim was found to have been lying on the floor in secluded and empty place but the scene of crime investigation shows no any evidence of foul play. But definitely it can be a case of spontaneous rupture of aortic aneurysm in a case of dissection of aorta. Presence of abrasions and contusions were present on the body but all of them go in favor of sudden fall while exercising due to this episode.

CONCLUSION

In this case it is concluded that it is a case of spontaneous rupture of aortic aneurysm in a case of dissection of aorta while having heavy and strenuous exercise in a case having atheromatous plaques in coronaries. The case is atypical due to age of occurrence is under 40 years in this case.

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