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Case Report

A Fatal Case of Cardiac Tamponade Consequent to Aortic Dissection

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Abstract

Aortic dissection characterized by the infiltration of blood between layers of the aortic wall, is a grave and fast-progressing medical emergency, with considerable mortality rates even in the context of contemporary advances in imaging and treatment. We present a case study of an 80-year-old female with ruptured aortic dissection, focusing on the autopsy findings, particularly the presence of atherosclerotic plaque and a tear in the aortic intima. The typical and atypical presentations of the condition, including **cardiac tamponade**, are discussed. Major risk factors such as hypertension, atherosclerosis, advancing age, and male gender are elaborated, as well as lesser-known risks like connective tissue and aortic valvular diseases. Emphasizing the importance of early diagnosis and surgical intervention, we conclude with the vital recognition that the management of hypertension is a critical modifiable risk factor in preventing aortic dissection.

1. Introduction

The Aortic dissection occurs when blood tracks between the middle and outer thirds of the aortic media, creating a blood-filled channel within the aortic wall¹. It is a rapidly progressing, life-threatening condition with high mortality rates despite recent advances in imaging and treatment.¹⁻³ Complications such as pericardial tamponade, myocardial infarction, malperfusion syndromes to vital organs, or frank exsanguination from aortic rupture usually cause rapid death. The most common risk factors linked to the development of aortic dissection are hypertension

and atherosclerosis.^{2,3} Other recognised risk factors include connective tissue diseases and aortic diseases such as infective and autoimmune aortitis, and degenerative or congenital aortic valvular disease. Advancing age and male gender have also been cited as risk factors for aortic disease.¹⁻⁵ Diagnosis of aortic dissection is challenging because of often non-specific clinical signs and symptoms. Common screening modalities such as chest radiographs appear normal in up to 40% of cases, and ECG findings are often unremarkable; therefore, a high index of

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clinical suspicion remains essential for diagnosis.⁶ Aortic dissection may also be seen as an artefact consequent to the embalming process.^{7,8}

2. Case report

An 80-year-old female was brought dead to the casualty of a tertiary care center with a history of a fall at her residence. The decedent was referred for post-mortem examination. Medical records were not available at the time of autopsy. A verbal history of previous hypertensive disease was obtained from the next of kin. However, the decedent had refused any follow-up treatment for the past two decades. This scenario is common among the lower socio-economic class in the region. Once the police provided the inquest papers, the autopsy proceeded with minimal medical history.

External examination revealed a reddish-brown avulsed laceration on the left frontal aspect of the head, and abrasions on the left elbow and both knees. Internal examination showed extravasation of blood within and beneath the scalp tissue corresponding to the laceration. The brain demonstrated mild edema with a contusion on the frontal aspect. The pericardial space contained 250–300 g of clotted blood, indicating cardiac tamponade. Examination of the heart and aorta revealed rupture of the ascending aorta at its base (Figure 1).

Figure 1: rupture of aorta at the base.



Sections from the intimal tear in the aorta (located 1 cm from the aortic cusp and measuring 1.3 cm in length) showed atherosclerotic plaque and an intimal tear with blood dissecting through the tunica media (Figure 2a, 2b). The same area demonstrated mucoid extracellular matrix accumulation and focal replacement by hyalinized connective tissue. The tear

extended into the adventitial connective tissue, resulting in vascular rupture and haemorrhage encasing the root of the aorta.

Figure 2a: Histopathology of aortic rupture showing tear through the intima.

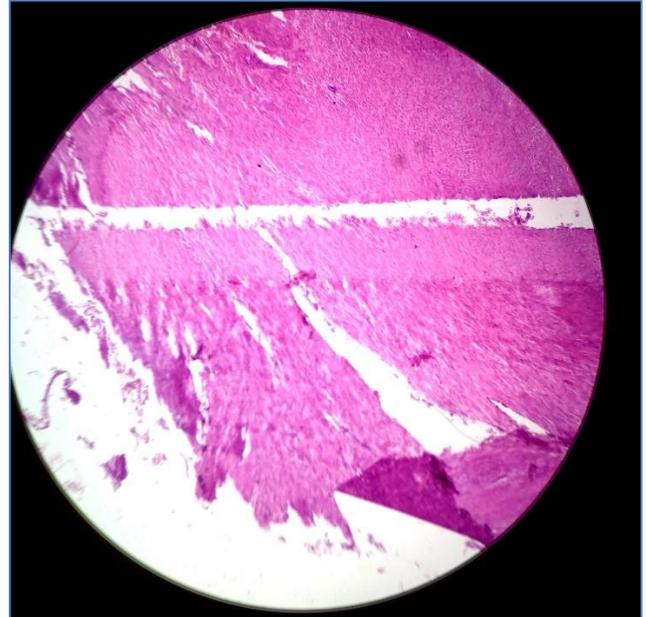
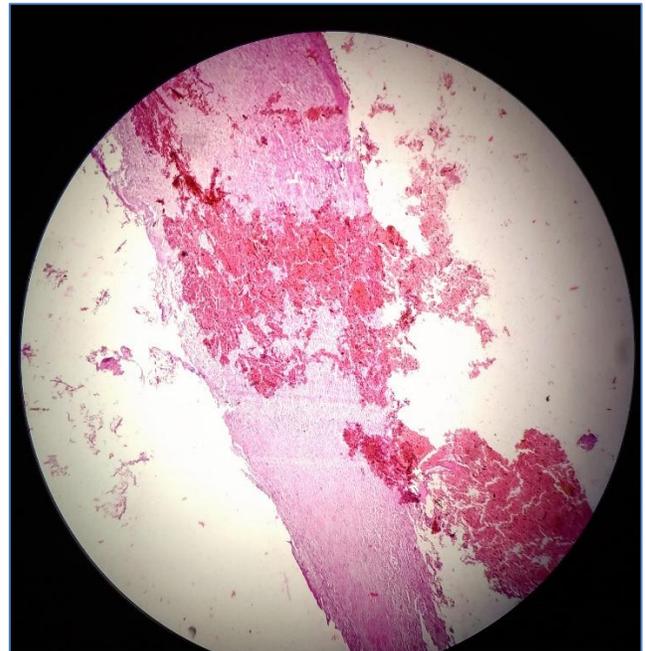


Figure 2b: Mucoid extracellular matrix accumulation focally replaced by hyalinized connective tissue.



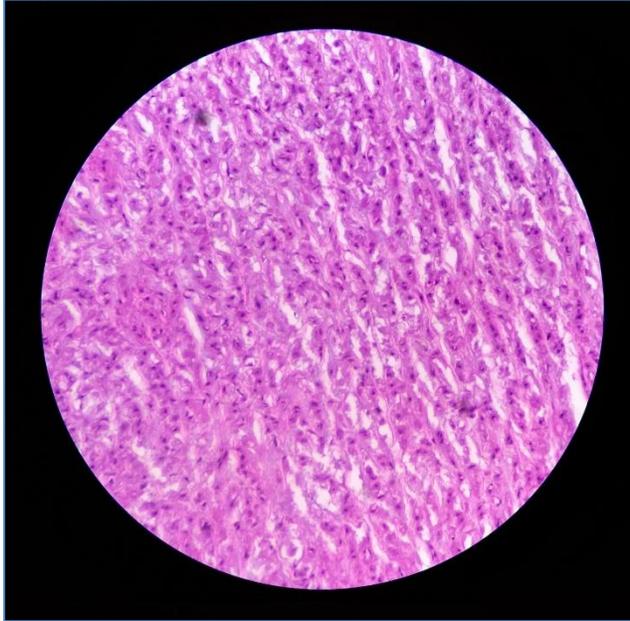
Atheromatous plaques were also present focally at the root of the aorta. Sections from the right and left ventricles showed hypertrophy and hyperplasia of cardiac muscle bundles (Figure 3).

No other remarkable findings were noted. The cause of death was certified as cardiac tamponade due to rupture of the root of the aorta consequent to aortic dissection.

3. Discussion

Cardiovascular diseases are one of the leading causes of death in India, surpassing the global average.⁹⁻¹³ Among fatal vascular conditions, Acute Aortic Catastrophes (AAC) take precedence, consisting mainly of ruptured aneurysms and dissections.

Figure 3: Hypertrophy and hyperplasia of ventricle.



Aortic rupture-related AACs are relatively uncommon; however, they are serious disorders with a high fatality rate.¹⁴ They are typically caused by ruptured aortic aneurysm or ruptured aortic dissection. A 27-year study reported an incidence of approximately 29 cases per million annually, with a mean age of 65.7 years (range: 36–97 years).⁴ The present case involves an elderly female (80 years old) with ruptured aortic dissection.

Aortic dissection is classified into two types: type A and type B. Type A involves the ascending aorta, while type B involves the aorta distal to the left subclavian artery. This restricted form of aortic dissection frequently precedes aneurysm formation and late rupture and is usually associated with hypertension.¹⁵

Previous studies indicate that aortic atherosclerosis is a major risk factor (73% of cases) in the development of fatal aortic dissection.^{2, 3} Plaque ulceration can cause intimal disruption, leading to the formation of a dissection plane. Systemic hypertension is also an important risk factor² (58% of cases³) and, like atherosclerosis, is modifiable. Approximately 11.9% of dissections are associated with an area of aneurysmal dilatation. Other

contributing factors include connective tissue diseases (3.5% of cases) and cystic medial degeneration. In the present case, atherosclerotic plaque was found along with aortic dissection. Since no medical history was available at the time of autopsy, a correlation with hypertension could not be established.

A study by Suzuki et al. found that about 60% of aortic dissection cases go undiagnosed until a complete autopsy is performed.⁵ The most common presentation of aortic dissection is cardiac tamponade. In fact, aortic dissection is the second most common cause of cardiac tamponade, after ruptured myocardial infarction.¹⁶ Associated symptoms may include chest pain and syncope. Atypical presentations, such as hoarseness of voice, have been described but are rare.¹⁷ In the present case, the aortic dissection ruptured at the root of the aorta, causing cardiac tamponade and resulting in death.

4. Conclusion

Ruptured aortic dissection represents one of the most lethal Acute Aortic Catastrophes, with elderly individuals at highest risk. Atherosclerosis and hypertension are the predominant predisposing factors, with additional contributions from structural and degenerative aortic conditions.

Despite advances in diagnostic imaging and surgical techniques, overall mortality remains high, particularly in cases presenting with cardiac tamponade. Rapid recognition and urgent surgical intervention offer the best chance of survival, yet prevention through risk factor control remains paramount. Hypertension, as the most significant modifiable factor, warrants targeted public health measures, early detection, and strict long-term management to reduce the burden of this fatal condition.

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References:

1. Davies MJ, Treasure T, Richardson PD. The pathogenesis of spontaneous arterial dissection. *Heart*. 1996; 75(5):434.
2. Patel PD, Arora RR. Pathophysiology, diagnosis, and management of aortic dissection. *Ther Adv Cardiovasc Dis*. 2008; 2(6):439–68.

3. Bailey K, Duflou J, Puranik R. Fatal cases of aortic dissection: an autopsy study. *Int J Cardiol.* 2012; 158(1):148–9.
4. Mészáros I, Mórocz J, Szlávi J, Schmidt J, Tornóci L, Nagy L, et al. Epidemiology and clinicopathology of aortic dissection. *Chest.* 2000; 117(5):1271–8.
5. Suzuki T. Aortic dissection—a contemporary revisit of an autopsy series. *Am Heart J.* 2019; 209: 106–7.
6. McMahon MA, Squirrell CA. Multidetector CT of Aortic Dissection: A Pictorial Review. *RadioGraphics.* 2010; 30(2):445–60.
7. Savall F, Dedouit F, Piercecchi-Marti MD, Leonetti G, Rougé D, Telmon N. Acute aortic dissection diagnosed after embalming: Macroscopic and microscopic findings. *J Forensic Sci.* 2014; 59(5):1423–6.
8. Rae G, Husain M, Mcgoey R, Swartz W. Postmortem Aortic Dissection: An Artifact of the Embalming Process. *J Forensic Sci.* 2016; 61 Suppl 1:246–9.
9. Prabhakaran D, Jeemon P, Roy A. Cardiovascular Diseases in India. *Circulation.* 2016; 133(16):1605–20.
10. Murray CJL, Lopez AD. Alternative projections of mortality and disability by cause 1990-2020: Global Burden of Disease Study. *Lancet.* 1997; 349(9064):1498–504.
11. Tamilmani K, Manivasagam M. A Retrospective Study on Microscopic Changes of Heart in Sudden Death of Young Individuals. *J Forensic Med Sci Law.* 2021; 30(1):11-5.
12. Zanjad NP, Nanadkar SD. Study of Sudden Unexpected Deaths in Medico-legal Autopsies. *Journal of Indian Academy of Forensic Medicine.* 2006; 28(1): 27-30.
13. Chaudhari VA, Mohite SC. Current trends in sudden natural deaths. *J Forensic Med Sci Law.* 2012; 21(1):1-8.
14. Pál D, Szilágyi B, Berczeli M, Szalay CI, Sárdy B, Oláh Z, et al. Ruptured Aortic Aneurysm and Dissection Related Death: an Autopsy Database Analysis. *Pathology Oncology Research.* 2020; 26(4):2391.
15. Rizzoli G, Scalia D, Casarotto D, Tiso E. Aortic dissection type A versus type B: a different post-surgical death hazard? *Eur J Cardiothorac Surg.* 1997; 12(2):202–8.
16. Goran KP. Suggestion to list acute aortic dissection as a possible cause of type 2 myocardial infarction (according to the universal definition). *Eur Heart J.* 2008; 29(22):2819–20.
17. Hammad N, Jabri A, Shahreri Z, Haddadin F, Nasser F, Balakumaran K, et al. Ortner’s syndrome: A rare case of hoarseness secondary to chronic aortic dissection. *SAGE Open Med Case Rep.* 2022; 10:2050313X221108651.