Sudden Death with Dual Organ Pathologies–An Autopsy -based Case Report

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Abstract

Sudden death due to cardiac cause is considered as a major health problem worldwide accounting for 15–20% of all deaths and cardiomyopathies account for 10–15% of the cases.According to the 2016 WHO classification, angiomatous meningioma is a rare subtype of meningioma classified as Grade I. It is an aggressive variety with a fair prognosis, with typical symptoms including headache and seizures. We present a case of a 60-year-old man brought to the morgue for autopsy with a history of progressive left-sided weakness and headache for several months with no prior diagnosis or treatment for the same because of current pandemic of COVID-19.On conducting medicolegal autopsy significant pathologies in heart and brain were found which could have contributed to the cause of death.

Key words: *Sudden death,hypertensive cardiomyopathy,Angiomatousmeningioma, Intracranialtumor, Space occupying lesion, Autopsy.*

Introduction

Sudden cardiac death (SCD) is a term used to describe an unpredicted death of a person as a consequence of a cardiovascular event, with or without an existence of an underlying cardiac pathology[1]. It is considered as a major health problem worldwide accounting for 15–20% of all deaths[2]. Coronary artery diseases (CAD), valvular heart diseases, cardiomyopathy syndromes, infiltrative diseases of the myocardium, myocarditis, infective endocarditis, hereditary ion channel abnormalities, and congenital heart illnesses are some of the underlying cardiac causes of SCD.CAD is responsible for 80 percent of SCD cases, cardiomyopathies for 10–15 percent, and hereditary heart abnormalities such as coronary artery abnormalities or cardiac channelopathies for 5–10 percent of SCD cases[3]. In people over the age of 35, coronary atherosclerosis is the most common cause of SCD.Meningiomas are primary central nervous system tumours that account for 15 to 18 percent of intracranial tumours and 33% of all incidental neoplasms in adults[4].The Angiomatous meningiomas are an uncommon (2.1 percent) kind of meningioma identified by the World Health Organization (WHO) based on morphology.Although they appear aggressive, these are benign in nature, and the meningiothelial type 1 variety is the most frequent[5]. Main differential is hemangiopericytoma, which also goes by the label "angioblastic meningioma." Hemangiopericytoma and angioblastic meningioma are difficult to distinguish radiologically, however textural analysis can aid.In radiology,

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histology, immunohistochemistry, and even clinical presentation, these have distinct properties. Therefore, a multidisciplinary approach is required to distinguish this unique meningioma from other space-occupying vascular lesions[6].Literature searchprovided adequate research in radiology, immunohistochemistry, pathology but lacked autopsy-related documentation of this variety in Indian scenario.

We present a case of a 60yearold man who suddenly collapsed at the home after fall from the bed right after the dinner. He had past medical history of hypertension on irregular medication. Autopsy examination showed acute myocardial infarction (AMI) of the left ventricle with atherosclerotic changes of the coronaries. Apart from that, there was an incidental finding of a space occupying lesion in the brain and anterior cerebral artery atherosclerosis.

Case Details:According to the inquest and documents provided by the investigating officer, the deceased had been suffering from left-sided weakness for a few months, he was known to be hypertensive and was on irregular medication for hypertension, and on the day of the incident, 05/01/2021 at late night 13:00 while his daughter saw the deceased lying unconscious on the floor with bleeding from his nose and mouth, he was shifted to a hospital.

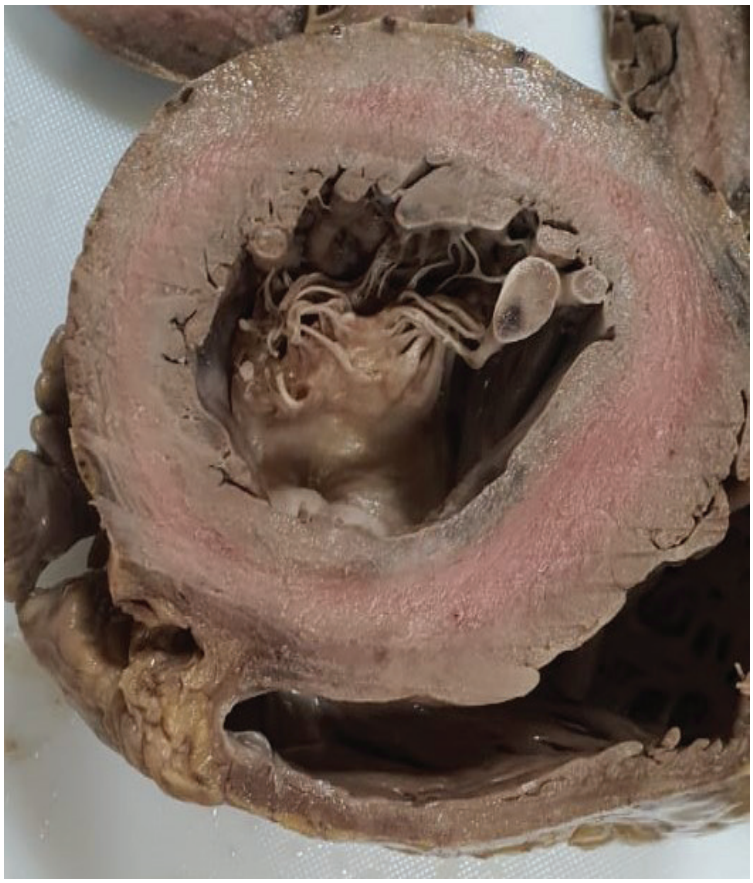
Autopsy findings: There was a 2cmx1cm contusion present over nasal bridge red in colorand there was no other external injury. The face was congested with bluish appearance of nailbed and lips. On internal dissection, lungs were oedematous,heart weighed 518gm and fat deposits were found around the heart. The right and left ventricular wall thicknesses were found 2mm and 15mm, respectively. The left ventricle showed acute myocardial infarction (AMI) which was demonstrated by the haemorrhagic myocardium seen in the papillary muscles (Fig.1). The stomach had around 300gm semi-digested food material with visible grain particles having no particular smell, the mucosa was congested without submucosal haemorrhages. The liver weighed 1500gms and it was congested; both kidneyswere congested, left kidney weighs 158gms and the right kidney weighs 160gms with intact corticomedullary junction. On removing the skull cap the dura was adherent to inner table of the skull and it was bluish in colour, left side frontal region had an organised space-occupying lesion adherent to dura with visible vessels over the surface. The space occupying mass weigh 50gms and the brain tissue adjacent to the lesion had a depression of 4cmx3cmx2cm (Fig. 2). The brain was oedematous and vessels were engorged and weigh 1346gms. Gross dissection of brain showed atherosclerotic changes in multiple areas of circle of Willis, more commonly in the right anterior cerebral artery.The heart and space-occupying lesion were preserved in formalin solution and sent for histopathological analysis.

Histopathology laboratory report: Angiomatous meningioma grade I was discovered in the space occupying mass (Fig-3), and cardiac tissue revealed striking hypertrophy of the myofibres (Fig-4). Transverse diameters of affected myofibres increased three to five times, with nuclear enlargement and hyperchromasia.In addition, anterior Cerebral blood vessels exhibited straightforward atherosclerotic alterations but no essential luminal constriction.

Discussion

One of the less prevalent types of primary cardiomyopathies is hypertrophic cardiomyopathy (HCM).Although the illness is becoming more widely recognised in India, there is little information on its incidence and mortality rates.The primary goal of this case report was to look into HCM that was discovered after an autopsy.The role of myofibre disarray as a diagnostic sign for the disease has been severely examined.Our goal was also to demonstrate the necessity of histological analysis in confirming or excluding the diagnosis of HCM,

particularly in the case of sudden death.In most cases, SCD autopsy techniques begin with a macroscopic examination of the heart; if the aetiology is found, no more testing is required.However, depending on the victim's age, a negative macroscopic test is followed by either histological or genetic testing.If a victim is over 30 years old and has had a negative macroscopic exam, histological testing is the next step; if the test is positive, no further action is required[7].After the heart has been cleared of blood, other measures are obtained, including the heart's weight, thickness, and dimensions[8].After staining the tissues with hematoxylin and eosin also the Masson trichrome stain, histological studies are carried out[9]. Hypertrophic cardiomyopathy (HCM), an autosomal dominant illness caused by mutations in sarcomere protein-coding genes, can be found in young people with SCD[10].It has thickened left ventricular (LV) walls, asymmetrical septal hypertrophy, and mid-ventricular blockage morphologically.Myocardial fibre disarray and myocyte hypertrophy, which is associated with a fourfold increase in cell and nuclear size, are microscopic observations in HCM.There is also an aberrant thickening of the coronary arterioles[11]. Meningiomas account for 36.1 percent of primary cerebral tumours and are more common in people in their medium to late years of life[12].Meningiomas develop from arachnoid villi meningiothelial cells[13].Divya et al provided a case of agiomatous meningioma with an intraparenchymal origin (angiomatous meningioma, WHO Grade 1 of meningiomas)[14].The most common symptom of angiomatous meningioma is headache[15].Juyoung et al and Dietzmann K et al stated on radiological examination, it is difficult to distinguish the type of meningioma due to the presence of distinctive perilesional oedema.Immunohistochemistry and electron microscopy can be used to distinguish angiomatous meningioma from hemangioblastoma and hemangiopericytoma[16,17]. Angiomatous meningiomas have a vascular component that accounts for more than half of the tumour size and 2.1 percent of all meningiomas[18]. Daniel et al found these are more common in the area of cerebral convexity and connected to the dura[19].The female/male ratio of meningiomas is higher, with a male preponderance in thesubtype angiomatous meningioma[15]. Martin et al classified angiomatous meningiomas based on the diameter of vascular channels, macrovascular (more than 50% of vessels with a diameter greater than 30 micrometre) and microvascular (less than 50% of vessels with a diameter greater than 30 micrometre), (more than 50 percent of vessels diameter smaller than 30micrometer)[15]. Meningiomas are normally asymptomatic, however they can cause seizures, focal deficits, and neuropsychiatric symptoms such as depression or psychosis in some cases[5].Metastasis is uncommon in meningiomas, occurring in only 0.1 percent of cases[15].



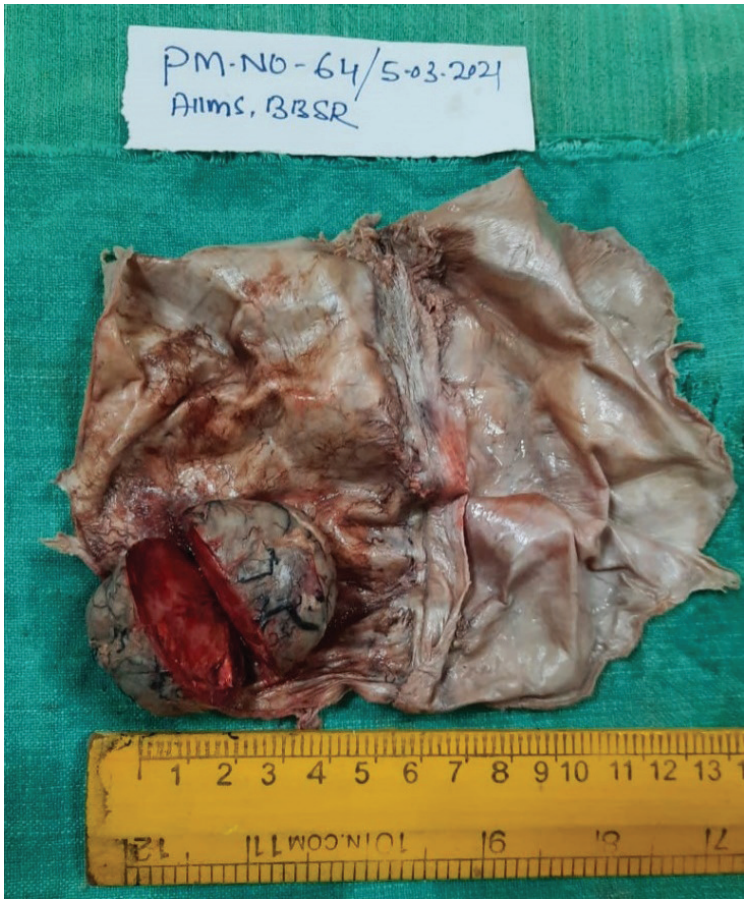


Fig-Papillary muscle HaemorrhageFig-2 Space Occupying Lesion

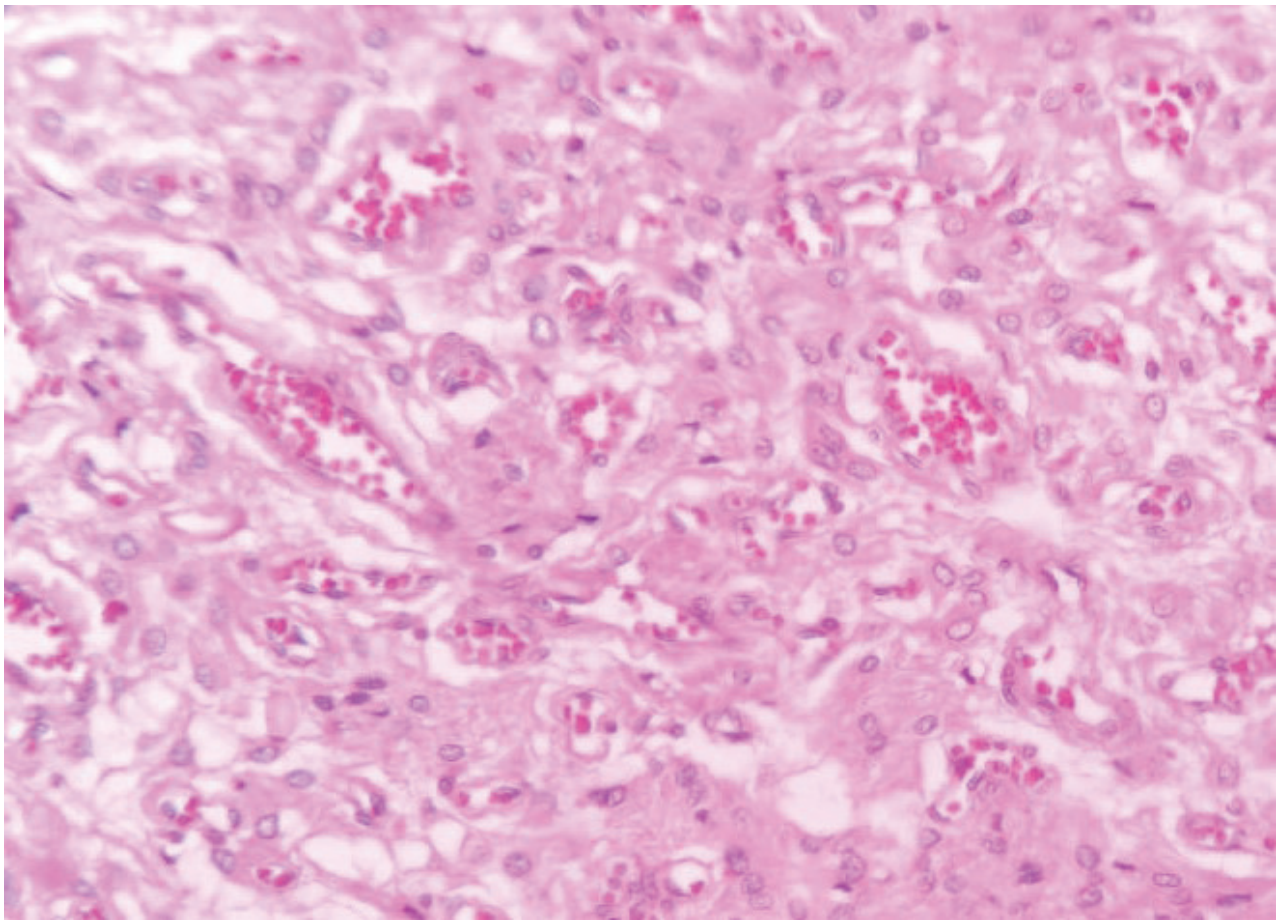


Fig- 3 AngiomatousMeningioma

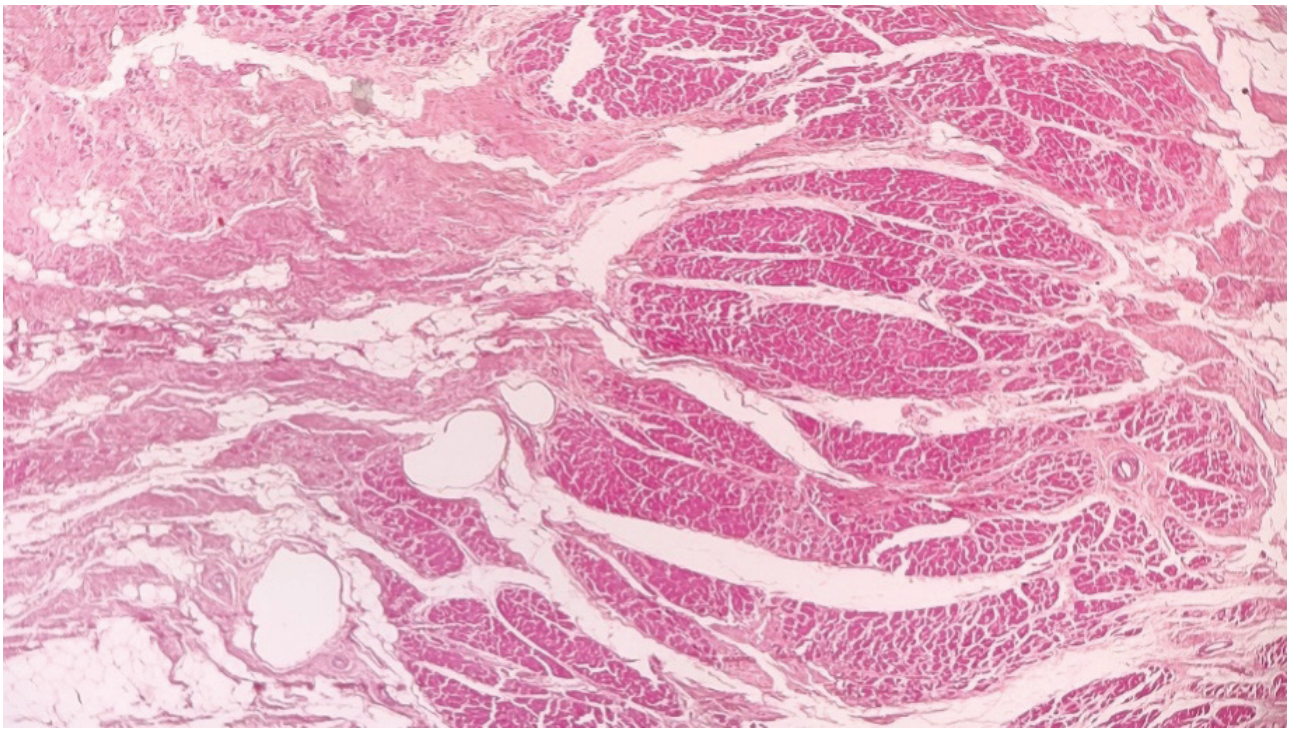


Fig-4 Myocardial Hypertrophy

Conclusion

Sudden death is unquestionably one of the most unforeseen and tragic consequences.The use of myofibre disarray as a diagnostic for the diagnosis of HCM in biopsy specimens is limited.This is due to the varying amount and distribution of disorder in the myocardium, as well as sample restrictions.Disarray is pathognomonic of HCM when measured quantitatively alongside other histological characteristics.The value of a histological investigation cannot be overstated, particularly in the case of a sudden death.Angiomatous meningioma is characterised by a high blood supply and specific features. It is more prevalent in males and is frequently seen connected to the dura in cerebral convexities, with headache being the most prevalent symptom.Autopsy report in ourcase holds a significant value in detailing the exact cause of death.

Conflict of Interest- None

Source of Funding- None

Ethical Clearance: Taken from Institutional Ethical Committee, AIIMS Bhubaneswar. The identity of the deceased was not revealed in the manuscript.

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