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CARDIAC PERFORATION : A RARE PRESENTATION IN CARDIAC AUTOPSY(5 YEAR STUDY)

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Abstract

Cardiac perforation is a condition that rarely occurs but could be highly fatal.Here we present a five year retrospective study done between 2020-2024 in which around hundred autopsy cases were reported for histopathological examination.

Key words: Autopsy, Cardiac perforation

Introduction

Cardiac death rates have been on the rise worldwide, particularly among urban populations, over the last fifty years. In India, the incidence of ischemic heart disease has grown to around 10%.[1]

Giovanni Battista Morgagni's statement, "it is impossible to investigate the nature and cause of any disease without examining the respective cadavers," highlights the vital importance of autopsies in determining the actual cause of death before concluding a patient's case..[2]

Coronary atherosclerosis is the most common cause of ischemic heart disease in cases of sudden death. In particular, involvement of all three coronary vessels is the most frequent pattern observed in coronary atherosclerosis. Therefore, a comprehensive examination of the cardiovascular system during an autopsy is essential to determine the cause of death.[3]

Cardiac perforation is a rare, yet potentially life-threatening condition. In subacute and chronic cases, it may present with no symptoms or lead to serious manifestations that can be fatal. Typical signs include chest pain, contractions in the chest muscles or diaphragm, hiccups, abdominal discomfort, shortness of breath, dizziness, or fainting episodes.[4]

Cardiac perforation may occur as a complication of the implantation of a cardiac implantable electronic device.[5]

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Iatrogenic perforation of the myocardial wall or central vessels during percutaneous procedures is a rare yet life-threatening complication. Despite immediate intervention, the mortality rate is elevated, particularly in cases involving left ventricular laceration.[6]

Cardiac perforation complications have been reported in cases of pericardiocentesis and acupuncture. [7]

Blunt cardiac injury resulting from accidents is more commonly observed in the right-sided chambers of the heart. The survival rate closely matches the expected survival probability. Using seatbelts correctly is essential to prevent blunt cardiac injuries in traffic accidents. The severity of injuries tends to be higher in accidents involving light motor vehicles.. [8]

Sharp objects can enter the cardiovascular system either directly through the chest wall, indirectly through the gastrointestinal tract after being ingested, or by the migration of fractured needles from distant injection sites in intravenous drug users.[7]

Materials and Methods

The present study is a retrospective study done over a period of 5 years between 2020-2024 in which total 100 heart autopsies were analysed.The specimens were received in 10% formalin.

In all the cases detailed history, suspected cause of death and postmortem findings were taken from forensic expert and post mortem papers.

The gross examination is important while studying cardiac pathology.

Weight of heart, ventricular surface is examined along with status of coronary arteries. The heart specimens were opened by modified Virchow's method following the direction of blood flow. All the chambers were washed off any blood clots and examined for any pathology of valves or endocardium. Thickness of ventricular walls and interventricular septum was also measured. Multiple blocks were taken from representative areas. After tissue processing, slides were preapared and stained with haematoxylin and eosin.

Results

The study was conducted in Department of Pathology between period of 2020-2024 in which total hundred heart specimens were reported for histpathological examination out of which one rare case was diagnosed with cardiac perforation.

The study includes males and females in the age group 0- 72 years.

Age wise distribution of cases

Age (years)	Total no. of cases	% of cases
0-19	01	01

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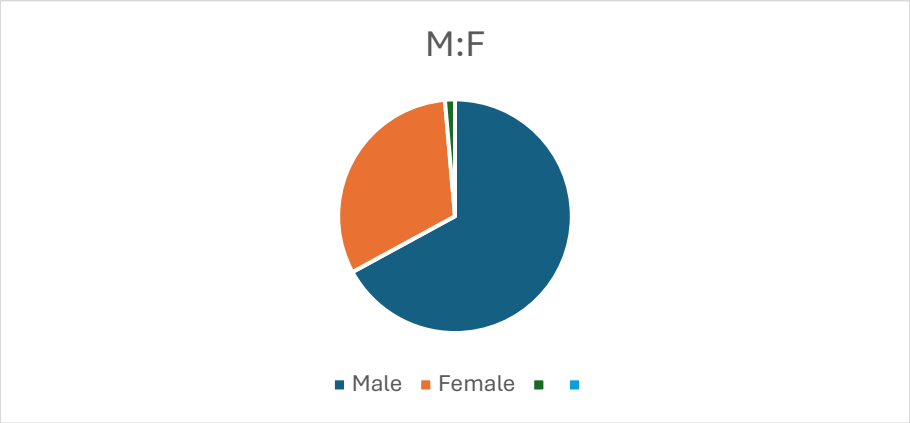
20-39	25	25
40-59	47	47
60-79	19	19
80-99	8	8

The male to female ratio of the study is 2.1:1



While women typically have a lower incidence of cardiovascular disease (CVD) compared to men, they experience higher mortality rates and poorer outcomes after acute cardiovascular events. [9]

On gross examination

Weight of Heart	Percentage out of total cases
300-400 gm	70%
>400 gm	30%

Heart weight is a crucial factor in determining cardiac hypertrophy. The recorded heart weight should be compared with reference tables based on age, gender, body weight, and height. [10]

Distribution of pathological diagnosis on autopsy

Cases	Number of cases
Congestion	53
Congestive heart diseases	26
Myocardial Infarction	20
Cardiac perforation	1

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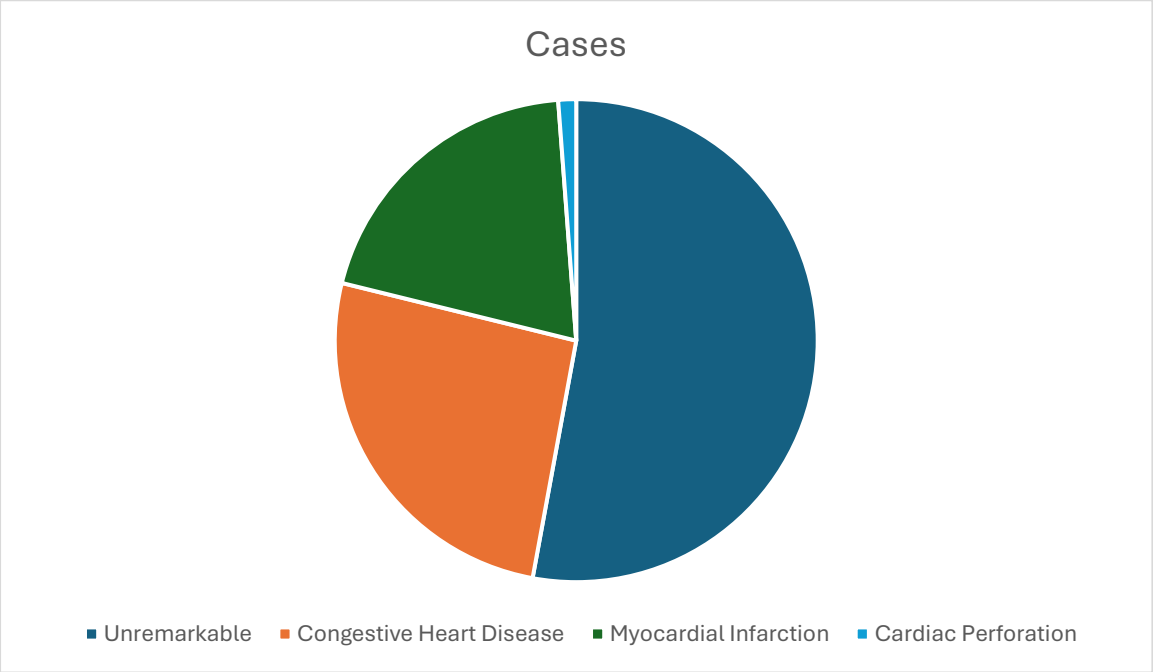

Congestive heart failure (CHF), as defined by the American College of Cardiology (ACC) and the American Heart Association (AHA), is "a complex clinical condition caused by any structural or functional disruption in the ventricles' ability to fill or pump blood."[11]

Myocardial infarction (MI), often called a "heart attack," is caused by a reduction or complete blockage of blood flow to a section of the myocardium. Most cases of myocardial infarction are the result of underlying coronary artery disease..[12]

The deceased was a 50 year old male. There was no previous history of myocardial infarction.

The heart weighed 410 gm and measured 14x 8 x 7 cm.On further grossing,Left ventricle wall thickness was found to be 1.5 cm and Right ventricle wall thickness was 0.8 cm.

On external surface there was seen a slit like dehiscence in posterior wall measuring 2 cm in length.

Sections were examined from left ventrical wall, left coronary artery, right ventrical wall, right coronary artery, aorta, left anterior descending artery, apex, dehiscence area.

On microscopic examination, H & E stained sections revealed inflammatory infilterate comprising of neutrophils, lymphocytes, foamy macrophages with areas of necrosis and splaying of cardiomyocytes. No fibrosis was seen.

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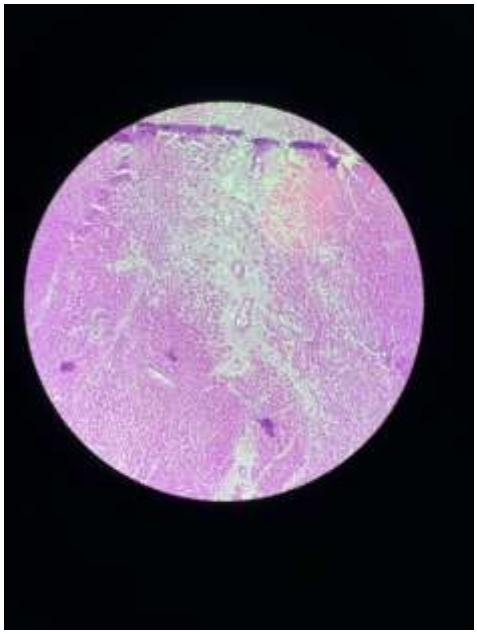
Gross examination of heart exhibiting 2 cm long dehiscence.



Sections exhibiting cardiac perforation

(H&E X400)

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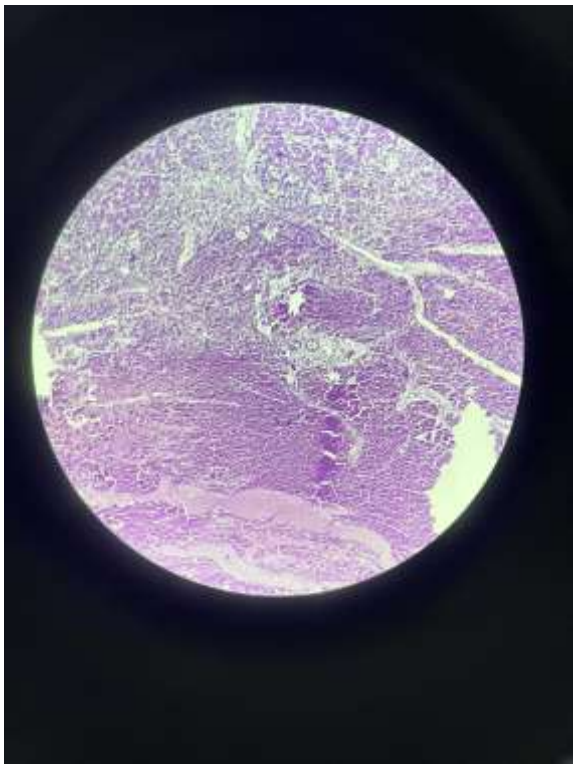

Sections exhibiting cardiac perforation

(H&E X400)

Discussion

Sudden death is often the first indication of an underlying condition in individuals who appeared healthy and showed no prior symptoms. In these situations, an autopsy provides the primary, and sometimes sole, chance to identify and record the precise cause of death..[13]

Out of approximately hundred cases reported for cardiac specimens, one rare case of cardiac perforation was diagnosed on histopathological examination.

For all the cases studied during the five year duration,detailed history of prior diseases, medications and trauma was taken. Specimens were examined grossly and later microscopic examination was done.

Maximum cases showed no remarkable pathology followed by cases of congestive heart failure and myocardial infarction.A single case of cardiac perforation was diagnosed.

The study included more males than females.

The age group of 40-79 years showed maximum remarkable cases.

Conclusion

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Cardiac perforation is a rare autopsy finding and is an important cause of sudden cardiac death.Autopsy along with histopathological findings hold a key role in diagnosis of the condtion and cause of death.

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Conflict of interest : NIL

Ethical clearance: Taken

References

[1] Garg, Shilpa & Hasija, Sonia & Sharma, Puja & Kalhan, Shivani & Saini, Neerav & Khan, Anam. (2018). A histopathological analysis of prevalence of various heart diseases: an autopsy study. International Journal of Research in Medical Sciences. 6. 1414. 10.18203/2320-6012.ijrms20181306.

[2] Basso C, Stone JR. Autopsy in the era of advanced cardiovascular imaging. Eur Heart J. 2022 Jul 7;43(26):2461-2468. doi: 10.1093/eurheartj/ehac220.

[3] Dr. Sana Mohamed Hanif and Dr. Jignasa Bhalodia. An autopsy study of histomorphological changes in heart. Int. J. Clin. Diagn. Pathol. 2022;5(1):68-71.

[4] Piekarz J, Lelakowski J, Rydlewska A, Majewski J. Heart perforation in patients with permanent cardiac pacing - pilot personal observations. Arch Med Sci. 2012 Feb 29;8(1):70-4.

[5]Peter H Waddingham, James Elliott, Alexander Bates, James Bilham, Amal Muthumala, Shohreh Honarbakhsh, Waqas Ullah, Ross J Hunter, Pier D Lambiase, Rebecca E Lane, Anthony W C Chow, Iatrogenic cardiac perforation due to pacemaker and defibrillator leads: a contemporary multicentre experience, *EP Europace*, Volume 24, Issue 11, November 2022, Pages 1824–1833.

[6] Provaznik Z, Holzamer A, Camboni D, Rupprecht L, Resch M, Wittmann S, Schmid C, Floerchinger B. Perforation of myocardial wall and great vessels after cardiovascular interventions-a 5-year analysis. J Thorac Dis. 2017 Dec;9(12):5288-5294. doi: 10.21037/jtd.2017.10.113. PMID: 29312737; PMCID: PMC5756958.

[7] Ali Z, Mourtzinos N. Postmortem Imaging of an Unusual Case of Fatal Heart and Lung Perforation Due to Self-Treatment. Acad Forensic Pathol. 2022 Jun;12(2):75-79. doi: 10.1177/19253621221102045. Epub 2022 Jun 9. PMID: 35799997; PMCID: PMC9254013.

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 7, 2025

[8] Kutsukata N, Sakamoto Y, Mashiko K, Ochi M. Morphological evaluation of areas of damage in blunt cardiac injury and investigation of traffic accident research. Gen Thorac Cardiovasc Surg. 2012 Jan;60(1):31-5. doi: 10.1007/s11748-011-0853-6. Epub 2012 Jan 13. PMID: 22237736.

[9] Zujie Gao, Zengsheng Chen, Anqiang Sun, Xiaoyan Deng,

Gender differences in cardiovascular disease,

Medicine in Novel Technology and Devices,

Volume 4,

2019,

100025,

ISSN 2590-0935.

[10] Basso C, Michaud K, d'Amati G, Banner J, Lucena J, Cunningham K, Leone O, Vink A, van der Wal AC, Sheppard MN; Association for European Cardiovascular Pathology. Cardiac hypertrophy at autopsy. Virchows Arch. 2021 Jul;479(1):79-94. doi: 10.1007/s00428-021-03038-0. Epub 2021 Mar 19. Erratum in: Virchows Arch. 2021 Jul;479(1):95.

[11] Malik A, Brito D, Vaqar S, et al. Congestive Heart Failure. [Updated 2023 Nov 5]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-.

[12] Ojha N, Dhamoon AS. Myocardial Infarction. [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-.

[13] Basso C, Aguilera B, Banner J, Cohle S, d'Amati G, de Gouveia RH, di Gioia C, Fabre A, Gallagher PJ, Leone O, Lucena J, Mitrofanova L, Molina P, Parsons S, Rizzo S, Sheppard MN, Mier MPS, Kim Suvarna S, Thiene G, van der Wal A, Vink A, Michaud K; Association for European Cardiovascular Pathology. Guidelines for autopsy investigation of sudden cardiac death: 2017 update from the Association for European Cardiovascular Pathology. Virchows Arch. 2017 Dec;471(6):691-705.