



Histomorphological spectrum of myocardial pathology in cases of sudden death at autopsy of tertiary care hospital

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ABSTRACT:

Background: The objective of the study was a histopathological examination of various cardiac pathology in an autopsy performed in case of sudden death.

Method and materials: 100 specimens of heart received in the autopsy section were examined retrospectively in the Department of Pathology, SMIMER, Surat. All the heart autopsies were examined grossly and microscopically. H&E stain was done to see a microscopic picture of cardiac pathology.

Result and conclusion: Ischemic heart disease was the most commonly observed cardiac pathology in the autopsy of sudden death. Myocardial infarction with advanced atherosclerosis was reported in all ages and was more common in males. Myocardial hypertrophy was the second common finding noted. Another uncommon cardiac pathology like myocarditis was also seen.

Keywords: Autopsy, heart, cardiac pathology, histomorphological examination

dilated or hypertrophic cardiomyopathy, Congenital coronary arterial abnormalities, Myocarditis, Cardiac conduction abnormalities, and many others.

Myocardial Infarction, also commonly referred to as "heart attack," is the death of cardiac muscle due to prolonged ischemia. In more than 90% of cases, myocardial ischemia results from reduced blood flow due to obstructive atherosclerotic lesions in the epicardial coronary arteries; consequently, IHD is frequently referred to as coronary artery disease (CAD)¹.

There is no valid method for sampling living populations also there is moderate concordance between clinical and pathological causes of death. Over one-fifth of clinically unexpected autopsy findings are correctly diagnosed only by histological examination². An autopsy is therefore a tool of real value for the assessment of pathologies that are difficult to access in living³. So, this study was conducted for the evaluation of various cardiac pathology in heart autopsies with a history of sudden death.

I. INTRODUCTION:

Sudden Cardiac Death (SCD) is most commonly defined as unexpected death from cardiac causes, either without symptoms or within 1 to 24 hours of symptom onset. The mechanism of sudden cardiac death is most often a lethal arrhythmia (e.g., asystole or ventricular fibrillation). Although ischemic injury can directly affect the major components of the conduction system. Coronary Artery Disease is the leading cause of sudden cardiac death, responsible for the majority of cases; unfortunately, Sudden cardiac death can be the first manifestation of ischemic heart disease (IHD). With the decreasing prevalence of ischemic heart disease in high-income countries, SCD is increasingly being seen in individuals with hypertrophic and fibrotic hearts (from hypertension, obesity, substance abuse, etc.) without IHD. With younger victims, nonatherosclerotic causes are more common etiologies for SCD like

II. METHOD AND MATERIALS:

This study was done in the pathology department, SMIMER, Surat. One year of data was collected for this study. A total of 642 autopsies were received in our department, out of which 177 autopsies had a cardiac cause of death in histopathological examination. We studied various cardiac pathology in 177 heart autopsies by histopathological examination, which can be a cause of sudden death.

Gross Examination: Hearts were cut after fixation with 10% formalin. Weigh the specimen of heart, inspection was done for the epicardial surface including pericardial fat (abundant, scant), petechiae, and adhesions. Describe each ventricle separately including hypertrophy or dilatation, fibrosis (endocardial, epicardial, transmural, location, and degree), infarcts (old or recent), and



presence of mural thrombus. Measure the wall thickness of both ventricles. Describe any valve lesions if present. Examine the aorta (calcification/thrombus) and coronary arteries

(left coronary artery, right coronary artery). Do a serial section perpendicular to the vessels to look for luminal obstructions.



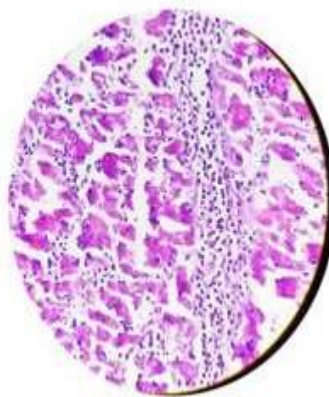
Figure 1: brownish lesion of acute myocardial infarction at the interventricular septum and left ventricular wall, Figure 2: left ventricular wall shows a whitish lesion of healed myocardial infarction Figure 3: left ventricular wall shows marked hypertrophy of cardiac muscle fibers

Microscopic examination: Sections were submitted from the stump of the aorta, both (right and left) coronaries, apex, right ventricular wall, left ventricular wall, and interventricular septum.

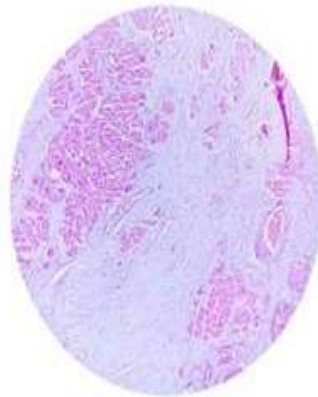
The sections were processed, and the paraffin section was made and stained with Haematoxylin and Eosin stain for microscopic examination.



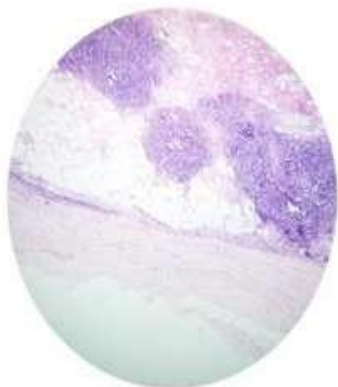
Advanced atherosclerosis: (4x).



Acute MI (40X).



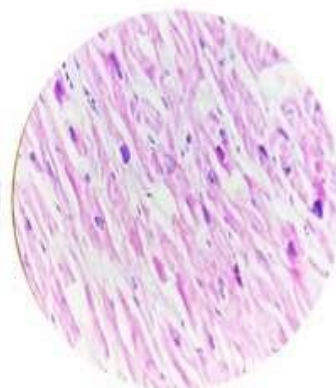
Healed MI (10X)



Pericarditis shows marked
Lymphocytic infiltrate(10x)



Myocarditis:Necrosis of cardiac
muscle & lymphocytic infiltrate(40x)



**Hypertrophy of cardiac
muscle fibers(40x)**

III. RESULT:

In this present study, 177 cases of the autopsied heart were taken. Out of 177 cases, 163 (92.09 %) were male and 14 (7.09 %) were female. (Table 1)

Out of 177 cases, a maximum number of cardiac pathology was found in the age group of 41-50 years, near to a similar number of cases were found in the age group of 51-60 years. (Table 2)

Table 1: Sex-wise distribution of cases

Gender	Number of cases	% of cases
Male	163	92.09
Female	14	7.09
Total	177	100

Table 2: Age-wise distribution of cases of sudden death due to cardiac pathology

Age (years)	Number of cases	% of cases
0-10	0	0
11-20	1	0.56
21-30	9	5.08
31-40	35	19.77
41-50	52	29.38
51-60	50	28.25
61-70	24	13.56
71-80	6	3.39
Total	177	100

In the present study, microscopic histopathological examination shows 131 cases shows advanced coronary atherosclerosis, followed by 104 cases of myocardial infarction. 24

cases show hypertrophy of the myocardial fibres. 7 cases have features of pericarditis and 5 cases show features of myocarditis.

Table 3: Various cardiac pathology-wise distribution of cases

Cardiac pathology	Number of cases
Advanced coronary atherosclerosis	131
Myocardial infarction	104
Myocarditis	5
Pericarditis	7
Hypertrophy of myocardial fibres	24



Of a total of 104 cases of myocardial infarction, 73 cases (70.19%) were of Healed myocardial infarction and 31 cases (24.8 %) were of Acute myocardial infarction.

Table 4; Myocardial infarction Acute MI or Healed MI

Type of Infarction	Number of cases	% of cases
Acute MI	31	24.8
Healed MI	73	70.19
Total	104	100

IV. DISCUSSION:

The autopsy histopathology examination of the heart provides the knowledge of morphological changes of myocardial fibres in Myocardial infarction which is followed by coronary artery disease (atherosclerosis).

There is no valid method of sampling the living population. It was therefore considered that death suspected due to cardiovascular pathology, probably provides the best sample of the living population for studying cardiovascular diseases³.

In this study males were 92.09% and female were 7.09%. This study showed similar cases in Garg S et al study, male were 76% and females were 24%⁴. So, on the basis of the study, males are on the greater risk for developing cardiovascular disease than females.

In present study, deaths occur most common in the age group of 41-50 years followed by the age group of 51-60 years. Similar findings were reported in the study of Chandrakala Joshi 41-60 years and Shilpa garg et al 41-60 year. This shows that age is a powerful risk factor for heart disease. The development of atherosclerosis increases markedly with age up to an age of about 65 years⁴.

By the autopsy histopathological examination, the present study shows 131 cases were of coronary atherosclerosis followed by 104 cases of Myocardial infarction. This study shows similar findings in other studies for coronary atherosclerosis done by Shah Saloni N et al. 93 (61.18%) Chandrakala Joshi et al (64%) and Garg S et al (55.3%)⁵. For myocardial infarction Dr Akhtar Un Nisa Salaria study shows 14 (6%) cases which is lower than our study. Similarly Bora Ozdemir et al, reported myocardial infarction in 48% cases which is also slightly lower than this study³.

Next common cardiac pathology in this study was myocardial hypertrophy which was similar reported by Cristino Basso et al, and Wang HY et al.

Then, in the present study pericarditis is present in 7 cases and myocarditis in 5 cases. The present study was compared with Garg S et al. study in which, Myocarditis was found in

5 (3.5%) cases. Variable percentage of myocarditis has been reported by different authors. In the present study pericarditis was found in 4 (2.8%) cases.

V. CONCLUSION:

Histopathological examination of autopsied heart gives much more clue for cardiovascular disease which can become the lead cause of sudden cardiac death. In this study, we found that the most common cause of sudden cardiac death was myocardial infarction due to atherosclerosis, which are more common in males. So proper and specific interventions should be put for future better performance in cardiac patients.

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