



HISTOMORPHOLOGICAL SPECTRUM OF CARDIAC LESIONS- AN AUTOPSY BASED STUDY AT A TERTIARY CARE CENTRE.

Pathology

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ABSTRACT

Background: Cardiovascular diseases have now emerged as the leading cause of mortality in India. A quarter of all mortality is attributable to CVDs. Histopathological examination of heart on autopsy plays an important role in determining the cause of death. **Aims and Objectives:** The primary objective of this study was to assess the histopathological spectrum of various cardiac lesions in autopsy specimens. **Materials and Methods:** This retrospective study was conducted in the Department of Pathology, M.G.M Medical College, Indore. A total of 530 autopsies were analysed, irrespective of cause of death. Among them heart was included in autopsies, out of which 35 were autolysed. Hence, 495 specimens of whole heart were included in our study. Detailed gross and microscopic examinations were done and histopathological findings were correlated. **Results and Conclusion:** Atherosclerosis was the most common cardiac lesion followed by ischaemic heart disease, 04 cases revealed myocardial hypertrophy, 02 cases revealed rheumatic heart disease, 01 case revealed tiger heart, 01 case showed HIV changes and 01 case had tuberculosis. Left coronary artery was most frequently involved vessel followed by right coronary artery.

KEYWORDS

INTRODUCTION –

Cardiovascular diseases (CVDs) have emerged as a major public health problem in India, affecting the most productive years of an individual's life. According to World Heart Federation report, one-third of all deaths due to cardiovascular diseases in India occur in age group 35-64 years.

The Global Burden Of Disease study estimate of CVD death rate of 272/100000 population in India is higher than the global average of 235/100000 population. The rising CVD burden and the catastrophic consequences it has on individuals, families and populations requires immediate attention with particular causes of concern including its accelerated build-up, early age of disease onset in Indian population and high case fatality rate.

Autopsy along with histopathological examination is still the most accurate method of establishing the cause of death which has important medico-legal implications and has fulfilled multiple purposes including those pertinent to medical care (diagnosis, quality assurance and patient care), body of medical science (research and education), society (public health, vital statistics, forensic issues) and the family.

Histopathological examination of heart is a very important part of a complete forensic autopsy, especially in cases of sudden death with no anatomic cause or suspected cardiomyopathy. It can also aid in studying epidemiological profile, patho-physiology and management plan of various cardiac lesions.

Hence, this study was done to determine the cause and nature of cardiac death and to study spectrum of various histomorphological changes including 495 autopsy specimens of whole heart

MATERIALS AND METHODS-

The present retrospective randomized study was conducted in the Department of Pathology, M.G.M Medical College, Indore over the period of 12 months.

Case selection-

A total of 620 autopsies submitted to this institute for post-mortem examination, irrespective of cause of death, were analysed. The cases were medico legal involving individuals of all age-group, sex, religion and caste. Epidemiological data and post mortem findings were noted from the post mortem and police papers.

Exclusion criteria-

Out of total 620 autopsies, specimen of heart was included in 530 autopsies, out of which 35 were ill preserved and completely autolysed and were excluded from the study. Hence, 495 whole heart specimens were included in our study.

Gross examination of heart-

The samples were received in 10% formalin fixative with relevant history and clinical details. The heart specimens were measured and examined externally for any rupture, infarct and discoloration. The heart was then dissected by modified Virchow's method following the direction of blood flow and examined for any pathology including stenosis, calcification, vegetations or thrombi. Thickness of inter-ventricular septum and ventricular walls was measured. The two main vessels including right coronary artery (RCA) and left coronary artery (LCA) were examined for any hardening, blockage and plaque. The aorta was checked for any plaque, thickening or dilatation.

Microscopic examination-

Representative sections were taken from right and left ventricular wall, inter ventricular septum, coronary arteries and its major branches, valves and stump of aorta. Additional sections were taken from suspected pathological lesions. The sections were routinely processed and stained with Haematoxylin and Eosin stain for microscopic examination. The microscopic findings were noted and were correlated clinically.

Statistical analysis-

The results of the study were statistically analyzed using the Statistical Package for the Social Sciences (SPSS) version 20 (IBM Corp. SPSS statistics, in Armonk NY) for windows. Data were expressed as mean $\pm$ standard deviation and range for quantitative variables, numbers, and percentage.

RESULTS-

A total of 620 autopsies received in the department of pathology were analysed. Out of these 90 cases did not include heart tissue and 35 cases were autolysed to yield any findings and were excluded from the study. Hence, a total of 495 specimen of whole heart were included in our study.

Age and sex distribution

The included cases were divided based on the age at the time of death, into particular age groups. The youngest case was 10 day old male and the oldest was 88 years male forming a age range of 0-88 years.

Maximum number of cases were found in the age group of 41-50 years i.e. 242 (24.2%). Out of 495 cases, 390 (78.8 %) were males and 105 (21.2 %) were females .There was remarkable male dominance.

Clinical details-

The cases presented with varied causes of death. Majority of them (37.0%) had cardiovascular symptoms like chest pain, breathlessness and dizziness. Third most common cause was unknown previous illness (9.0%) and cases were under treatment.

Histopathological changes in heart-

A wide array of microscopic changes were observed. Atherosclerosis was the most common finding seen in 310 cases. 04 cases showed myocardial hypertrophy ,02 cases showed rheumatic heart disease, 01 case showed changes of tiger heart ,01 case showed tuberculosis with involvement of pericardium and 01 case showed changes of HIV. No significant pathological changes were noted in 176 hearts. In age group 0-10 years microscopic examination of heart and vessels did not show any pathology.

Changes in coronary arteries-

Overall prevalence of atherosclerosis was 60.6 %. All the cases with age more than 70 years had significant atherosclerosis Out of the two coronary arteries, left coronary artery was most commonly involved vessel (220 cases), followed by right coronary artery (RCA) (80 cases). Secondary changes in coronary arteries like calcification and thrombus formation were seen in 135 cases of LCA and RCA respectively. In 35 cases (11.6 %) aorta also showed atherosclerotic plaques.

Pattern and distribution of IHD-

Overall prevalence of IHD was 34.6% with features of chronic IHD (CIHD) in 21.6% and acute myocardial infarction (AMI) in 8.5% A direct correlation was seen between IHD incidences and increasing age, with maximum number of cases reported in the age group of 51-60 years. The most commonly observed pattern of involvement was diffuse i.e. involvement of all the three areas i.e. left ventricular wall (LVW), inter ventricular septum (IVS) and apex , followed by isolated involvement of left ventricular wall.

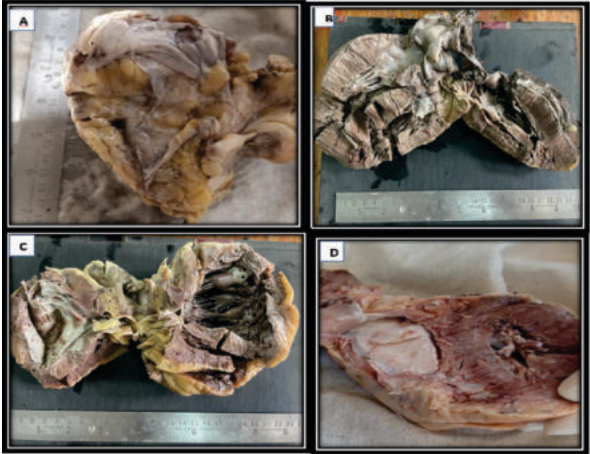
DISCUSSION-

Histopathological examination of heart plays a very important role in determining whether cause of death is attributable to a cardiac disease or other as well as to determine the nature of cardiac disease, whether it was mechanical or arrhythmic and to rule out the possibility any other unnatural cause. Out of 495 whole heart specimens from our study, 78.8% were males and 21.2% were females, and most of the cardiovascular deaths occurred within the age range of 41-60 years. This may be due to westernization , sedentary life style, poor diet habits and lack of exercise and regular medical checkups. Secondly, there is increased tobacco and alcohol consumption in males, in contrast to vasoprotective effects of estrogen in females. Many different studies showed similar findings like similar male predominance and role of increasing age with Karnafil R et al having maximum case in 41-50 years age range, Chug SS et al in 50-59 years and Rao D et al in 50-60 years. 8–10. Our study also observed that in adolescents and young adults (<40 years)hypertrophic cardiomyopathy, pericarditis, tuberculosis and premature coronary artery disease were found to be a major causative factor. While after 40 years, coronary atherosclerosis and IHD were predominant findings .These findings are inconcordance with study done by Rao D et al, Singh P et aland Marwah et al.In this study, the prevalence of coronary atherosclerosis was 61.0%, which is comparable to other studies done by Shah SN et al (61.18%), Garg S et al (55.3%) and JoshiC et al (64%).In terms of frequency of involvement and secondary changes LCA was most commonly involved vessel, followed by RCA

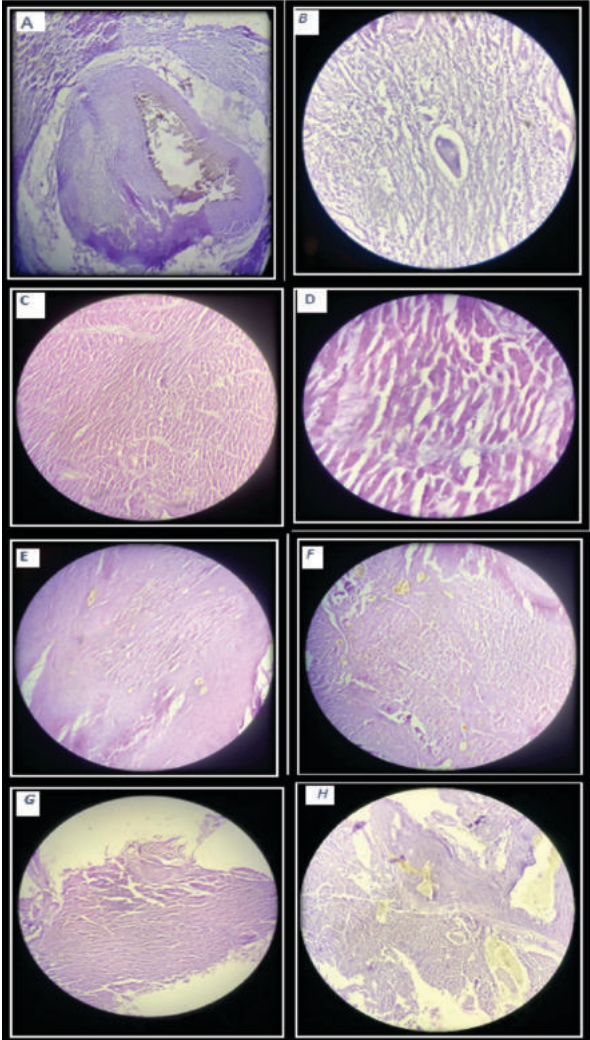
Table 1- Histopathological Changes In Heart According To Age Group Distribution

AGE(Y EARS)	NOR MAL	CONG ESTIO N	CORONARY ATHEROSCLER OSIS	HCM	TIGER HEART	HIV	T.B
0-10	02						
11-20	20	28					
21-30	12	95					
31-40	04	10	25	01			
41-50		17	55	02	01		01

51-60		110	01			
61-70		80			01	
71-80		30				
81-90						
91-100						
TOTAL						



Gross findings of heart revealing: A)Pericardial tuberculosis B)Hypertrophic Cardiomyopathy C)Tiger heart D)In a HIV positive Case



Microscopic images of heart depicting :A)Coronary Atherosclerosis B)Pericardial Tuberculosis. C&D)Hypertrophic Cardiomyopathy E&F)Tiger Heart .G&H)Changes in a HIV positive case

CONCLUSIONS-

Our study studied various histological changes in autopsied heart in different age groups. Ischemic heart disease (coronary atherosclerosis) turned out to be the commonest cause of death. Incidence of ischemic heart disease is more common in males and its incidence increases with increasing age. Thus, in case of autopsy cardiovascular system should be carefully examined to reach the cause of death.

Conflict of Interest – None.

REFERENCES –

1. Renuka verma et al, Histopathological array of cardiac lesions: An autopsy based study in a tertiary care centre, IP Archives of Cytology and Histopathology Research 2021;6(3):173–180
2. Karanfil R, Gulmen MK, Hilal A. Evaluation of cardiac conduction system in sudden death cases. *J For Med.* 2013;27(1):17–28.
3. Rao D, Sood D, Pathak P, Dongre SD. Cause of sudden cardiac deaths on autopsy findings; a four-year report. *Emergency.* 2014;2(1):12–7.
4. Chugh SS, Kelly KL, Titus JL. Sudden cardiac death with apparently normal heart. *Circulation.* 2000;102(6):649–54. doi:10.1161/01.cir.102.6.649.
5. Singh P, Satarkar RN, Kalhan S, Hasija S, Bhawna, Sangwaiya A, et al. Correlation of coronary artery atherosclerosis typing and luminal narrowing with ischemic myocardial lesions in post mortem heart specimens: a four year retrospective study. *Trop J Path Micro.* 2018;4(3):248–57.
6. Marwah N, Sethi B, Gupta S, Duhan A, Singh S, Sen R, et al. Histomorphological spectrum of various cardiac changes in sudden death: An autopsy study. *Iranian J Pathol.* 2011;6(4):179–86.
7. Shah SN, Patel KA, Patel HB, Bhalodia JN. Histomorphological study of changes in heart - An autopsy study. *Arch Cytol Histopathol Res.* 2019;4(2):159–63.
8. Garg S, Hasija S, Sharma P, Kalhan S, Saini N, Khan A, et al. A histopathological analysis of prevalence of various heart diseases: an autopsy study. *Int J Res Med Sci.* 2018;6(4):1414–8. doi:10.18203/2320-6012.ijrms20181306.
9. Joshi C. Postmortem study of histopathological lesions of heart in cases of sudden death-an incidental finding. *J Evid Based Med Healthc.* 2016;3(6):184–8.