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CARDIAC PATHOLOGY IN MEDICOLEGAL AUTOPSIES.

Pathology

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ABSTRACT

Background-Cardiac diseases are the leading causes of death in the age group of 35 to 64 years in India .The causes of sudden cardiac death in young & older people are different

Aims &objectives- The present study aimed at studying the spectrum of cardiac lesions , it's frequency ,age and sex distribution of cases in medicolegal autopsies.

Material &methods- This was a retrospective study of histopathological examination of whole heart of medicolegal autopsy cases over a period of two years. Morphological examination of heart as per standard protocol was done .Data were analysed .

Results- The commonest finding was coronary artery disease(34.7%) followed by ischaemic heart disease(16.26%).Unexpected & unusual lesions viz.metastasis from pancreatobiliary adenocarcinoma,leukemic infiltrate in myocardium and toxoplasma myocarditis were found during study period.

Conclusion- Diseased hearts were 39% in the present study .So whole heart should be subjected for histopathological examination in all medicolegal autopsies.

KEYWORDS

Cardiac Pathology, Medicolegal Autopsy, Atherosclerosis.

INTRODUCTION

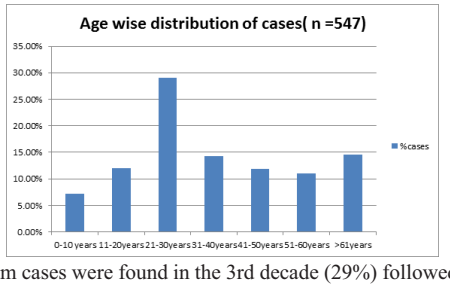
In India, cardiovascular diseases are the leading causes of death in the age group of 35-64 years. 'World Heart' Federation reported that 35% of all deaths are caused by cardiovascular diseases. In cardiovascular diseases, coronary artery diseases accounted for 90-95% of all cases and deaths. Sudden deaths due to an unknown cause may reveal cardiac pathology in the deceased after autopsy. There are 2,50,000 sudden cardiac arrests each year in the US but most deaths are in the older adults and very few in young people. The causes of sudden cardiac deaths in young and older people are different. Ischemic heart disease is the leading cause of death worldwide for both men and women. Other cardiac lesions like myocarditis, congenital heart disease, pericarditis, myocardial hypertrophy can be seen in medicolegal autopsies. An autopsy study is a valuable tool which tells us various pathologies involving the heart. Clinical findings in cardiac diseases may be vague and may not pinpoint the cardiac pathology. Sudden progression of the disease does not give time for the clinician for detailed investigations and may cause confusion. In this situation, a detailed histopathological examination of the heart at autopsy is of great help in knowing the exact pathology involving the heart and may provide the cause of death. The present study is aimed at studying various histopathological lesions occurring in the heart, its frequency at the tertiary care center, along with age and sex distribution.

MATERIAL AND METHODS-

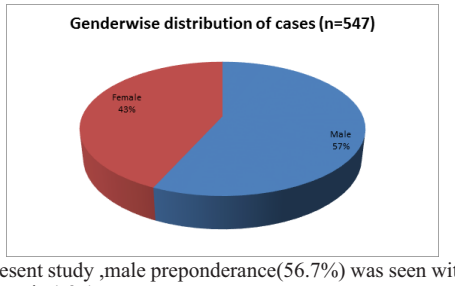
The present study was a retrospective, observational, non-interventional study carried out in the Department of Pathology, Dr. V.M.Govt. Medical College, Solapur. The study included heart specimens of all medicolegal autopsy cases received for histopathological examination over a period of two years from January 2014 to December 2015. The present study comprised of total 568 specimens of heart, of which 21 specimens were excluded from the study owing to complete autolysis. A detailed gross examination of the heart was done. Weight and dimensions of the whole heart were recorded. The external surface was examined for pericardial pathology and the heart was opened by inflow outflow technique, short-axis method and four-chamber method as per the need of the specimen. After opening all the chambers, valves, papillary muscle, chordae tendinae were examined. The thickness of all chambers was measured. The valves were examined for stenosis and calcification. The interventricular septum, papillary muscle, and apex were examined for recent or old infarcts. Areas of recent or old infarction were examined. Its location and size were recorded. All four coronary arteries were examined using regular transverse cuts for every 4-5 mm. The ascending aorta was examined for thickening/ atherosclerosis. Representative sections from ventricular walls, atria, apex, interventricular septum, papillary muscle, and suspected pathological areas were taken. The sections were processed as per the standard protocol for routine paraffin embedding method and H&E staining. Special stains were employed as per the case merit. A thorough microscopic examination was done and final opinion was formed. The data of the cardiac pathology in the said period was analyzed with respect to age and sex distribution, histopathological patterns of cardiac pathology and it's frequency of occurrence.

RESULT

In the present study, total 568 specimens were received for histopathological examination over a period of two years. Of which 21 autolysed specimens were excluded from the study. Total 547 heart specimens were studied.



Maximum cases were found in the 3rd decade (29%) followed by the 4th decade (14.25%)and over 60 years of age(14.62%). The mean age was 40 years.



In the present study ,male preponderance(56.7%) was seen with male to female ratio 1.3:1.

Table 2: Histopathological cardiac findings in medicolegal autopsies (n=547)

Sr.No.	Cardiac pathology	No.of cases	%
1	Heart failure		

	Hypertrophy	15	2.74
	Atrophy	1	0.18
2	Ischemic heart disease		
	Myocardial infarction	30	5.48
	Chronic IHD	59	10.78
3	Valvular heart disease		
	Calcific valve	3	0.54
	Rheumatic heart disease	1	0.18
4	Myocardial diseases		
	myocarditis	5	0.91
	cardiomyopathy	1	0.18
5	Pericardial diseases	9	1.64
6	Cardiac neoplasms		
	Secondary	2	0.36
7	Atherosclerosis of coronary arteries	190	34.7
8	Unremarkable	334	61

Cardiac pathology was found in 39% of the specimens. The dominant pathology was coronary artery atherosclerosis (34.7%)followed by ischaemic heart disease (16.26%)(fig.1).Myocardial infarction was observed in 5.48%of cases. Unusual findings like cardiac metastasis from pancreatobiliary adenocarcinoma and leukemic infiltrate in myocardium were also noted during study period. Pericarditis was observed in 9 cases(1.64%).Out of nine cases a single case each of tuberculous pericarditis & acute fibrinous pericarditis and acute pericarditis by toxoplasma gondii were seen. Six cases had focal or diffuse chronic pericarditis. Myocarditis was found in 5cases(0.91%).A single case of acute pericarditis &myocarditis by toxoplasma gondii was found during study period .Four cases of focal or diffuse lymphocytic myocarditis were also noted.

Fig.1-Photomicrograph showing old healed myocardial infarction(Chronic ischaemic heart disease)

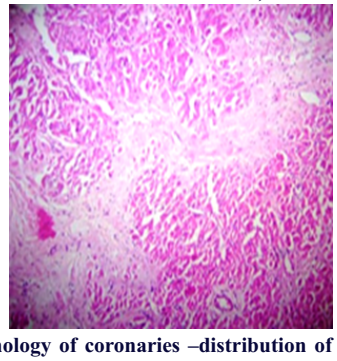


Table 3: Pathology of coronaries –distribution of cases (n= 190 cases)

Lesions	No. of cases	Percentage
Atherosclerosis	154	81.05%
Atherosclerosis with calcification	35	23.3%
Atherosclerosis with thrombosis	1	0.52%

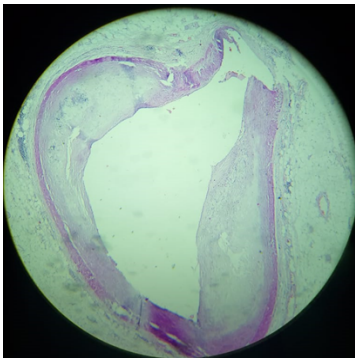


Fig.2-Photomicrograph of coronary artery showing complicated atherosclerosis

In the present study coronary artery atherosclerosis was found in 190 cases ,out of which23.3%cases had complicated atherosclerosis(fig.2) and 81% showed uncomplicated atherosclerosis .A single case showed atherosclerosis with thrombosis.

DISCUSSION

An autopsy is an important tool used to study various pathologies, it's frequency, severity, and course of the disease.

There is no ideal method available for grading of atherosclerosis in living. So, it was considered that autopsy study can detect atherosclerosis in death suspected due to cardiovascular pathology and gives the best sample for studying the prevalence of atherosclerosis, it's the severity and cause effect relationship of ischemic diseases.

In the present study, a slight male dominance was observed constituting 56.7% of males and 43.3% of females. Warler et all found a dominance of male gender with a mean age of 41.3 years in his study where the study included the population ranging from newborn to 100 years. Garg S et all in 2018 also found male dominance in his study.

In the present study, maximum cases were in the age group of 21-30 years in contrast to other studies where the age range was on a higher side compared to the present study. Shilpa Garg et al in her study of 141 cases, found the maximum number of cases in the age group of 41 to 60 years. The age range for cardiac pathology in the study of Ramzan Karanfir et al was of 17-78 years and Chandrakala Joshi was 41 to 60 years.

This lower age range in the present study can be attributed to the fact that morphologically normal hearts were found in 61% of the cases which were mostly young adults. But it also emphasizes that in medicolegal autopsy cases 39% of cases had cardiac pathology which might have either led or contributed to the death.

In the present study, coronary artery disease (atherosclerosis) was the commonest histopathological finding accounting for34.7% of the cases, followed by ischemic heart disease (16.26%). Literature searches have shown that the commonest histopathological finding in the autopsy was coronary atherosclerosis. Garg et al found 55.3% of cases of coronary atherosclerosis. He further quoted that Ramzan Karanfil et al,Stavroula A et al and Chandrakala Joshi found it in 77%,75%and 64% of cases. Present study had a much lower frequency compared to it. But the limitation of the study was the examination of received specimens were selected by forensic experts. This may not reflect the true frequency as few cases might have signed out without histopathological examination of the heart. However, atherosclerosis was the most dominant pathology found in the present study similar to other studies in this field. Amongst 190 cases of atherosclerosis, 35 (23.3%) cases had complicated atherosclerosis in the form of calcification. A single case showed superimposed thrombus formation.

Out of 89 cases of ischemic heart disease, 30 cases (5.48%) showed acute myocardial infarction, whereas 59 cases (10.78%) showed old healed infarct in the present study. Other studies have reported a higher incidence of myocardial infarction compared to present studies. Garg et all (2018) reported myocardial infarction in 14.8 % of cases, Bora Ozdemi in 26% of cases, Wang HY in 10% cases. This difference may be due to the fact that the present study found cardiovascular pathology in 39% of specimens. However, out of 190 cases of atherosclerosis 30 cases (5.48%) had myocardial infarction. Mario Marzilli in his study quoted that 50%of controls with critical coronary obstruction had no history of IHD. He further quoted that 212 consecutive patients with acute coronary syndrome, coronary angiographic and electrocardiographic findings showed normal or near-normal vessels in 30.6% of patients. Hence the occurrence of myocardial infarction is a multifactorial phenomenon. Coronary obstruction has a crucial role but it can not be the sole factor in all patients. Literatures mention that there is a time gap between the occurrence of death due to infarction and the appearance of microscopic features.

Myocarditis was found in 0.91% of cases in the present study. An unusual case of acute pericarditis &myocarditis by toxoplasma gondii in 35 years female was an extremely unexpected pathology encountered in the study. Prevalence of cardiac toxoplasmosis is 12%in a study of 182 cardiac necropsies by P.Hafman et al. He found 12%toxoplasma myocarditis in immunocompromised patients. Present case had a history of retroviral disease .Different authors have noted different incidences. Myocarditis reported by Agale et al was 6.92%.Kremer et al, Basso et al, and Joshi C have reported it 29%,22%,10% respectively. Low incidence of 6%was recorded by Waller et al. These differing incidences may be due to individual preferences of applying available proposed histological criteria of Dallas for diagnosis. The evidence of 14 lymphocytes per mm square without myocyte damage (focal, diffuse or confluent) are sufficient for the diagnosis of myocarditis. (Sudheer Arava 2018)Secondly, it could

be due to over or underestimation of inflammatory infiltrate. The number and sites of bits taken for histological examination. Most of the times dissimilar looking areas are sampled for examination. But myocarditis may not show an abnormality on gross examination. All these facts can explain the difference in incidences.

Pericarditis was found in 9(0.73%) cases. Shubhangi V Agale et al reported it to be 9.69%. Myocardial hypertrophy, where the cause could not be ascertained was seen in 2.21% cases. Valvular calcifications were seen in four cases (0.72%) constituting a calcific mitral valve in three(0.54%) and a single case of rheumatic heart disease. Cardiomyopathy killed a single case in the present study. Cardiac neoplasms were seen in two cases. An unusual case of cardiac metastasis from pancreatobilliary adenocarcinoma in a 74 years male was found.Another case of leukemic infiltrate in pericardium was also encountered during the study period. Importantly 334 (61%) specimens did not reveal any pathology on gross and microscopic examinations. Shubhangi V Agale and Zijio et al found unremarkable specimens in 22.49% and 6.1% respectively in their study of sudden death. This differences may be due to individual preferences and need of forensic expert to select the specimen for histopathological examinations.

CONCLUSION-

The present study found 39% of diseased heart in medicolegal autopsy cases. A wide spectrum of pathologies was observed. The commonest pathology found was coronary atherosclerosis followed by ischaemic heart disease. Most unexpected pathologies included cardiomyopathy, cardiac metastasis and pericarditis and myocarditis due to toxoplasma gondii.It is highly imperative to subject the whole heart of all medicolegal autopsies for histopathological examination in order to know or to rule out various pathologies. In many cases, it provides an exact cause of death.

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