



**MORPHOLOGICAL PATTERNS IN HEART DISEASES- AN AUTOPSY STUDY**

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**ABSTRACT**

Heart disease is the common cause of sudden death after trauma and poisoning. As the age increases there is increased chances of heart diseases .In order to assess the pattern of heart diseases, a retrospective study of 97 autopsy heart was carried out in a tertiary care hospital for a period of 1 year. Maximum number of cases (29.8%) were in the age group 40-49 yrs. males were commonly affected by the heart diseases. Male: Female ratio was 11:1. . Atherosclerosis was the major pathology identified constituting 77.3% of the cases. Chronic ischemic heart disease was second in pathology constituting 13.4 % followed by Acute MI (3.09%), congestion (2.06%), stromal fatty infiltration (2.06), pericarditis and cysticercosis each contributed 1.03% of the total cases

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**INTRODUCTION**

The normal heart weight varies with body height and weight; it averages approximately 250 to 300g in females and 300 to 350g in males. The usual thickness of the free wall of the right ventricle is 0.3 to 0.5cm and that of the left ventricle 1.3 to 1.5cm.<sup>1</sup> The three major epicardial coronary arteries are left anterior descending (LAD), left circumflex (LCX) and right coronary (RCA). LAD supplies most of the apex of the heart, anterior wall of left ventricle and anterior two-thirds of ventricular septum. LCX perfuse only lateral wall of left ventricle.RCA supplies the entire right ventricular free wall and postero-basal wall of left ventricle and posterior third of ventricular septum.<sup>2</sup>

**Categories of heart diseases**

1. Congenital heart disease
2. Ischemic heart disease (IHD)
3. Hypertensive heart disease
4. Valvular heart disease
5. Non-ischemic myocardial disease

**Myocardial Infarction( MI )**

Ischemic heart disease (IHD) is defined as acute or chronic form of cardiac disability due to imbalance between supply and demand of oxygenated blood. In more than 90% cases the cause of myocardial ischemia is reduced blood flow due to coronary atherosclerosis. Thus IHD is often termed coronary artery disease (CAD) or coronary heart disease (CHD).<sup>3</sup>

CAD is the leading cause of global deaths with about 80% of burden occurring in developing countries.<sup>4,5</sup> In India, CAD has emerged as the single largest disease accounting for nearly one third of all deaths. The incidence of coronary artery disease has doubled during past three to four decades. Evolution of morphologic changes in MI

Time	Gross features	Light microscopy
Reversible Injury 0-1/2 hr	None	None
Irreversible Injury ½-4 hr	None	Variable waviness of fibers at border
4-12 hr	Occasional dark mottling	Beginning coagulation necrosis; edema; hemorrhage
12-24hr	Dark mottling	Coagulation necrosis; pyknosis of nuclei,myocyte hypereosinophilia; beginning of neutrophilic infiltrate
1-3 days	Mottling with yellow-tan infarct centre	Coagulation with loss of nuclei and striations;interstitial infiltrate of neutrophils
3-7 days	Hyperemic border;central yellow – tan softening	Beginning disintegration of dead myofibers with dying neutrophils;
7-10 days	Maximally yellow-tan and soft,with depressed red-tan margins	Well-developed phagocytosis of dead cells; early formation of fibrovascular granulation tissue at margins
10-14 days	Red-grey depressed infarct borders	Well established granulation tissue with new blood vssels and collagen deposition
2-8 wk	Grey- white scar, progressive from border toward core of infarct	Increased collagen deposition, with decreased cellularity
>2 month	Scarring complete	Dense collagenous scar

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**Atherosclerosis**

Atherosclerosis is characterized by intimal lesions called atheromas which protrude into and obstruct vascular lumens and weaken the underlying media. They may lead to serious complications. Global in distribution, atherosclerosis contributes to more mortality .<sup>6,7</sup> It is the most common findings in autopsies.

**Myocarditis**

Coxsackievirus A and B and other enteroviruses are the most common causes of myocarditis. Other causes include-chlamydia, rickettsiae, candida, immune mediated, HIV etc.<sup>4</sup> Grossly - heart may appear normal or dilated. Ventricular myocardium is flabby and often mottled by pale foci or minute hemorrhagic lesions. Any chamber may have mural thrombi.

Microscopically-Interstitial mononuclear inflammatory infiltrate and focal necrosis of myocytes.<sup>5</sup>

**Pericarditis**

**Types**

**Acute pericarditis**

1. Serous Pericarditis- Non-infectious inflammations such as RF, SLE, scleroderma, tumors and uremia are the causes. Microscopically - there is scant number of neutrophils, lymphocytes and macrophages are seen in the epicardial and pericardial surface.
2. Fibrinous and Serofibrinous Pericarditis-most frequent type.
3. Purulent Pericarditis
4. Hemorrhagic
5. Caseous Pericarditis

**Chronic Pericarditis**

**Stromal Fatty Infiltration**

Fatty infiltration of the myocardium is usually an incidental intraoperative or necropsy finding. Most publications dealing with fatty infiltration in the heart have accordingly been largely limited either to retrospective postmortem studies or individual case reports. With advanced radiological and echocardiography techniques it is now possible to identify myocardial fat infiltration antemortem.<sup>8</sup>

**Cysticercosis**

Heart is rarely involved by the cysticercus. Only few cases have been reported in the literature in the form of autopsy studies. Heart involvement is part of a severe and generalized infection with the presence of cysts in the myocardium.<sup>9</sup>

In order to assess the pattern of heart diseases, a retrospective study of autopsy cases for the presence of atherosclerotic lesions of coronary arteries and associated ischemic cardiac lesions like acute myocardial infarction (MI) along with other heart disease was under taken for a period of 1 year in a tertiary care hospital.

**MATERIALS AND METHODS**

This retrospective study was carried out in a tertiary care hospital, Pathology department PGIMS rohtak for a period of

1 year. A total of 97 hearts constituted the material for the study.

Received hearts were weighed in grams. Grossing of heart was performed by the inflow and outflow method. Right and left atrium wall, right and left ventricular wall, interventricular septum and aortic stump were measured. On gross examination any area of infarct, thrombosis or any other finding was noted. Then sections were taken from right and left atrial wall, right and left atrio-ventricular junction, right and left ventricular wall, interventricular septum, apex and right and left coronary arteries. Hematoxylin and eosin stained slides were then studied under microscope. Histopathological findings were noted to see the type of disease.

**RESULTS**

**Table1** Age distribution in heart diseases

Age group	Male( no. of cases)	Female( no. of cases)
< 20 yrs	1	0
20-29 yrs	7	2
30-39 yrs	17	2
40-49 yrs	27	2
50-59 yrs	24	0
>60 yrs	13	2

Table 1 shows distribution of heart diseases according to age. Maximum number of cases (29.8%) were in the age group 40-49 yrs followed by 24.7% in age group 50-59 yrs. Only 1 case (1.03%) was noted below the age of 20 yrs.

**Table 2** Sex distribution

Total no. of cases	97
No. of Males	89(91.75%)
No. of Females	8(8.2%)

Table 2 shows males were commonly affected by the heart diseases. 89 males were affected in comparison to 8 females. Male: Female ratio was 11:1.

**Table 3** Type of diseases

Name of disease	No. of cases
Atherosclerosis	75(77.3%)
mild	21
moderate	38
severe	16
MI(acute)	3(3.09%)
Chronic Ischemic heart disease	13(13.4%)
Pericarditis	01(1.03%)
Cysticercosis	01(1.03%)
Congestion	02(2.06%)
Stromal fatty infiltration	02(2.06%)

Table 3 shows the types of diseases seen in the hearts examined. Atherosclerosis was the major pathology identified constituting 77.3% of the cases. Chronic ischemic heart disease was second in pathology constituting 13.4 % followed by Acute MI (3.09%), congestion (2.06%), stromal fatty infiltration (2.06), pericarditis and cysticercosis each contributed 1.03% of the total cases.

**DISCUSSION**

Heart disease is the common cause of sudden death after trauma and poisoning. Atherosclerosis is most common amongst the heart diseases. Males are commonly affected

than females. As the age increases there is increased chances of heart diseases.

**Table 4** Comparison of mean age group

Study group	Common age group
Ahmad <i>et al</i> <sup>10</sup>	40-59 yrs
Rao <i>et al</i> <sup>11</sup>	50-60 yrs
Present study	40-59 yrs

Ahmed *et al*<sup>10</sup> concluded that 40-59 yrs is the most common age group for the heart diseases. Rao *et al*<sup>11</sup> studied 50 -60 yrs is the commonest age group. Present study also revealed heart disease is frequently seen in 4<sup>th</sup> and 5<sup>th</sup> decades.

**Table 5** Comparison of male: female ratio

Study group	M:Fratio
Ahmad <i>et al</i> <sup>10</sup>	6.6:0
Abedinzadeh <i>et al</i> <sup>12</sup>	2:1
Packard <i>et al</i> <sup>13</sup>	3:1
Cherian <i>et al</i> <sup>14</sup>	2:1
Rao <i>et al</i> <sup>11</sup>	10:1
Present study	11:1

Ahmad *et al*<sup>10</sup> concluded all were men in their study. Abedinzadeh *et al*<sup>12</sup> showed M:F of 2:1 which was in concordant with Packard<sup>13</sup> and Cherian *et al*<sup>14</sup> study. Our study concluded M:F of 11:1 which was almost similar to the study of Rao *et al*<sup>11</sup>.

**Table 6** Comparison of percentage of cases of atherosclerosis

Study group	Percentage
Ahmad <i>et al</i> <sup>10</sup>	78%
Rao <i>et al</i> <sup>11</sup>	56.86%
Kasthuri <i>et al</i> <sup>15</sup>	76.9%
Present study	77.3%

Present study revealed 78% of the cases were constituted by atherosclerosis which was in conformity to the two previous studies of Kasthuri *et al*<sup>15</sup> and Ahmad *et al*<sup>10</sup>. Rao *et al*<sup>11</sup> concluded lower percentage (56.86%).

Present study concluded that atherosclerosis was the major pathology identified constituting 77.3% of the cases. Chronic ischemic heart disease was second in pathology constituting 13.4 % followed by Acute MI (3.09%), congestion (2.06%), stromal fatty infiltration (2.06), pericarditis and cysticercosis each contributed 1.03% of the total cases.

## CONCLUSION

1. The most common age group with heart diseases was 40-59 yrs (29.8%). Only 1 case noted below 20 yrs.
2. Males were more affected than females with M: F ratio of 11:1.
3. Atherosclerosis was the major pathology identified constituting 77.3%.
4. Chronic ischemic heart disease was 2nd common pathology constituting 13.4% followed by Acute MI.

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