Coronary Atherosclerosis and Myocardial Infarction An Autopsy Study

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Abstracts: <u>Background & objectives</u> The prevalence and incidence of ischemic heart disease virtually ubiquitous among most developed nations and in India. Considerable progress on the health impact of atherosclerosis disease has been made over recent decade and being largest cause of mortality and morbidity in country like India. The study highlights the impact of atherosclesis lesion in population Bhavnagar Gujarat. <u>Method:</u> Study comprise of 300 specimen of heart subjected to autopsy, to grade and to evalue athermanous plaque and myocardial infarction. The atherosclerotic lesions were graded according to American heart association classification. <u>Results:</u> The study show significant atheroma that was grade IV (29.7%), grade V (29%) and grade VI (21.7%). Triple and double vessels involvement was seen in 43.7% and 39.6 % cases respectively. The changes of myocardial infarction were found in 31 cases. <u>Conclusion:</u> The study highlights the impact of atherosclerotic lesions in the population of Bhavnagar,Gujarat.The incidence of atherosclerosis is more in male as compare to female. The study show increase incidence of atherosclerosis in younger people in third decade The evaluation of the study may form baseline for research and forthcoming study. [Shailadaria P et al NJIRM 2013; 4(3) : 106-108]

Key words: Autopsy, Atherosclerosis, ischemic heart disease, myocardial Infarction

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Introduction: Atherosclerosis considers a chronic inflammatory response of to vascular wall to a variety of events that are initiated early in life. it is estimated that there were approximately 29.8 million patients of cardiovascular disease in India. An estimated 1.5 million people died of cardiovascular disease every year. The coronary heart disease is expected to be the single most important cause of death in India by the year of 2015. The prevalence of coronary heart disease in urban area is 6.5% and in rural area 2.5 %. [1]

Major advances in medical, interventional and surgical therapy, together with effective secondary prevention, has resulted in extended life expectancy and an improvement in the quality of life of most patients with clinical coronary artery disease. [2]

Multiple mechanisms contributes to plaque formation and progression including endothelial dysfunction, monocyte adhesion, infiltration, lipid accumulation and oxidation, smooth muscle proliferation, extracellular matrix deposion and thrombosis.[3]

In order to assess the magnitude of the problems, prospective study of autopsied patients fo t the presence of atherosclerosis lesions of the coronaries artery and myocardial infarction was undertaken at government medical college, Bhavnagar, Gujarat. An autopsy study gives a good measure the prevalence, grading and distribution pattern of atherosclerotic lesions.

Material and Methods: Permission of institutional review board before conducting the study was taken. In the present study, heart specimens of 300 routine autopsies including myocardial infarction and other causes received in the department of pathology, Autopsy section, government Medical College, Bhavnagar, Gujarat. We examined grossly and microscopically for the presence of extent of atherosclerosis and evidence of myocardial infarction. The medical history and clinical history were traced.

The heart were fixed in 10% formalin, weighed and then investigated for the presence of scars of MI measurements of right ventricle wall, left ventricular wall, intra ventricular septa and stump of aorta were taken. Circumferences of the mitral, tricuspid, pulmonary and aortic valve were noted. The three main coronary arteries were dissected out. Each coronary artery was then section by multiple closely spaced cuts with a scalpel. The exposed artery was carefully examined for any thickening, yellow streaks, frank plaque or calcification. Then ventricles were sectioned transversely at 10 mm intervals coming from apex.

After routine processing and paraffin embedding 3 micro meter section were taken. All the histological sections were stained in H & E stain. All the histological section were examined microscopically for the presence of atheroma, ischemic heart disease and MI. American heart association typing of atherosclerosis plaque was done.

American heart association criteria for the grading atherosclerosis lesions [4]
Type I: initial lesion
Type IIa: progression-prone type II lesion
Type IIb: progression-resistant type II
Type III: intermediate lesion (preatheroma)
Type IV: atheroma
Type Va: fibroatheroma (type V lesion)
Type Vb: calcific lesion (type VII lesion)
Type Vc: fibrotic lesion (type VIII lesion)
Type VI: complicated lesion
    VIa: with surface defect
    VIb: with hematoma–haemorrhage
    VIc: with thrombotic deposit

Result: Out of the 300 hearts studied, 72% were males. Out of these 162 heart specimens showed no remarkable pathology. According to the Age sex wise distribution of these autopsy cases shown in table no.1

In our 300 autopsy case studied 216(72%) were male and 84(28%) were female. Out of these 138 heart specimens showed changes of atherosclerosis and 31 heart specimens showed myocardial infarction. Out of these 162 heart specimens showed no remarkable pathology.

Table 1 showed age and sex wise distribution

Age Group	Male	Female	Total	Percentage
1 – 10	0	0	0	0
11 to 20	4	0	4	1.33
21-30	49	21	70	23.3
31-40	55	23	78	26
41 -50	45	18	63	21
51-60	45	15	60	20
61-70	11	7	18	6
71-80	4	0	4	1.33
81-90	3	0	3	1
Total	216	84	300	100

Table 2: showed the frequency distribution of atherosclerosis in three major coronary arteries

RCA		LAD		LCA	
N	%	N	%	N	%
25	18.11	75	53.34	38	27.53

In our study showed significant increase the number of cases of atherosclerosis in the third and fourth decade. According to American heart association criteria for the grading atherosclerosis lesions we found 29.7 % in grade 4, 29 % in grade 5 and 21.7% in grade 6 lesions. The most commonly involved artery was left anterior descending coronary artery (54.34 %), LCA AND RCA showed 27.53 %, 18.11 % involvement respectively. Out of these cases 16.5% had a single vessels involvement were as double and triple vessels involved in 39.6 % and 43.7 % cases respectively. Presence of myocardial infarction was found 31 cases (22.46 %).

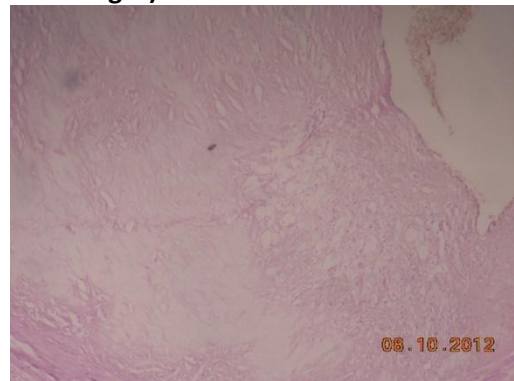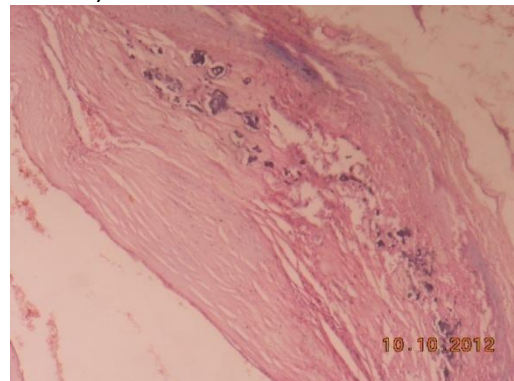**Fig.1 Type IV atherosclerosis (atherosclerosis with myxoid changes)**

Fig.2 Type V atherosclerosis (myxoid changes and calcification)


Discussion: The prevalence and severity of the disease among individual and groups- and

therefore the age when it is to likely to cause tissue injury – are related to a number of factors, some constitutional but others acquired and potentially controllable.

In the present study it was observed that 216 cases (72%) were male and 86 (28%) were females which are more or less similar to the past studies. Murthy et al [5] studied 150 cases out of which 123(82%) were males and 27(18%) were females. Singh et al studied 200 cases with 170 85% males and 30(15%) females. Padmavti [6] and tendon [7] found 66.5% ma les and 33.5% females. Similarly Bhargava et al [8] studied 74.8% males and 24.2% females in their studied. The reasons being that males more indulge themselves in smoking, alcoholism etc.

Fig. 3 myocardial infarction (necrotic cardiac myocyte with inflammatory cells)
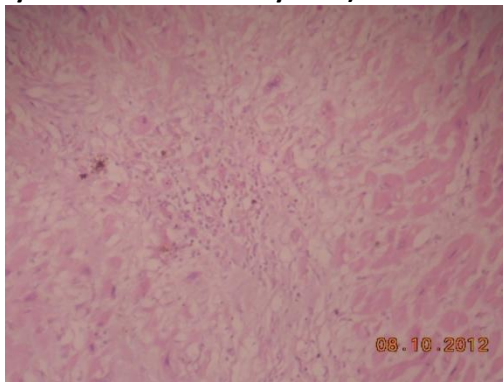
The Americans heart association characterises and classified atherosclerotic lesions from type I to type VI. It was proposed that these lesions progressed from one type to the next. The preatheroma (type III) was the most common type in our study (47.8%). Next in the frequency was atheroma (type IV) 29.7% and (type V) 29%.

Conclusion: The study highlights the impact of atherosclerotic lesions in the population of Bhavnagar, Guarat.The incidence of atherosclerosis is more in male as compare to female. The study show increase incidence of atherosclerosis in younger people in third decade suggest indirect evidence that effective preventative strategy not limited to middle and old aged people but also to young adult and should be taught about modifying risk factors of atherosclerosis like smoking, life style, physical activity and habits. The study add

valuable data to the literature regarding the morphology of atherosclerosis.

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