

An Autopsy Study of Different Coronary Arteries Occlusion among Randomly Selected Deceased

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Abstract: Background: There is an ever increasing trend of rise of coronary artery disease (CAD) in India and globally. Atherosclerosis of coronary arteries and myocardial infarction are the most common fatal cardiac diseases discovered in autopsies. The fact that formation of these lesions are preventable through exact health care programmes necessitates collecting baseline information on the prevalence of such lesions as performed in this study.

Methods: In this descriptive, cross-sectional study, from 1st April, 2016 to 31st October, 2016, specimens of the hearts were randomly chosen during autopsy aging above 40 years referred to R. G. Kar Medical College (50 specimens) were dissected and fixed in formalin 10% and coronary arteries were sectioned. In case of a definite or suspicious lesion, microscopic slides were also prepared. Otherwise, 3 random slides from each branch of coronary arteries were studied by a pathologist. Then the percentage of vessel obstruction was detected.

Results: Frequency of atherosclerotic lesions in 50 studied specimens (34 male and 16 female). Critical coronary artery blockage was observed in 18 of the male (36%) and 5 of the female (10%) specimens.

Conclusion: After the study was conducted it clearly show that coronary artery disease remains a factor for concern as per as morbidity & mortality of an individual. Other studies conducted elsewhere throughout the world shows the same type of frame as mine. Male predominance in the study though might have cause biasness however the following facts can not be overlooked.

Keywords: Coronary Artery Disease, Coronary Arteritis, Coronary thrombosis.

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I. Introduction

The coronary arteries carry blood containing oxygen and other nutrients essential to the normal functioning of the heart muscle. A coronary artery occlusion is the partial or complete obstruction of blood flow in a coronary artery. This condition may cause a heart attack. In some patients coronary occlusion causes only mild pain, tightness or vague discomfort which may be ignored but the myocardium is however damaged. The partial occlusion of the blood flow mean that when the heart tries to work harder, and to speed up the supply of oxygen carried in the blood is insufficient and the patient experiences pain (angina). This is sometimes called 'angina of effort'

Partial occlusion or blockage occurs because of the gradual build-up of plaques rich in cholesterol. This may be further aggravated by the formation of a blood clot on these plaques, a coronary thrombosis. Sometimes rupture or swelling of an unstable plaque causes sudden and complete occlusion of a coronary artery and death of the area of muscle served by that artery. Significant occlusion of coronary artery mean more than 50% luminal narrowing in an artery supplying a major segment of myocardium.

The prevalence of coronary artery disease (CAD) among Asian Indians is higher than among Europeans, Americans and other Asians. Many studies infer that the case load of CAD in India is alarming. According to the World Health Report 2002, 45 million people in India are suffering from CAD and it is contributing to one fifth of the deaths in India and also, by the year 2020, CAD will account for one third of all deaths. The heart disease in Indian population occurs 10 to 15 years earlier than in the western people. As many of these mortalities are going to be among young population, it will significantly affect the national productivity. Modern stressful lifestyle coupled with substance abuse, smoking, obesity, diabetes and hypertension are responsible for the increasing rate of CAD. Some studies from India noted the regional variation in CAD and reported a higher prevalence in southern India than other regions of the country. According to a report from the

Registrar General of India the mortality due to CHD is greater in southern India whereas stroke is more common in the Eastern Indian states.

II. Aims and Objectives

Identification of critical coronary artery occlusion among different age group starting from 40 years of age and among male and female population.

III. Materials And Method

This study was a descriptive, cross-sectional survey, carried out on the referred specimens to R. G. Kar Medical Collegecentre with various causes of death (homicide, suicide, accident, etc.) since from 1st April, 2016 to 31st October, 2016. The age of subjects ranged above 50 years (50 specimens). Those with a history of cardiovascular disease (group A) and without history of cardiovascular disease (group B) were included. Highly decomposed body, grossly mutilated body and people with known history of pre existing chronic disease unrelated with Cardio-vascular system.

A signed letter of consent was taken from the relatives of the dead bodies. The excised hearts of the subjects were immediately put in formalin 10% (as fixator) and sent to the Department of Pathology at R. G. Kar Medical College. Their coronary arteries were sectioned transversely at 5 millimeters from aortic origin.

The section would continue to where the branches of coronary arteries were visible by unarmede eye. Sections were studied grossly and in the absence of any specific lesions, 3 random sections were taken from every coronary branch. If a definite macroscopic lesion or suspicious area was noted, some more sections were taken from the involved area; 4 micron sections were stained with H&E method and were studied microscopically. Extent of lesions was evaluated according to the length and percentage of the transverse diameter of the vessel obstructed by the lesion by two assistants of pathology and confirmed by a pathologist. The stages of lesions were classified into stenosis, coronary arteritis and aneurysm. The results were analyzed statistically using Chi-Square test on a computer.

IV. Results

Among the 50 subjects studied, 34 (68%) were male and 16 (32%) were female. Among the samples, critical coronary artery blockage were observed in 23 (46%) of which 18 were male (36% of the male population) and 5 were female (10% of the female population). It is shown in (table.1) and p value was greater than 0.05. Groups of people having history of CVD was 33 (66%) of which 24 were male (48%) and 9 were female (18%) and groups of people without history of CVD was 17 (34%) of which 10 was male (20%) and 7 was female (14%). Relative frequency of the cases increased with age (Table.3). There was no significant difference between various age groups ($p > 0.05$). Studied hearts showed no significant differences in the percentage of obstruction in relation to age groups ($p > 0.05$). It was evident that more no. of people 13 (26%) having history of CVD belongs to the age group of 55-60 yrs.

Table 1. Sex wise distribution of critical coronary artery blockage

Block	Male	Female
Yes	18	5
No	16	11

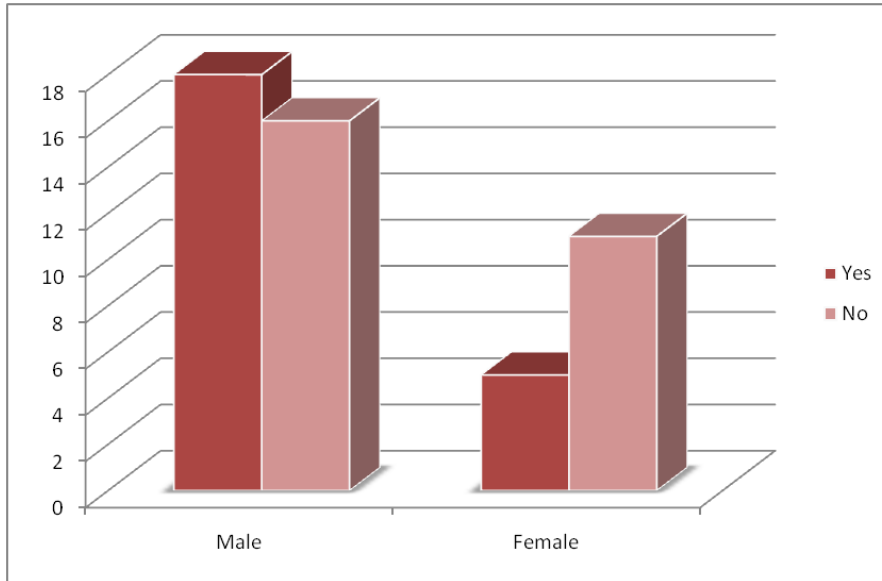


Table 2. Sex wise distribution of cases among group A(history of CVD)& group B (no history of CVD).

Sex	Group A	Group B
Male	24	10
Female	9	7

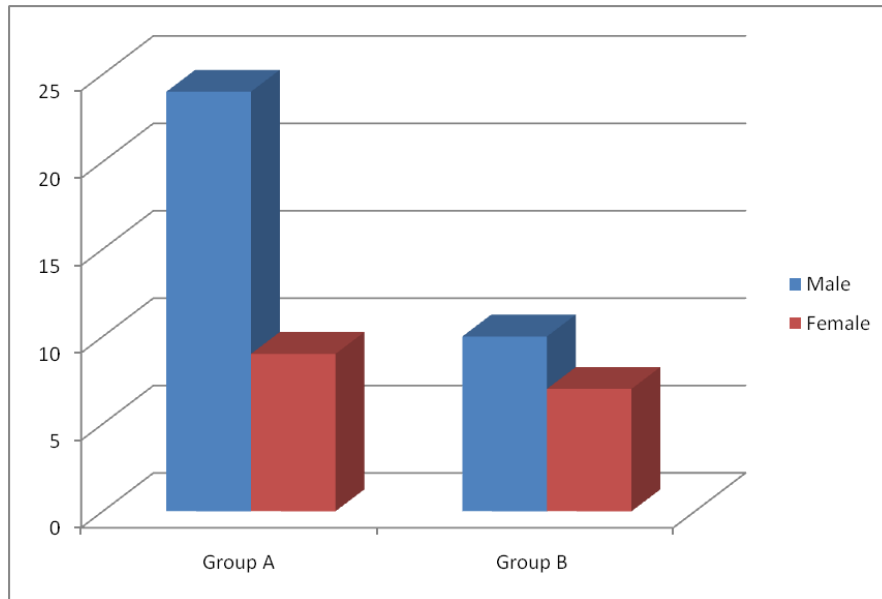


Table 3. Age wise distribution of coronary artery blockage

Age	Blockage	Percentage
40-45	7	14%
45-50	9	18%
50-55	13	26%
55-60	21	42%

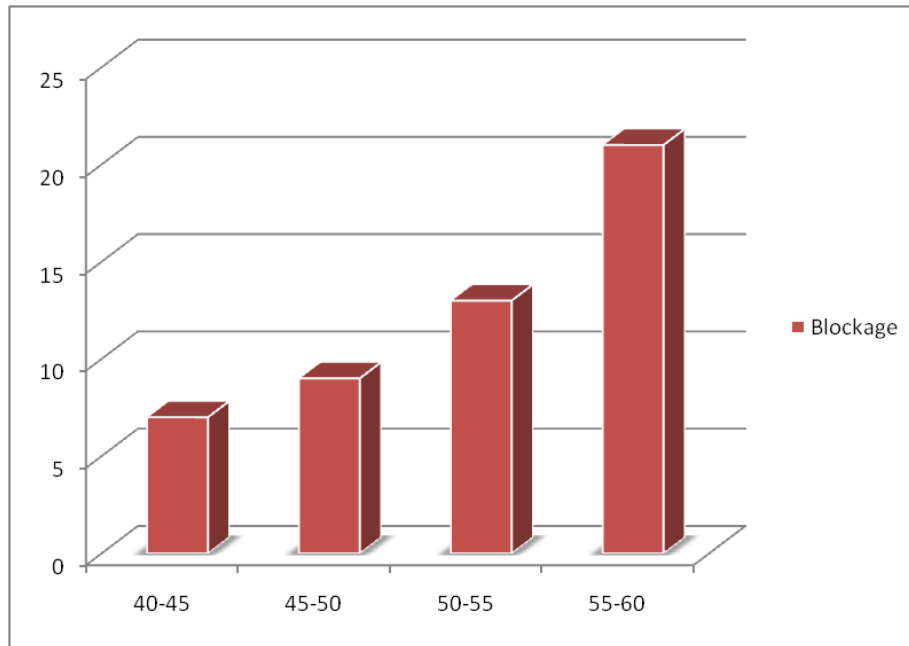
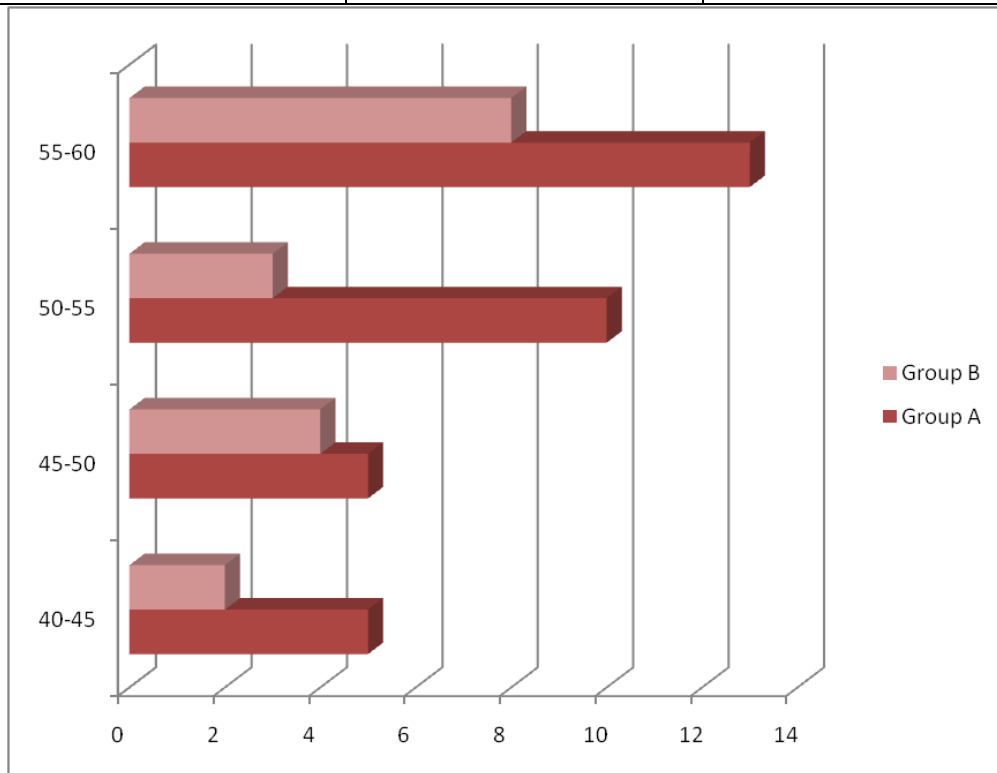


Table 4. Age wise distribution among the Group A (history of CVD) & Group B (no history of CVD)

Age	Group A	Group B
40-45	5	2
45-50	5	4
50-55	10	3
55-60	13	8



V. Discussion

Out of the 50 cases studied, the number of male was 34 & the number of female was 16. Out of the 50 case studies history of cardio vascular disease (CVD) was seen among 33 cases where as no such history was present among 17 cases.

In [Table-1] When we consider sex wise distribution of critical coronary blockage there was an increase number of cases among males (18). This finding is consistent with the finding of Sophie H Bots et al where they also found the same type of prevalence [14].

In [Table-2] When we consider the sex of the person there was an increase number of cases with history of CVD among the males (24). This finding is consistent with the finding of Sayed Abbas et al, Prabhu M.H et al, Yogender S Bansal et al, Yogender Singh Bansal et al, Suri AK et al, .Priti Vyas et al, X L Wang et al, Vandana Porwal et al, Gongora-Rivera F et al where they also found the same type of prevalence [3, 6, 7, 9, 10, 11, 12, 13].

In [Table-3] When we consider age wise distribution of coronary artery blockage more no. of people (21) had coronary artery blockage belonging to the age group of 50-55 yrs.

In [Table-4] When we consider the age of the person there was an increase number of cases with history of CVD between 55-60 yrs age group (13). This finding is consistent with the finding of Dr.Harkirat Singh et al, SeyedAbbassTabatabaeiYazdi et al, Monika Garg et al, SanjeetKumar et al, PrabhuM.H,SirajAhamed, .BabuEzhumalai et al, Henry C. McGill et al, Suri AK et al, X L Wang et al, By NEIL K. WHITE et al, Oscar Auerbach et al, J. Golshahi et al, MaruM. where they also found the same type of prevalence [2, 3, 4, 5, 6, 15, 8, 9, 11, 16, 17, 18, 19].

VI. Conclusion

After the study was conducted it clearly show that coronary artery disease remains a factor for concern as per as morbidity & mortality of an individual. Other studies conducted elsewhere throughout the world shows the same type of frame as mine. Male predominance in the study though might have cause biasness however the following facts can not be overlooked. There is no significant difference between groups of people with history of cardiovascular disease & groups of people without history of cardiovascular disease based on gender. There is no significant difference between groups of people with history of cardiovascular disease & groups of people without history of cardiovascular disease based on age groups. That means between 40-60 age groups are equally vulnerable of coronary artery disease.

References

- [1]. Joseph A, Ackerman D, Talley JD, Johnstone J, Kupersmith J, Manifestations of coronary atherosclerosis in young trauma victims--an autopsy study, *J Am CollCardiol*. 1993 Aug;22(2):459-67.
- [2]. Singh, Dr.SS Oberoi, Dr.RKGorea, Dr.Harkirat Singh, Atherosclerosis In Coronaries In Malwa Region Of Punjab, *JIAF*, 2005 : 27 (4). ISSN 0971-0973:236-239.
- [3]. SeyedAbbassTabatabaeiYazdi, AlirezaRezaei, JafarBordbar Azari, Prevalence of Atherosclerotic Plaques in Autopsy Cases with Noncardiac Death, *Iranian Journal of Pathology* (2009)4 (3), 101- 104.
- [4]. Monika Garg, Akash Deep Aggarwal, Sant Prakash Kataria, Coronary Atherosclerosis and Myocardial Infarction An Autopsy Study, *J Indian Acad Forensic Med*. Jan-Mar 2011, Vol. 33, No. 1,39-42.
- [5]. Sanjeet Kumar, Anoop Kumar Verma , Navneet Kumar, Prevalence of Coronary Atherosclerosis in Different Age Groups: A Postmortem Study. *Biomedical Research* 2013; 24 (1): 139-141.
- [6]. Praabhu.M.H, SirajAhamed S and AftabBegum, Atherosclerosis of coronary artery-An Autopsy Study, *Global Journals Inc. (USA)* , Volume 13 Issue 3 Version 1.0 Year 2013,19-24.
- [7]. Yogender S Bansal1, Shatrugan Prasad Mandal2, Senthil Kumar, Prevalence of Atherosclerotic Coronary Stenosis in Asymptomatic North Indian Population: A Post-mortem Coronary Angiography Study, *Journal of Clinical and Diagnostic Research*. 2015 Sep, Vol-9(9): HC01-HC04,1-4.
- [8]. Henry C. McGill, Jr, C. Alex McMahan, Effects of Coronary Heart Disease Risk Factors on Atherosclerosis of Selected Regions of the Aorta and Right Coronary Artery, *Journal of The American Heart Association*. 2000;20:836-845.
- [9]. Suri AK, Bodal VK, Geetika, HISTOPATHOLOGICAL FINDINGS IN CORONARY ATHEROSCLEROSIS IN 200 AUTOPSY CASES, *J Punjab Academy Forensic Med Toxicology* 2016;16(1):48-54.
- [10]. Priti Vyas, RatigarNarangarGonsai, Coronary atherosclerosis in noncardiac deaths: An autopsy study, *J Midlife Health*. 2015 Jan-Mar; 6(1): 5-9.
- [11]. X L Wang, C Tam, R M McCredie, Determinants of severity of coronary artery disease in Australian men and women, *US National Library of Medicine*. 1994 May;89(5):1974-81.
- [12]. VandanaPorwal, Shweta Khandelwal, Histological Classification of Atherosclerosis and Correlation with Ischemic Heart Disease: A Autopsy Based Study, *Annals of Pathology and Laboratory Medicine*, Vol. 03, No. 02, April - June 2016:100-104.
- [13]. Gongora-Rivera F, LabreucheJ, Autopsy prevalence of coronary atherosclerosis in patients with fatal stroke, *US National Library of Medicine*. 2007 Apr;38(4):1203-10.
- [14]. Sophie H Bots, Sanne A E Peter, Sex differences in coronary heart disease and stroke mortality: a global assessment of the effect of ageing between 1980 and 2010, *BMJ Glob Health* 2017: 2-8
- [15]. BabuEzhumalai and BalachanderJayaraman, Angiographic prevalence and pattern of coronary artery disease in women, *Indian Heart J*. 2014 Jul; 66(4): 422-426.
- [16]. By NEIL K. WHITE, M.D., JESSE E. EDWARDS, M.D, The Relationship of the Degree of Coronary Atherosclerosis with Age, in Men, *JIMA*: 1950:275(9): 650-667.
- [17]. Oscar Auerbach, M.D, LawrenceGarfinke, Atherosclerosis and Aneurysm of Aorta in Relation to Smoking Habits and Age, *The American College of Chest Physicians*. Volume 78, December 1980: 805-809.
- [18]. J. Golshahi MD, P. Rajabi MD, Frequency of Atherosclerotic Lesions in Coronary Arteries of Autopsy Specimens in Isfahan Forensic Medicine Centre, *Journal of Research in Medical Sciences* 2005; 1: 16-19.

- [19]. Maru M, Coronary atherosclerosis and myocardial infarction in autopsied patients in Gondar, Ethiopia, *J R Soc Med.* 1989 Jul;82(7):399-401.

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