 DOI: 10.18231/2394-6776.2016.0005

Autopsy study of coronary artery atherosclerosis in Rajkot Region

PJ Manvar[1,*], DK Vadgama[2], HM Mangal[3], PR Varu[4], RD Vaghela[5]

[1,4,5]Tutor, [2]Assistant Professor, [3]Professor, Dept. of Forensic Medicine, PDU Govt. Medical College,

***Corresponding Author:**
Email: pjmanvar@gmail.com

Abstract

Background: In cases of sudden death, cardiovascular disease (45 to 50%) was the most important cause of the sudden natural death. Keeping in view of the foresaid facts, it was considered worthwhile to study the coronary artery atherosclerosis in Rajkot region.

Material and Method: Present study was conducted from January 2014 to December 2014 at department of Forensic Medicine, P.D.U. Govt. Medical College, Rajkot. A detailed history was taken as to the circumstances of death with special reference to any signs and symptoms suggestive of myocardial ischemia. The routine autopsy technique (Virchow's[1]) was used for post mortem examination.

Results: Incidence of coronary artery disease is more in males as compared to females. Most common risk factor observed in death due to coronary artery disease was Hypertension (20.09%), followed by smoking (14.95%) and followed by diabetes mellitus (12.62%). Narrowing of lumen was maximally observed in left anterior descending coronary artery.

Keywords: Coronary artery, Heart, Sudden death, Atherosclerosis

Introduction

In cases of sudden death, cardiovascular disease (45 to 50%) was the most important cause of the sudden natural death. It was followed by respiratory disease (15 to 23%), central nervous system disease (10 to 15%) and others.[(1)]

Coronary artery atherosclerosis is the main cause of sudden death in India and other countries.[(2)] Since coronary artery atherosclerosis are such a large determinant of morbidity and mortality, it is important to have a knowledge of the structural pathology of heart, for example where the arterial stenosis most frequently occurs, how much of the artery is likely to be affected, how often several arteries are involved, the severity of stenosis of the affected arteries and development and progression of the disease as an age related phenomenon.

Well known risk factors for heart disease include age, sex, smoking, diet, body weight, physical inactivity, high blood pressure, diabetes and high cholesterol levels.[(3)]

Keeping in view of the foresaid facts, it was considered worthwhile to study the coronary artery atherosclerosis in case of sudden death in Rajkot region.

Material and Method

Present study was conducted from January 2014 to December 2014 at department of forensic medicine, P.D.U. Govt. Medical College, Rajkot. Total 2478 autopsies performed during above mention period, out of them 196 cases were noted of coronary artery atherosclerosis.

A detailed history was taken as to the circumstances of death with special reference to any signs and symptoms suggestive of myocardial ischemia like chest pain, sweating, collapse and shock, and details regarding the time of onset of illness, survival time, and any past history of smoking, hypertension or diabetes, also hospital records were referred wherever available.

The routine autopsy technique (Virchow's[1]) was used for post mortem examination. The heart is held at the apex and lifted upwards and pulmonary vessels, superior and inferior vena cava, and the ascending aorta are cut as far away as possible from the base of heart.

The heart was washed in running tap water to remove the blood and clots within it. The weight of the heart was recorded after removing the epicardial fat. Heart obtained from the test cases were subjected to meticulous gross examination of all coronary arteries and their major branches by serial transverse sectioning of artery to note the degree of calcification, narrowing of lumen, and presence of thrombus or haemorrhage into an atheromatous plaque. This was done by using a sharp scalpel and cutting transverse sections of the coronary arteries and their main branches at 3 mm intervals. Coronary arteries examined included the left main trunk, the left circumflex artery, the left anterior descending artery and the right coronary artery.

Observation

Table 1: Age and sex wise distribution of coronary artery disease

Age Group (Years)	Number of Cases		
	Male (%)	Female (%)	Total (%)
<41	9(4.59%)	01(0.51%)	10(5.10%)
41– 50	37(18.87%)	07(3.57%)	44(22.44%)
51 – 60	71(36.22%)	08(4.08%)	79(40.30%)
61 – 70	34(17.34%)	12(6.12%)	46(23.46%)
71 – 80	05(3.55%)	05(1.55%)	10(5.10%)
≥81	03(1.63%)	04(2.04%)	07(3.57%)

Total	159(81.12%)	37(18.88%)	196(100%)

Out of all cases of coronary artery disease, 81.12% cases were male and 18.88% cases were female. It is evident from the above table that highest numbers of cases (40.30%) were observed in age group of 51-60 years, followed by 23.46% cases in the age group of 61-70 years. Highest numbers of male cases (36.22%) were observed in age group of 51-60 years and highest numbers of female cases (6.12%) were observed in age group of 61-70 years.

Table 2: Distribution of cases according to risk factors

Risk Factors	No. of Cases	Percentage
Alcohol	10	5.10%
Diabetes Mellitus	26	13.27%
Hypertension	41	20.92%
Smoking	30	15.31%
Tobacco chewing	21	10.71%

Out of total 196 cases, Hypertension was observed in highest number of cases (20.92%), followed by smoking (15.31%).

Table 3: Distribution of cases according to grading of narrowing of coronary artery lumen

Coronary Artery	Grading of narrowing of lumen of coronary artery				
	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4
RCA	100 (51.02%)	39 (19.90%)	19 (9.69%)	33 (16.84%)	03 (1.53%)
LM	133 (67.86%)	36 (18.37%)	26 (13.27%)	01 (0.51%)	-
LAD	58 (29.60%)	25 (12.76%)	22 (11.22%)	77 (39.29%)	09 (4.59%)
LC	100 (51.02%)	33 (16.84%)	27 (13.78%)	34 (17.35%)	02 (1.02%)

Out of 196 cases, highest numbers of cases (19.90%) with narrowing of lumen of **grade 1** were observed in right coronary artery, followed by 18.37% cases in left main trunk.

Highest numbers of cases (13.78%) with narrowing of lumen of **grade 2** were observed in left circumflex artery, followed by 13.27% cases in left main trunk.

Highest numbers of cases (39.29%) with narrowing of lumen of **grade 3** were observed in left anterior descending artery, followed by 17.35% cases in left circumflex artery.

Highest numbers of cases (4.59%) with narrowing of lumen of **grade 4** were observed in left anterior descending artery cases followed by 1.53% cases in right coronary artery.

Table 4: Age groups wise distribution of cases according to grading of narrowing of coronary artery lumen

Age Groups	Grading of the coronary stenosis			
	Grade 1	Grade 2	Grade 3	Grade 4
<41	6(3.26%)	6(3.26%)	5(2.55%)	03(1.53%)
41-50	**39(19.90%)**	20(10.20%)	41(20.92%)	04(2.04%)
51-60	38(19.39%)	**38(19.39%)**	**59(30.10%)**	02(1.02%)
61-70	25(12.75%)	18(9.18%)	20(10.20%)	**05(2.55%)**
71-80	07(3.57%)	05(2.55%)	07(3.57%)	-
≥81	05(2.55%)	01(0.51%)	06(3.06%)	-

Out of all 196 cases, highest numbers of cases (19.90%) with narrowing of coronary lumen of **grade 1** were observed in age group of 41-50 years, followed by 19.39% cases in age group of 51-60 years.

Highest numbers of cases (19.39%) with narrowing of lumen of **grade 2** were observed in age group of 51-60 years, followed by 10.20% cases in age group of 41-50 years.

Highest numbers of cases (30.10%) with narrowing of lumen of **grade 3** were observed in age group of 51-60 years, followed by 20.92% cases in age group of 41-50 years.

Highest numbers of cases (2.55%) with narrowing of lumen of **grade 4** were observed in age group of 61-70 years, followed by 2.04% cases in age group of 41-50 years.

Discussion

In present study, majority of cases (81.12%) were male and only 18.88% cases were female which was comparable with the study of Kumar v et al,[4] Sarkioja T et al,[5] Zanjad NP et al,[6] Deyra AA[7] et al and Puranik R at el.[8] Male predominance is due to the fact that, males have more stress, smoking habits and absence of cardioprotective hormone estrogens.

Hypertension and smoking have damaging effect on myocardial ischemia. This is because hypertension and smoking are the independent risk factor for cardiac pathology.

In present study, the age group of 51-60 years covers the highest number of cases (40.30%) of narrowing of coronary artery lumen and in Gajera CN et al[41] study the age group was 41-50 years and similar results were observed in cases of male and female in present study and Gajera CN et al[9] study.

This indicates that incidence of coronary artery atherosclerosis is less at early age and more at late age. The reasons behind this are at early age person is active and mobile while after 50 years person become inactive and sedentary.

In present study, highest numbers of cases (64.86%) of narrowing of lumen were observed in left anterior descending artery which was comparable with the study of Bambhaniya AB et al.[10] So it is evident from above table that most affected coronary artery was left anterior descending coronary artery, followed by right coronary artery and left circumflex artery and least affected artery is left main trunk.

Conclusion

Incidence of coronary artery disease is more in males as compared to females. Highest numbers of male cases (36.22%) were observed in age group of 51-60 years and highest numbers of female cases (6.12%) were observed in age group of 61-70 years. Most common risk factor observed in death due to coronary artery disease was Hypertension (20.09%), followed by smoking (14.95%) and followed by diabetes mellitus (12.62%). Narrowing of lumen was maximally observed in left anterior descending coronary artery, followed by right coronary artery and left circumflex artery and least in left main trunk. Grade 3 narrowing of coronary lumen was observed in maximum cases followed by grade 1 narrowing of lumen in cases while Grade 4 narrowing of coronary lumen was observed in least number of cases.

Reference

1. Reddy KSN. The Essentials of Forensic Medicine & Toxicology. 32nd ed. Hyderabad: K. Sagunadevi; 2013. P. 145.
2. WHO. The Atlas of heart disease and stroke. Edited by J. Mackay and G Mensah 2004.
3. Kannel WB. Some lessons in cardiovascular epidemiology from Framingham. Am J Cardiol 1976;37(2):269-82.
4. Kumar V, Abbas, Fausto, Aster, Robbin's and Cotran. Pathological basis of disease. 7th ed. Noida: Elsevier, Health sciences Education, Marketing: 2008.
5. Sarkoija T. Hirvoven J. causes of sudden unexpected deaths in young and middle aged persons. FSI 1984:24:247-261.
6. Zanjad NP, Nanadkar SD. Study of Sudden Unexpected Deaths In Medico-Legal Autopsies JIAFM, 2006;28(1);27-30.
7. Derya AA. Sudden deaths in Edirne, Turkey, from 1984 to 2005. Med. Sci. Law 20007:47(2):147-155.
8. Puranik R, Clara KC, Dufolu JA, Kilborn MJ, Mcguire MA. Sudden death in young children. The journal of Paediatrics. 1949:(34):166-173.
9. Gajera CN. Study of histopathological changes in coronary arteries in the autopsy cases done at government medical college / new civil hospital, Surat: Veer Narmad South Gujarat university;2012.
10. Bambhaniya AB. Study of Coronary Arteries and Myocardium in Sudden Death Cases at Autopsy Jamnagar: Saurashtra University;2012.