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To assess sudden deaths due to atherosclerosis in adult population: An autopsy study

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Abstract
Background: Autopsy is the examination of a person's body after his death. The present study was conducted to assess sudden deaths due to atherosclerosis in adult population.
Materials & Methods: The present study was conducted on autopsies of sudden deaths due to coronary artery atherosclerosis of both genders. The degree of atherosclerosis was taken as the percentage of the cross-sectional area of occlusion of the lumen at the maximum point of occlusion of the respective artery.
Results: Out of 47 cases, males were 32 and females were 15. Age group 10-20 years had 4, 20-40 years had 10, 40- 60 years had 27 and >60 years had 6 cases. The difference was significant ($P< 0.05$). Out of 30 natural deaths, 12 had marked intimal thickening atheromatous lesions and ≤ 75% L.N. 7 had accidental deaths, 6 suicidal deaths and 4 homicidal deaths. The difference was significant ($P< 0.05$).
Conclusion: Authors found that maximum deaths were natural, followed by accidental deaths, suicidal deaths and homicidal deaths.

Keywords: accidental deaths, atherosclerosis, natural

Introduction
Autopsy is the examination of a person's body after his death. It is essential part of death investigation. Medico legal autopsy deals not only with unnatural deaths, but also with large areas of deaths from natural causes [1]. Most of them are sudden, unexpected and clinically incomprehensible. Death is said to be sudden or unexpected when a person not known to have been suffering from any dangerous disease, injury or poisoning is found dead or dies within 24 hours after the onset of terminal illness [2].
Coronary atherosclerosis sometimes called as 'the Captain of the Men of Death', is the most frequent cause of sudden death in Western societies [3]. Coronary artery diseases constitute the most important single disease state that is likely to become a serious cause of disagreement on either side of the bench, in a court of law. When an apparently normal healthy individual, dies all of a sudden, more so in the absence of any medical examination before his death, innumerable doubts may erupt up in the minds of not only the family physician and close relatives but also of the enquiring police officers [4].
In cases of Sudden Deaths, the goal of the clinical autopsy is to determine whether death was due to cardiac disease or one of the many non-cardiac causes. The clinical autopsy generally includes histology. Modified Verbal Autopsy questionnaire based on medical records and by interview of family members and police aids in determining cause of death [5]. The present study was conducted to assess sudden deaths due to atherosclerosis in adult population.

Materials & Methods
The present study was conducted in the department of Forensic Medicine. It comprised of 47 autopsies of sudden deaths due to coronary artery atherosclerosis of both genders. The study protocol was approved from institutional ethical committee. Data such as name, age, gender etc. was recorded.
The Hearts were dissected out with a portion of ascending aorta from fresh bodies. Each heart was then thoroughly washed and the specimens were then fixed in 10% formalin solution for 2-5 days. The degree of atherosclerosis was taken as the percentage of the cross-sectional area of occlusion of the lumen at the maximum point of occlusion of the respective artery. Results were tabulate and subjected to statistical analysis. P value less than 0.05 was considered significant.

Results

Table I: Distribution of victims

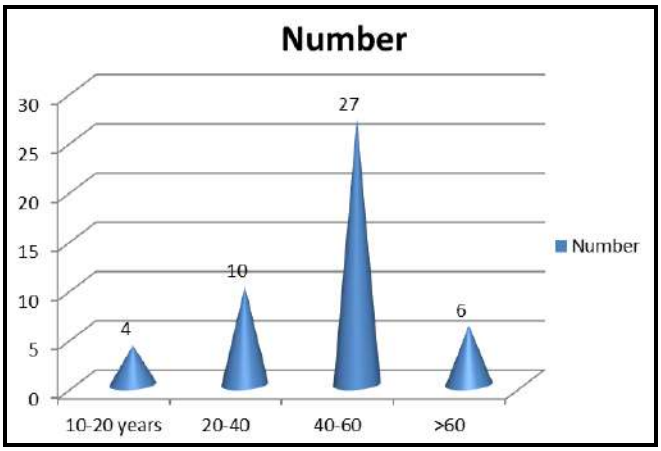
Total- 47		
Gender	**Males**	**Females**
Number	32	15

Table I shows that out of 47 cases, males were 32 and females were 15.

Table II: Age wise distribution

Age group (Years)	Number	P value
10-20	4	0.01
20-40	10	
40-60	27	
>60	6	

Table II, graph I shows that age group 10-20 years had 4, 20-40 years had 10, 40- 60 years had 27 and >60 years had 6 cases. The difference was significant ($P< 0.05$).

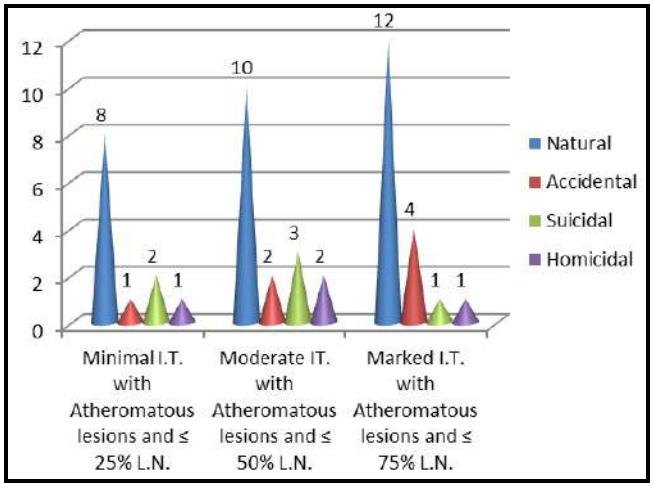


Graph I: Age wise distribution

Table III: Coronary Atherosclerosis in cases

Histology of Coronary Arteries	Natural	Accidental	Suicidal	Homicidal	P value
Minimal I.T. with Atheromatous lesions and ≤ 25% L.N.	8	1	2	1	0.01
Moderate IT. with Atheromatous lesions and ≤ 50% L.N.	10	2	3	2	
Marked I.T. with Atheromatous lesions and ≤ 75% L.N.	12	4	1	1	
Total	30	7	6	4	

Table III, graph II shows that out of 30 natural deaths, 12 had marked intimal thickening atheromatous lesions and ≤ 75% L.N. 7 had accidental deaths, 6 suicidal deaths and 4 homicidal deaths. The difference was significant ($P< 0.05$).



Graph II: Coronary Atherosclerosis in cases

Discussion

Sudden cardiac death (SCD) is currently defined as a natural death from cardiac causes occurring within 1 hour of symptom onset and heralded by abrupt loss of consciousness. Sudden cardiac death accounts for 400,000 deaths annually in the United States. Coronary artery disease is the most common cause of SCD [6]. The medico-legal opinion may be asked about the state of coronary artery in sudden death in road accidents, operations, and occupational diseases. Coronary artery disease is responsible for over 70% of sudden cardiac deaths. In the young, the primary cause of death is the non-atherosclerotic coronary abnormalities. In the older patients; the most prevalent cause is atherosclerotic Coronary disease [7]. The present study was conducted to assess sudden deaths due to atherosclerosis in adult population.

In present study, out of 47 cases, males were 32 and females were 15. Age group 10-20 years had 4, 20-40 years had 10, 40- 60 years had 27 and >60 years had 6 cases. Autopsy studies have found approximately two thirds of unexpected deaths to be cardiac in origin, with CAD related to atherosclerosis accounting for most of these deaths. For example, Verma *et al*. [8] reported that 54% (189 of 350) of consecutive cases of "natural" sudden death in adults living in the United Kingdom that occurred within 6 hours of symptom onset were related to ischemic heart disease.

Verma *et al*. [9] examined coronary arteries for atherosclerotic changes in 50 cases of sudden deaths. We observed that there were marked intimal thickening with luminal narrowing ≤ 75% of luminal diameter in 20 cases (40%) in total hearts. In natural deaths 17 cases (48.57%) showed luminal narrowing ≤ 75% of luminal diameter. These findings are suggestive of medico legal intervention to clarify the mode of death in some instances.

We found that out of 30 natural deaths, 12 had marked intimal thickening atheromatous lesions and ≤ 75% L.N. 7 had accidental deaths, 6 suicidal deaths and 4 homicidal deaths. This is in agreement with Sudha *et al*. [10] It is shown that coronary artery disease is an occupational disease due to prolonged exposure to deleterious substances like carbon disulphide in industries. There are certain occasions, when a person dies on the operating table or soon after surgery, and a coronary attack is probably the cause of death in such cases. A final coronary episode may sometimes be associated with an operative procedure supposedly due to hypotensive state. In cases of litigation for compensation purposes, the quantum of damage suffered by the victim due to trauma has to be carefully accessed and no misplaced humanitarian consideration should unnecessarily lead to an award of higher damages. It is not uncommon for two experts to disagree in scientific matters, of course, not out of

professional jealousy, but due to genuine differences in the prevailing scientific concepts of a given issue in question [11].

Conclusion

Authors found that maximum deaths were natural, followed by accidental deaths, suicidal deaths and homicidal deaths.

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