

SUDDEN NATURAL DEATHS IN MEDICOLEGAL CASES- AN AUTOPSY BASED STUDY*C. S. Sreedevi¹, Sreelekshmi J²*

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ABSTRACT

BACKGROUND

Death occurring in apparently healthy individual in a case of natural death may arise suspicion of foul play. In these circumstances these cases may be subjected to medicolegal autopsy. The disease condition may be unknown to the individual and the relatives. This study was done to review the exact cause of death in sudden unexpected deaths, and enabling or assisting the legal authorities in detection of crime, to prove or disprove the foul play. Body mass index is the most frequently used indicator of body fatness. An attempt is made to find out whether there is any significant relationship between BMI and the risk for sudden cardiac death.

MATERIALS AND METHODS

Data of 50 cases of sudden unexpected death brought for medicolegal autopsy at govt. T.D. medical college Alappuzha in the year 2010 were studied and information were collected from the postmortem records. Data was entered in the proforma. The histopathological examination findings of relevant cases were studied. Analysis was done using MS EXCEL and Chi-square test was used as the test of significance in the comparison between two categorical variables.

RESULTS

In 50 cases, male predominance was observed and 88% were males in which 50% of males died of atherosclerotic occlusive coronary artery disease and among females 33% died of myocardial infarction. While considering the systemic distribution of cause of death, the cardiovascular system was found to be most commonly affected, 33 cases (66%) followed by respiratory system 7 cases (14%). In 4 (8%) cases gastrointestinal system was affected. In Two cases (4%) central nervous system was affected and others were generalized infection, which constituted 2 cases. Out of 33 cases observed in cardiovascular system the commonest cause being the atherosclerotic occlusive coronary artery diseases involving 27 cases (81.81%) in which the predominant involvement was seen in left anterior descending artery 21 cases (77.77%) followed by right coronary artery, 4 cases (14.8) and left circumflex coronary artery, 2 cases (7.4%). Coronary artery thrombosis and myocarditis constituted two cases (6.6%) each. Sixth decade was commonly affected followed by fifth decade. One case each of cases of rupture of ectopic pregnancy, aneurysmal rupture of cerebral artery and alcoholic steatohepatitis were observed. Respiratory system was involved next to the cardiovascular system in which most common cause was pneumonia, which was found in 3 cases (42.86%). In gastrointestinal system 50% were due to pancreatitis. Persons having normal basal metabolic index was most commonly affected 31 cases (62%) followed by overweight persons 10 cases (20%). Out of 50 cases, 24 (48%) were instantaneous deaths; among them 14 cases were due to myocardial infarction, (58.33%). Others are due to acute haemorrhagic pancreatitis, valvular heart disease, squamous cell carcinoma of larynx, pneumonia, Cardiomyopathy, Rupture of aneurysm, carcinoma of gastro oesophageal junction, myocarditis and alcoholic steatohepatitis. In one case of myocardial infarction there was history of attack by dog, and in 3 cases there was history of mental harassment and in 1 case, physical assault was observed.

CONCLUSION

From the cases of natural disease brought for medicolegal autopsy it was found that majority of cases were due to cardiac causes. Males were most commonly affected. Sixth decade of age had most cases followed by fourth decade. Pancreatitis, steatohepatitis, rupture of cerebral aneurysm and ectopic pregnancy were rare causes of sudden death encountered in this study. It was observed that physical and mental injury can precipitate or accelerates death in myocardial infarction. It was observed that proportion of cases with normal BMI was high among MI category than non-MI category. But this was not statistically significant.

KEYWORDS

Sudden Natural Death, Occlusive Coronary Artery Disease, Body Mass Index, Alcoholic Steatohepatitis.

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BACKGROUND

Natural deaths are those which occurs entirely due to natural diseases, old age or debility without any trauma, poisoning of accidental or suicidal or homicidal in origin. An apparently healthy individual of any age dies suddenly and unexpectedly without any preindication or in case of natural death under suspicious state, a suspicion of foul play may arise. These cases may also be subjected to medicolegal autopsy.¹ The existence of disease may be unknown to the individual too. He dies on the way to hospital or during treatment before diagnosis. In these cases, the lesion can be detected during autopsy. Sometimes a case of natural death may present as unnatural one.² A person suddenly dies may fall and sustain injuries. Similarly, may sustain vehicular, domestic or industrial accidents during death due to natural disease. The case may be notified as accident. Majority of sudden natural deaths are due to cardiovascular diseases Cardiovascular causes includes congenital heart disease, coronary artery disease, cardiomyopathies etc. Respiratory causes include bronchitis, bronchopneumonia. Central nervous system causes include intracranial haemorrhages, cerebral embolism, meningitis, rupture of berry aneurysms, gastrointestinal causes are perforation of peptic ulcer, oesophageal varices, intestinal obstruction etc. Rupture of ectopic pregnancy and pelvic haematocele includes genitourinary causes of sudden death.³ The rate of natural disease in populations and individuals would vary in relation to their physical characteristics and lifestyle, particularly in fat deposition in the body. Body mass index is used as a reflector of life style and food habits of an individual.⁴ So an attempt was made to find out the association of body mass index with the commonest cause of sudden death.

Aims and Objectives

1. To find out the causes of death and the different organ systems affected in cases of sudden natural death.
2. To find out the association of body mass index (BMI) with the commonest cause of sudden natural death

MATERIALS AND METHODS

A cross sectional study was done among the cases of sudden unexpected deaths brought for medicolegal autopsy at Government T. D. Medical College Alappuzha for a period of 6 months in the year 2010. Data collection was done from postmortem records and the details were entered in a proforma. The histopathological examination reports of relevant cases were studied. Cases of both sexes and all age groups were included and decomposed and unknown bodies

were excluded from the study. The privacy and confidentiality of the data collected were ensured throughout the study. The results are expressed using frequency and proportions for the qualitative data Analysis was done using MS EXCEL and Chi-square test was used as the test of significance in the comparison between two categorical variables.

RESULTS

Out of 50 cases studied, 44 persons were males and others females. In 56.81% of males, atherosclerotic occlusive coronary artery disease was the cause of death. Among females 33% died of myocardial infarction and other causes constituted tuberculosis, rupture of ectopic pregnancy, hypoxic encephalopathy and septicemia. While considering the systemic distribution of cause of death the cardiovascular system was found to be most commonly affected, 33 cases (66%) (Figure 1) followed by respiratory system 7 cases (14%). In 4 (8%) cases gastrointestinal system was affected. In Two cases (4%) central nervous system was affected and others were generalized infection, which constituted 2 cases (4%). (Table 1) Out of 33 cases observed in cardiovascular system the commonest cause being the atherosclerotic occlusive coronary artery diseases involving 27 cases (81.81%) in which the predominant involvement was seen in left anterior descending artery 21 cases (77.77%) followed by right coronary artery, 4 cases (14.8) and left circumflex coronary artery, 2 cases (7.4%). Coronary artery thrombosis and myocarditis constituted two cases (6.6%) each. One among the twenty seven persons of occlusive coronary artery disease showed intracranial bleed and 8 persons had evidence of previous myocardial infarction. One person among the coronary artery thrombosis cases was suffering from pneumonia.

Respiratory system was involved next to the cardiovascular system in which most common cause was pneumonia, which was found in 3 cases (42.86%). In gastrointestinal system 50% were due to pancreatitis. In one person among two with pancreatitis had evidence of previous myocardial infarction. Alcoholic steatohepatitis (Picture 1) was found to be a rare cause of unexpected natural death. In central nervous system involvement, hypoxic encephalopathy and rupture of cerebral artery aneurysm were found as causes of death. In genitourinary system rupture of ectopic pregnancy and postpartum haemorrhage were found to be the causes of death. Generalised infection were found in two cases (4%).

Majority of persons were in their sixth decade, 18 cases (36%) (Figure 2). Among them 83% had atherosclerotic coronary artery disease and others had valvular heart disease, squamous cell carcinoma and pneumonia. Out of 50 cases, 24 (48%) were instantaneous deaths (among them 14 cases were due to myocardial infarction) (58.33%). (Table 2). Others are due to acute haemorrhagic pancreatitis, valvular heart disease, squamous cell carcinoma of larynx, pneumonia, Cardiomyopathy, Rupture of aneurysm, carcinoma of gastro oesophageal junction, myocarditis and steatohepatitis (Figure 3). In one case of myocardial

infarction, there was history of attack by dog. In 3 cases, there was history of mental harassment and in 1 case there was history of physical assault. Persons having normal basal metabolic index was most commonly affected 31 cases (62%) followed by overweight persons 10 cases (20%). Very severely underweight, one among them was suffering from valvular heart disease and the other was found suffering from tuberculosis (Table 3).

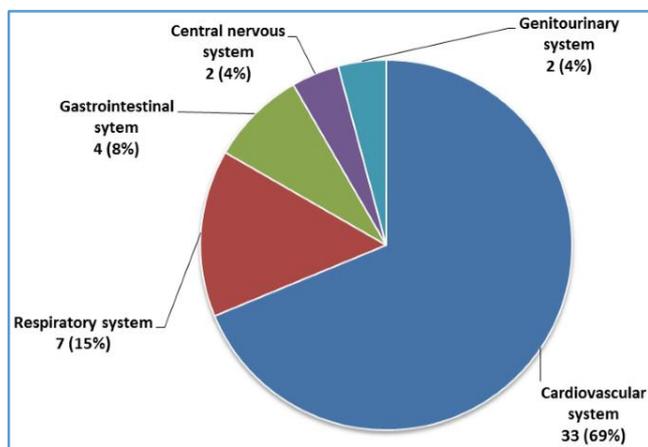
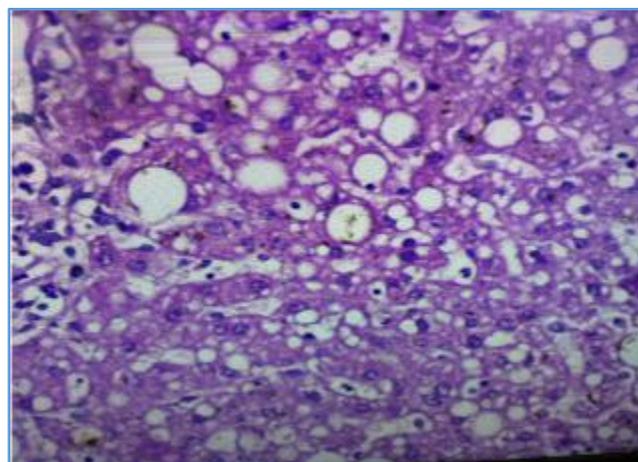


Figure 1. System wise Distribution of Cases in Sudden Natural Death

Organ System Involved (n) %	Cause of Death	No. of Cases (Percentage) n (%)
Cardiovascular System (n=33) 66%	Atherosclerotic occlusive coronary artery disease	27 (81.8)
	Coronary artery thrombosis	2 (6.1)
	Cardiomyopathy	1 (3.0)
	Valvular heart disease	1 (3.0)
	Myocarditis	2 (6.1)
Respiratory System (n=7) 14%	Pneumonia	3 (42.9)
	Tuberculosis	2 (28.6)
	Squamous cell carcinoma lung	1 (14.3)
	Carcinoma larynx	1 (14.3)
Gastrointestinal System (n=4) 8%	Gastro esophageal adenocarcinoma	1 (25.0)
	Pancreatitis	2 (50.0)
	Alcoholic Steatohepatitis	1 (25.0)
Central Nervous System (n=2) 4%	Hypoxic encephalopathy with nerve disorder	1 (50.0)
	Aneurysmal rupture of cerebral artery	1 (50.0)

Genitourinary System (n=2) 4%	Ectopic pregnancy rupture	1 (50.0)
	Postpartum haemorrhage	1 (50.0)
Others (n=2) 4%	Generalized infections	2 (100)

Table 1. Distribution of Cases According to Organ System Involvement and Cause of Death (N=50)



Picture 1. Microscopic Appearance of Alcoholic Steatohepatitis Showing Steatosis and Inflammation.

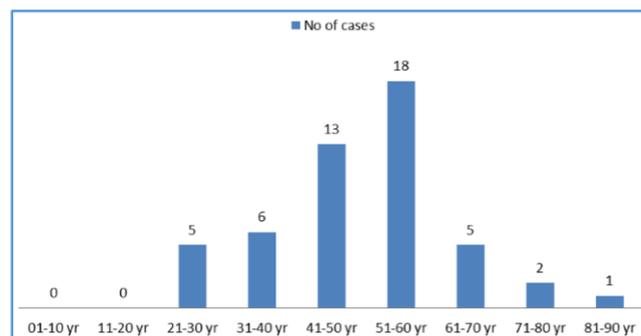


Figure 2. Distribution of Case According to Age

Period of Survival	No. of Cases	Percentage
Instantaneous	24	48
Minutes	9	18
Hours	17	34
Total	50	100

Table 2. Distribution of Case with Period of Survival

Body Mass Index	No. of Cases	Percentage
Very severely underweight	2	4
Severely underweight	2	4
Underweight	4	8
Normal	31	62
Overweight	10	20
Obese class 1	1	2
Obese class 2	0	0
Obese class 3	0	0
Total	50	100

Table 3. Distribution of Cases According to the Body Mass Index

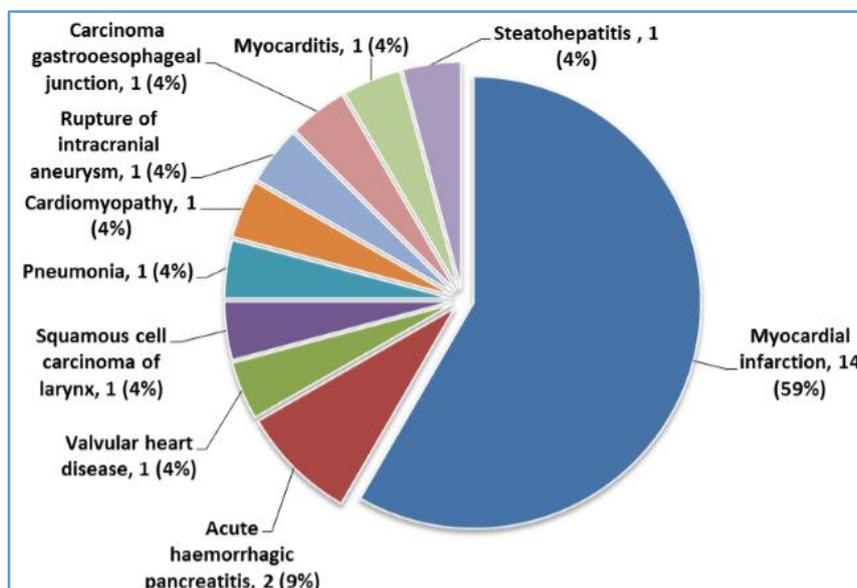


Figure 3. Distribution of Cases in Instantaneous Death

Body Mass Index	MI Present n (%)	MI Absent n (%)	Total n (%)	Chi-square Value	p-Value
Normal	19 (70.4)	12 (52.2)	31 (62.0)	3.273	0.18
Underweight	2 (7.4)	6 (26.1)	8 (16.0)		
Overweight & Obese	6 (22.2)	5 (21.7)	11 (22.0)		
Total	27 (100)	23 (100)	50 (100)		

Table 4. Comparison of Body Mass Index Categories with the Presence of Myocardial Infarction

DISCUSSION

In this study majority of persons were males and others were females. The predominance of male in sudden natural deaths is also in agreement with study conducted by Sandesh Chaudhari et al.⁵ Majority of cases in this series were found affected cardiovascular system the commonest cause being the atherosclerotic occlusive coronary artery diseases involving 81.81% in which the predominant involvement was seen in left anterior descending artery followed by right coronary and left circumflex coronary artery. This is in agreement with study conducted by Dinesh Rao and Yadhukul.⁶

Respiratory system was involved next to the cardiovascular system in which most common cause was pneumonia, which was found in 3 cases (42.86%). The same observation was made by Sanjay Gupta, Ravi Panchal et al.⁷ While observing the gastrointestinal system 50% death were due to pancreatitis. This observation disagrees with the study by Kuller et al⁸ in which liver pathology was observed as commonest cause of death among gastro intestinal system. Alcoholic steatohepatitis was found to be a rare cause of unexpected natural death in our study. It was not often observed in other similar studies.

Intracranial haemorrhage following aneurysmal rupture of cerebral artery was found in this study as observed as a cause of natural death in study done by Sandesh. H. Chaudhary et al.⁵ Rupture of ectopic pregnancy and postpartum haemorrhage were found to be the causes of death in genitourinary system.

Persons in their sixth decade was commonly affected in this study and this disagreed with the study conducted by Sanjay Gupta et al⁷ in which sudden natural deaths mostly affected in 4th and 5th decade and agrees with Dinesh Rao and Yadhukul.⁶ Out of 50 cases, 24 (48%) were instantaneous deaths which disagrees with the findings of Dinesh Rao et al. Our study agrees with Sanjay Gupta’s observation that malignancy was less in number in instantaneous deaths. In cases of myocardial infarctions, one case there was history of attack by dog and multiple lacerations were found on limbs and in 3 cases there was history of mental harassment and 1 case with physical assault. This is in favour of K. S. Narayan Reddy’s statement that a blow or physical trauma may precipitate a myocardial infarct.⁹

Persons having normal basal metabolic index was most commonly affected followed by overweight persons. Two persons were very severely underweight. It was observed that proportion of cases with normal BMI was high among MI category than non-MI category. But this was not statistically significant as p-value is 0.18 which is more than 0.05 (Table 4). These results are in favour that fluctuating weight, the so-called yo-yo effect, rather than BMI per se, was associated with greater coronary heart disease risk as proved by the seven countries study by university of Minnesota.

CONCLUSION

From the descriptive study of natural disease brought for medicolegal autopsy it was found that majority of cases were due to cardiac causes with predominance of atherosclerotic occlusive coronary artery disease affecting anterior descending branch of left coronary artery. Males were most commonly affected and sixth decade of age and had most cases followed by fourth decade. Alcoholic steatohepatitis was observed as a rare unexpected cause of sudden death in this study. It was observed that physical and mental injury can precipitate sudden death by myocardial infarction. It was observed that proportion of cases with normal BMI was high among MI category than non-MI category, but this was not statistically significant.

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