

Original research article**A study of autopsy profile of sudden cardiac deaths****¹Dr. Prateek Karagwal, ²Dr. Sangram Singh Yadav, ³Dr. Pankaj Verma**¹Assistant Professor, JNUIMSRC, Jaipur, Rajasthan, India²PG Resident, Department of Forensic Medicine and Toxicology, BPS GMC (W), Khanpur Kalan, Sonipat, Jaipur, Rajasthan, India³Assistant Professor, Forensic medicine and Toxicology, JNUIMSRC, Jaipur, Rajasthan, India**Corresponding Author:**

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Abstract

In India, cardiovascular disease is the major cause of mortality for men between the ages of 20 and 65 years old. It is also the most common cause of death overall. According to estimates provided by Zipes and Wellens, coronary artery disease claims the lives of up to 80 percent of people who pass away unexpectedly from heart disease. The occurrence changes during the 24-hour period beginning in the wee hours of the morning. The occurrence of sudden cardiac death (also known as SCD) has been climbing steadily in every region of the world. It is a very difficult and challenging task for forensic physicians to determine the cause of sudden cardiac death (SCD), despite the fact that this is one of the most desired pieces of information among the clinicians who are involved in these cases.

Keywords: Cardiovascular disease, post-mortem certificate, sudden death

Introduction

The incidence of sudden cardiac death (SCD) has been gradually growing all over the world, particularly in the urban population over the course of the past five decades ^[1, 2]. Ischemic heart disease has become more prevalent in India, reaching approximately 10 percent of cases ^[3]. According to the findings of autopsies, the majority of sudden and unexpected fatalities are the result of cardiovascular illness ^[4]. Myocardial infarction (MI) related to coronary artery insufficiency (coronary occlusion due to atheroma and coronary thrombosis) ^[5] is probably the cause of death that is noted in autopsies the most frequently. Finding out what led to a patient's unexpected passing is always one of the top priorities for the doctors who are working on these cases. On the other hand, determining the cause of death and the manner in which someone passed away is a very complex and demanding work for the forensic physician who is performing the autopsy ^[6, 7]. One challenge that is almost always present in cases of abrupt and unexpected fatalities, whether cardiac or a lack of specificity in collecting antecedent elements implicated within the 24-hour period before to death ^[8] is considered to be indicative of a lack of cardiac involvement. For instance, in certain situations of atrial fibrillations and spasms of coronary as a cause of death, the complete relaxation of coronary leaves no sign of such spasm, even though coronary ischemia was shown to be the cause of death during autopsy. This phenomenon occurs in certain cases of atrial fibrillations and spasms of coronary as a cause of death. It has been observed on numerous occasions that when gross pathology was unable to assist in determining the cause of death, the use of histology was able to save the situation and enable a conclusive opinion to be offered on the relevant cardiac pathology ^[9, 10]. In light of the information presented above, the current paper serves as a prospective study addressing the cause of SCD as determined by autopsy examination over a period of four years in Bangalore, India.

Materials and Methods

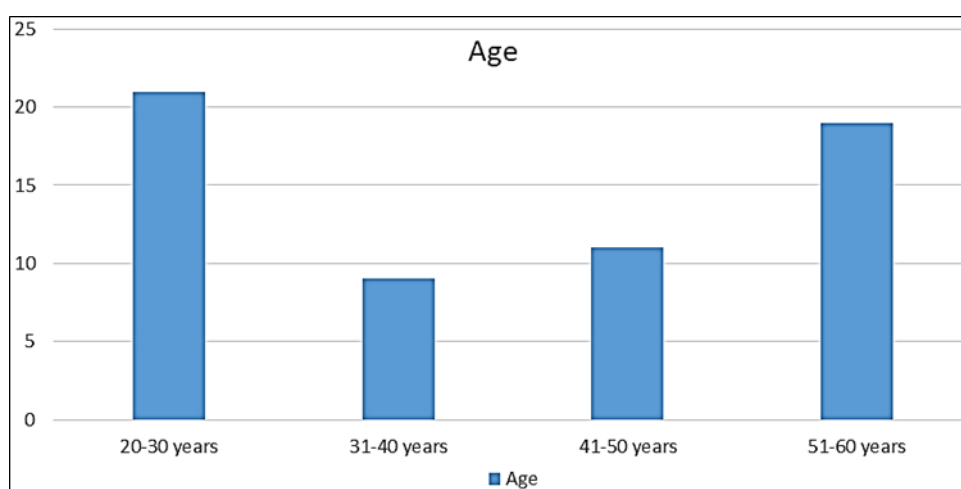
The current research is a prospective cross-sectional study that will be carried out in JNUIMSRC, Jaipur, India throughout the four-year period beginning in Oct 2020 and ending in Dec 2022. According to the criteria for the definition of sudden death, an autopsy was performed on a total of 60 instances. After the police and the magistrate had finished their investigation, all of the bodies were turned over to be autopsied. Following an examination of the autopsy, the police report, and the hospital records, the data was classified according to the underlying cause of death into the categories of natural and unnatural deaths. As a result, the cause of death was deduced based on the findings of the histology and gross examination as well as the facts provided by the hospital, circumstantial evidence, and the police report. The procedure called for by Davidson ^[11] was used to dissect the heart, and then the ventricles were cut in a transverse direction so that the endocardium, its colour, scarring, and fibrosis could be observed. The tissue were preserved in 10% formal saline, thickness of 3-5 millimeters was kept for fast and better fixation and stained with Haematoxylin and Eosin (200 gram aluminium

ammonium sulphate, 20 gram haematoxylin, 40 milliliter ethanol, 4 gram sodium iodate, 80 milliliter acetic acid, 1200 milliliter glycerol, 2800 milliliter distilled water). The details of morbid discoveries of the heart, including the surface, walls, coronaries, valves and major vessels, as well as the weight of the heart, ostias, and papillary mussels, were the primary focus of the autopsy's examination of the heart. In the situations of males, a weight of below 325 grammes was considered normal, while in the cases of females, a weight of below 275 grammes was considered normal [12, 13]. It was determined that the MI had occurred not too long ago if it had been noted that the myocardium had haemorrhages, paleness, and softening, and if it had the following microscopic changes: cytoplasmic hypereosinophilia, contraction band, granularity, lack of nuclei edoema, and haemorrhage. Along with the microscopic findings, any scar that was longer than 0.5 centimetres (and was typically of a triangular form and pointed towards the apex) was taken into consideration to be an old infarct.

Results

Table 1: Sex Distribution

Male	Female
48	12



Graph 1: Age Distribution

Table 3: Socio economic status

Low	07
Middle	43
High	10

Table 4: Findings

Mean heart weight	341.46 ± 21.28 grams
Coronary artery pathology	Right coronary-22 Left coronary-38
Other associated observations	Left ventricular hypertrophy-31 Pericardial effusion-09 Myocarditis-17

Discussion

A spontaneous unexpected death that occurs within an hour of the onset of new symptoms is currently the accepted definition of sudden death. Because cardiac causes of death are always tied to cardiovascular disease, the majority of investigations concentrated on those causes. This is due to the fact that cardiac causes are the major cause of sudden death, since other causes are not widely recognized due to the fact that autopsies are not performed on many sudden deaths. The majority of the hospitalized patients with a known history who passed away unexpectedly had an enlarged heart with left ventricular hypertrophy and mild coronary arthero-sclerosis, as was discovered during autopsy. An abrupt cardiac arrhythmia, most likely ventricular fibrillation, is the cause of death in each of these cases. It has been seen in clinical practice that people who have left ventricular hypertrophy have more ventricular premature contractions than normal individuals or individuals who have hypertension but do not have left ventricular hypertrophy of the ventricles in the heart. This observation supports the findings of our research, which found that a sizeable proportion of people who pass away suddenly and unexpectedly who have a clinical history of hypertension had only left ventricular hypertrophy without considerable

atherosclerotic involvement of their coronary arteries. A couple of our patients had berry aneurysms that had burst, and they were always located at the apex. These factors caused bleeding to occur within the subarachnoid spaces as well as the substance of the brain. The subarachnoid haemorrhage caused a generalised vasospasm, which ultimately led to the death of the patient as a result of an ischemic damage to the brain.

According to the findings of Kuller and colleagues, over two thirds of unexpected deaths that are not the result of trauma are brought on by arteriosclerotic illnesses ^[15]. In addition, research conducted by Harmon and colleagues ^[2] indicated that SCD is the most common cause of death among athletes. There is no correlation between gender or race and the age-related trend of SCD, which is an upward tendency with increasing age ^[16]. Within the parameters of this discussion, the geriatric age group (75-85 years) ^[17] has the largest prevalence. For instance, one study found that the risk of sudden death due to coronary artery disease is six times higher for those between the ages of 60 and 69, whereas the risk is only twice as high for people beyond the age of 80 ^[18]. The present series had participants whose average age fell between the ages of 50 and 59 years. A similar age occurrence was shown to occur in the research series of Pentilla that was administered 55-66 years ^[19]. It has been demonstrated time and time again that the incidence of SCD is significantly higher in men than it is in women ^[16, 17, 20, 21]. The current research reveals a larger male to female ratio (10:1) than previous studies. According to research conducted at Framingham, the incidence of SCD was ten times higher in males than in females ^[22]. There have been reports of the male to female ratio at the occurrence of coronary heart disease ranging from 3:2 to 8:1 ^[20, 23-25]. In addition to age and gender, socioeconomic status has also been shown to have a significant impact on the occurrence of SCD ^[26-28].

Conclusion

The study of the location of the death, the quantity and quality of autopsies performed and the utilisation of additional techniques, most notably molecular biology, are all critical factors in determining how far we have come in autopsy diagnosis of sudden deaths. In point of fact, molecular autopsy is required now to overcome challenges associated with autopsy diagnosis.

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