

Brief Communication

Presentation of Sudden Death in Emergency Department of a Tertiary Care Hospital of Bangladesh: A Retrospective Study

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Abstract

Background: The incidence and causes of sudden death vary in different societies, and these differences are influenced by demographic and clinical factors such as age, gender, risk factors, past medical history and presumed cause of death. This three years long retrospective study describes the influence of these factors on death from sudden cardiopulmonary arrest.

Materials and Methods: This is a retrospective study of sudden death among all the age groups who were seen at Emergency Room (ER) of Ibrahim Cardiac Hospital & Research Institute, Dhaka, Bangladesh. Total 414 cases of death were reported between 1st January, 2012 to 31st December, 2014. They were investigated retrospectively and subsequently analyzed on age, sex, risk factors, past medical history, endo-tracheal intubation with resuscitation and cause of death. The statistical analysis was performed as appropriate to illustrate any possible association between different demographic variables and cardiopulmonary arrest.

Results: Out of 414 deaths, 72.5% were male, & 27.5% were female. The mean age of subjects was 60.60 ± 13.34 years with male mean age of 60.35 ± 13.62 years and female mean age of 59.70 ± 13.24 years. There were three different age groups in this study. 52 deaths were in 17-45 years of age group, 233 death patients were in 46-65 years age group & 129 deaths were more than 65 years age group. Among 46-65 years age group 161 deaths were presumed to be due to cardiac cause which is higher than the other two groups. 75.12% of all the study patients had hypertension, 84.06% had diabetes mellitus, 23.43% had CKD & 69.32% had dyslipidaemia. 31.40% patients were active smoker, & 20.53% had prior h/o smoking. Patients who suffered cardiac cause of death had significant history of hypertension ($p < 0.001$), dyslipidaemia ($p < 0.001$), smoking habit ($p < 0.001$), & CKD ($p < 0.001$). 40.8% (169) of deceased patients had previous ischemic heart disease, 10.4% (43) had previous cerebrovascular disease and 28% (116) had prior morbidity like malignancy, multi organ dysfunction. 73.67% subjects needed endotracheal intubation with urgent cardio pulmonary resuscitation. Out of 414 study patients, 65% had presumed precipitating cardiac cause of death, 15% had presumed neurological cause of death and rest 20% had other causes.

Conclusion: The current study indicates a definite influence of age, gender, medical risk factors and past medical history has causal relationship with sudden death. The highest incidence occurred in the middle age group as compared to other age groups. Incidence was also higher in men than in women. Subjects with hypertension, diabetes mellitus and previous coronary artery disease had higher incidence of sudden deaths.

Key words: Sudden death; Risk factors; Ischemic heart disease.

Introduction

Sudden death (SD) is a serious public health problem

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worldwide¹. It is said to occur when symptoms of less than 24 hours in onset culminate in a nonviolent death¹. Sudden cardiac death (SCD) is also known as sudden unexpected death. The World Health Organization defines sudden death as death occurring within 24 hours of an abrupt change in previous clinical status². The global incidence of sudden death is not known, but there are studies from different parts of the world addressing this issue. In the Western world (Europe and the USA), sudden cardiac death accounts for 20% of all mortality³ and about 50% of all deaths attributable to cardiovascular disease in the USA and other developed countries⁴. The prevalence has been increasing in the USA from 56.3% in 1989 to 63.9% in 1998⁵. A study from Saudi Arabia reported sudden death in 17.5% of 1273 total deaths over a six-year period⁶. Coronary artery disease is the commonest cause of sudden cardiac death in Caucasians and Asians, but this is not so for blacks in Africa and the Caribbean⁷.

Materials and Methods

This was a retrospective study of sudden death in 414 adult patients aged 17 years and older, and data was obtained from

the Emergency Room (ER), Ibrahim Cardiac Hospital & Research Institute (ICHRI), Dhaka Bangladesh. The study included all cases of sudden unexpected death from nonviolent, nontraumatic causes recorded from January 1, 2012 and December 31, 2014 comprising cases of out-of-hospital unexpected death and death in ER. All cases came in ER presenting as gasping respiration or no sign of life or severe shortness of breath with low SpO₂ or severe chest pain with cardiogenic shock. All clinical data like identifying information, age, gender, hypertension, diabetes, dyslipidaemia, smoking history, family history of ischemic heart disease (IHD), chronic kidney disease (CKD), previous IHD, previous history of cerebro-vascular disease (CVD) and other disease conditions. Subjects who needed endotracheal intubation with cardiopulmonary resuscitation, and information of presumed cause of death were obtained from the medical files. Cases of suspected substance overdose, poly trauma & road traffic accident cases, and patients who were brought in by law enforcing authority were excluded from this study.

The age and gender differences and hypertension, diabetes, dyslipidaemia, smoking habit, family history of IHD, CKD, previous IHD, previous history of neurological and other diseases, patients who needed endotracheal intubation, and the suspected causes of death were statistically analyzed to determine the relationship with occurrence of SD. Data were analyzed using SPSS version 16.0. Results were cross-tabulated to find out the relationships between the variables. Statistical analysis was performed using χ^2 -square for test of association and Fisher's exact test as appropriate. A p-value of less than 0.05 was considered significant in all statistical analysis.

Results

Out of 414 study subjects, 72.5% were male & 27.5% were female. The mean age of patients was 60.60 \pm 13.34 years, and male mean age was 60.35 \pm 13.62 years and female was 59.70 \pm 13.245 years. There were three age groups in this study; these are 17-45 years, 45-65 years and more than 65 years. 75.12% of the study patients had hypertension, 84.06% had diabetes mellitus, 69.32% had H/O dyslipidaemia, and 23.43% had known CKD. 31.40% were smoker and 20.53% had past H/O smoking. Patient who suffered presumed cardiac cause of death had significant history of hypertension, dyslipidaemia, smoking habit and CKD ($p < 0.001$) but diabetes was found statistically insignificant ($p < 0.552$) as because incidence of death among noncardiac diabetic patients were also high. Frequency of IHD, CVD & other diseases are shown in table-I.

Table-I : Frequency of past medical history

Previous Sickness	Frequency (number)	Percent (%)
IHD	169	40.8
CVD	43	10.4
Others	116	28

Out of 414 study subjects, 73.67% were treated according to

advanced cardiac life support (ACLS) protocol. Out of 414 subjects 65% had presumed cardiac cause of death, 15% had neurological cause of death and rest 20% had other causes of death as suggested by history and clinical examinations. 52 deaths were 17-45 years of age group, 129 deaths were more than 65 years age group, & 233 death patients were 46-65 years age group. Among group of 46-65 years there were 161 cases with presumed cardiac cause of death. This is found to be higher than cardiac causes in other two groups (Table-II). Out of 169 subjects who had prior H/O IHD 145 of them died of cardiac cause.

Table-II : Cause of death in different age group

Age Group	Cardiac cause. n = 269	Neurologic cause. n = 62	Other causes. n = 83	Total 414
17-45 years	38	7	7	52
46-65 years	161	37	35	233
>65 years	70	18	41	129
Total	269 (65%)	62 (15%)	83 (20%)	414

Discussion

Sudden cardiac death (SCD) is an unexpected death due to cardiac causes that occurs in a short time period (generally within 1 hour of symptom onset) in a person with known or unknown cardiac disease²¹. Other forms of sudden death may be noncardiac in origin. The immediate cause of sudden cardiac arrest is usually due to malignant arrhythmia. Sudden neurological death (SND) is defined as death, or brain death, attributable to, and occurring immediately or soon after, the onset of a neurological illness or a neurological phenomenon²². In the 1970s the World Health Organization defined stroke as a "neurological deficit of cerebrovascular cause that persists beyond 24 hours or is interrupted by death within 24 hours"²³. The current retrospective hospital-based study presents enough evidence of the influence of age and gender on the incidence of SD in this part of the world, as it was much higher at the 46-65 age spectrums than other age groups in our study and was also higher in men than in women. These findings were consistent with the international experience, especially the findings from western countries^{13, 16-18, 20}. The incidence of major cardiovascular and neurological symptoms and signs was quite high affecting 65% and 15% of our patients. These findings suggest that there is a strong relationship between the prodromal symptoms and clinical signs of critically ill patients at the final presentation and their outcome, especially if their symptoms and signs are related to cardiac and/or respiratory medical emergency. Drory et al¹⁷ reported that similar incidence of 54% of prodromal symptoms affected his SD cases. The two main prodromal symptoms were chest pain in subjects aged more than or equal to 17 years. In another study by Alonzo AA et al¹⁹ of 160 hospitalized patients with acute myocardial infarction, and 138 individuals who had died prior to hospitalization from acute heart disease, it was found that 70% of the hospital subsample and 64% of the out of hospital subsample reported prodromal symptoms. However, Engelstein ED and Zipes DP²⁰ stated that prodromal symptoms were often nonspecific,

and could only be suggestive. They believed that there was age, race and sex influence on SCD, but the proportion of sudden coronary deaths decreased with age. The annual incidence of SCD among men was 3-4 times higher than in women from our three years data. We strongly believe that understanding the role of age, sex, risk factors and other co-morbidities can be very useful for the prevention of SD. For example, history of class III or class IV dyspnea, dizziness or syncopal attacks, very fast palpitation, or chest pain could direct the attention of the treating physician to request specific investigations such as electrocardiogram, echocardiogram, 24 hours Holter Monitoring, coronary angiogram and if needed electrophysiological study to arrive at an accurate diagnosis and provide the appropriate treatment^{11,16,19}. Nonetheless, a prompt appreciation of prodromal symptoms during that phase of a life threatening medical problem such as acute myocardial infarction by lay people and paramedical personnel is necessary if intervention by the treating physician is to be effective in preventing sudden death.

Conclusion

The current study illustrates a clear influence of age and gender on the incidence of sudden death. The incidence of SD increased significantly at the 46-65 years age group, and men has significantly more SD than women. Risk factors like hypertension, dyslipidaemia, history of smoking, known CKD, previous history of IHD have significantly increased incidence of SD caused by cardiovascular disease. Therefore prevention of sudden death requires increased awareness of the general population and medical community regarding the risk factors of SD and prodromal signs and symptoms of life threatening medical problems which may cause SD.

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