

*Case Report*

Sudden Death in a Young Army Personnel- A Case Report

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*Received: 06/01/2014**Revised: 31/01/2014**Accepted: 25/02/2014*

ABSTRACT

Sudden death, inarguably one of the most unpredictable and devastating especially when it occurs in soldiers. Death in combat is devastating, but it is an inherent risk of an occupation that calls for individuals to put their life at risk for others, more so if it happens during routine military training. Sudden death is said to occur more often in young patients, those with a family history. The mechanisms responsible for sudden death are complex and are probably not identical in all patients. Available data suggest that the most common precipitating factors of sudden death are arrhythmias.

Much attention has been paid to sudden cardiac death in young athletes leading to the implementation of tighter screening controls in many sporting activities at various levels. Less attention has been paid to this subject in young army recruits. We highlight issues regarding diagnostic testing to identify risk factors and suggest potential additions to the current screening program for detecting cardiac pathology and reducing the rates of sudden cardiac mortality in this group.

Key words: Physical exercises, Hypertrophic cardiomyopathy, sudden death.

INTRODUCTION

Sudden cardiac death is commonly defined as an unexpected natural death due to cardiac cause within a short time period (usually within one hour) with or without onset of symptoms and without any prior conditions that would appear fatal. Sudden cardiac death has a much higher incidence in men than women that increases with age because of high prevalence of ischemic heart disease in older ages.

The most common underlying pathologic conditions in children and adolescents are hypertrophic

cardiomyopathy, myocarditis, congenital coronary artery anomalies, atherosclerotic coronary artery disease, conduction system abnormalities, mitral valve prolapse and aortic dissection.

In adults coronary atherosclerosis and acquired forms of cardiomyopathy are the most common findings of autopsies.

Ventricular tachycardia and fibrillation and less often bradycardia and asystole are responsible for sudden cardiac death. In most cases, the fatal arrhythmia is triggered by electric irritability of myocardium distant from the conduction

system, induced by ischemia, electrolyte imbalance and/or other cellular abnormalities/ infiltration.

CASE REPORT

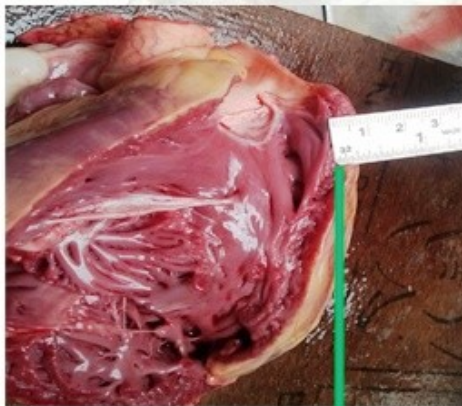
On 27th Oct 2011 at around 6:45 am the deceased, a BSF personnel said to be undergoing their usual physical exercises at their campus, suddenly collapsed. He was

shifted to hospital, where he was declared dead. No history of any past illness.

External Examination: Dead body that of a male aged 25 years measuring 5 feet and 6 inches in length, moderately built and nourished, whitish in complexion. Eyes partially opened, pupils dilated and fixed. Post mortem staining present over back of chest and abdomen and fixed. Rigor mortis well appreciated all over the body. fig1



Fig 1. Dead body of young jawan.



Right ventricle thickness-0.6 cms



Left ventricular wall thickness- 2.5cm

Fig 2. Ventricular thickness.

Internal Examination:

1. Skull intact, brain & meninges were intact & congested.
2. Both lungs were edematous & congested.

3. Heart weighed 492gms

On dissection, right and left ventricle wall thickness were 0.6cms and 2.5cms respectively and inter ventricular septum was 2.2cms with

hypertrophy of papillary muscles, coronaries and aorta were intact. fig 2

4. Stomach contained about 100 ml of cream colored fluid, no unusual smell and mucosa normal.
5. Liver, spleen, kidneys, intestinal coils were intact & congested.

Heart was subjected for histopathological examination, which confirmed the presence

of symmetrical thickening of interventricular septum, right and left ventricular papillary muscles hypertrophy and opined as myocardium showed hypertrophic changes with myocyte disarray. fig 3 and 4.

Cause of death: Death is due to cardiac insufficiency as a result of hypertrophic cardiomyopathy (sudden natural).

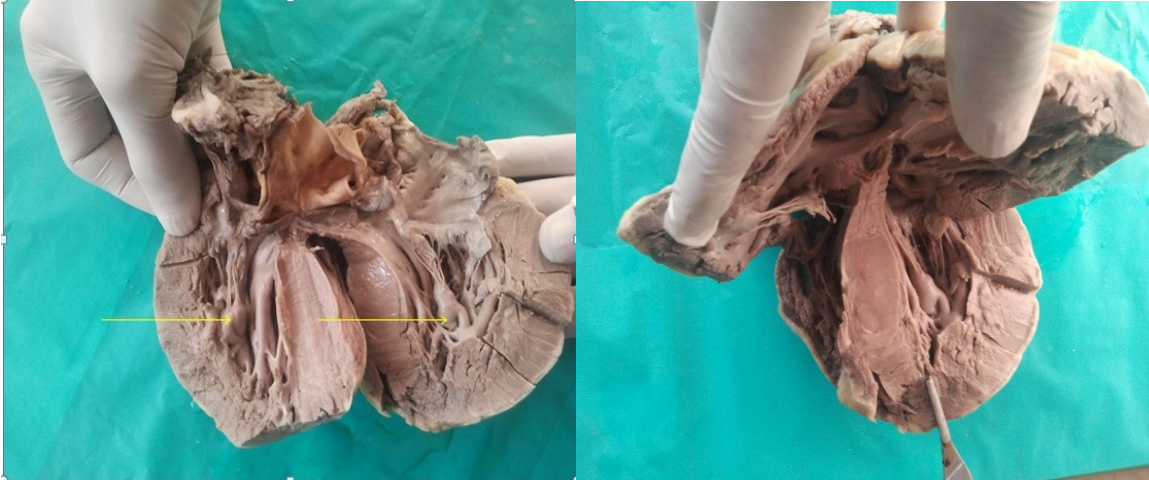


Fig. 3. Hypertrophy of papillary muscle.

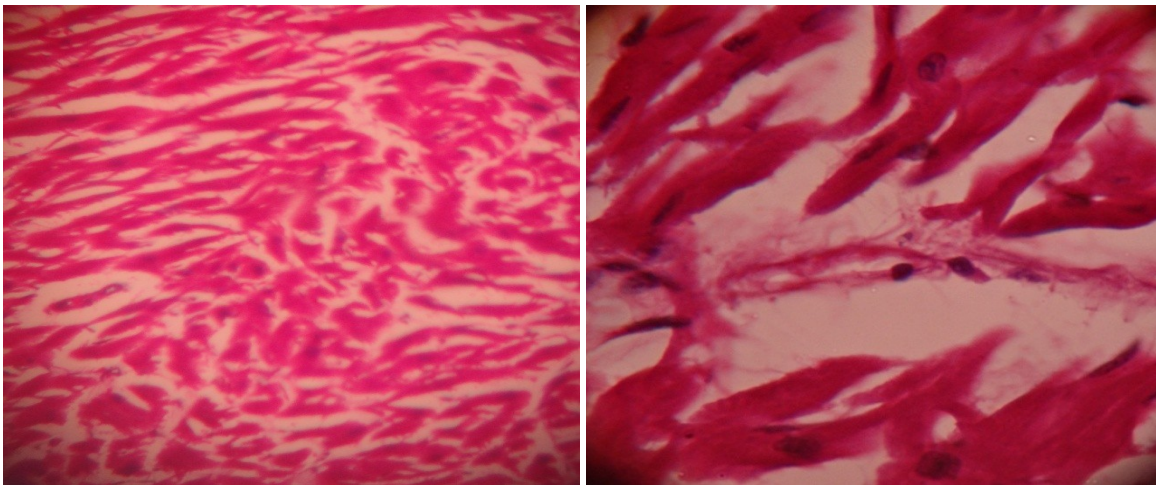


Fig 4. A bizarre and disorganized arrangement of the cardiac muscle cells in the septum, myocyte.

DISCUSSION

The beneficial effects of regular exercise, for the primary and secondary prevention of cardiovascular disease (CVD),

are well established. However, occasionally, a young and apparently healthy individual may die suddenly during exercise or immediately afterwards due to a silent cardiovascular disorder. Such tragedies have

a devastating effect on friends and family of the victim as well as the lay community who perceive a young fit person to represent the epitome of health. Young deaths often generate significant media interest that draws attention to the youth of the individual the number of potential life years lost and the counter-intuitive nature of the event. Unsurprisingly, the death of a young and fit person commonly galvanises emotionally charged discussions relating to pre-participation cardiovascular evaluation particularly since most implicated disorders can be diagnosed during life.

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(WHO).In the context of time, "sudden" is defined for most clinical and epidemiologic purposes as 1 h or less between a change in clinical status heralding the onset of the terminal clinical event and the cardiac arrest itself.

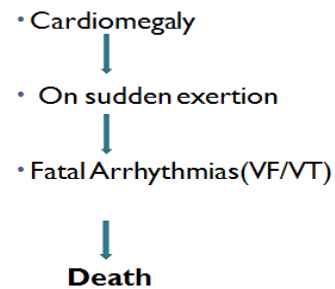
Atherosclerotic coronary disease was the most common cause of death in the over 30s. No similar analysis of sudden deaths in British military personnel exists, but the main cause of sudden cardiac death in people under 30 years in the general population in the Western world is HCM, accounting for around 50% of cases The prevalence of HCM in young adults is approximately 1 in 500.^[1]

Incidence of sudden death is approximately 10% of all deaths, most commonly due to diseases of_presents between the ages of 20 and 40 years. The classic pattern is disproportionate thickening of ventricular septum compared with the free wall of left ventricle ratio of 1:3(asymmetric septal hypertrophy), In about 10% of cases, the hypertrophy is symmetrical. Myofibre disarray is a highly sensitive and specific marker for HCM only

when considered in a quantitative rather than a qualitative fashion. In this context, the rationale for performing an end myocardial biopsy is to rule out mimics of HCM. Hypertrophic cardiomyopathy (HCM) represents one of the less common forms of primary cardiomyopathies. The condition is being increasingly recognized in India and yet, there is little data available regarding the incidence and the rates of mortality. Researchers have critically analyzed the role of myofibre disarray as a diagnostic marker for the disease. Our aim was also to elucidate the importance of histological examination in making or ruling out the diagnosis of HCM, especially in the setting of sudden death.^[2]

The cardiac etiology of sudden death in an autopsy - based study has been reported in 60-70% of such victim may present some prodromal symptoms like palpitation, chest pain and dyspnoea may suggest a cardiovascular etiology.^[3]

Mechanism of sudden death in cardiomegaly:



Sudden cardiac death has a much higher incidence in men than women that increases with age because of high prevalence of ischemic heart disease in older age.The most common underlying pathologic conditions in children and adolescents are myocarditis, hypertrophic cardiomyopathy, myocarditis valvular heart disease such as mitral valve prolapse ,

aortic valve stenosis and congenital coronary artery disease.^[4]

HCM is increasingly being recognized in India, though there is little data available regarding the incidence. Recent studies indicate that the disease is familial in 50% to 60% of cases and sporadic in the remainder.^[5]

In most cases, the fatal arrhythmia is triggered by electric irritability of myocardium distant from the conduction system, induced by ischaemia, other cellular abnormalities or infiltration. With detailed postmortem examination, most of the time the cause of sudden cardiac death can be determined but in a few cases, the pathologist faces a great difficulty especially in the hearts which appear normal to the naked eye, limitations should be considered in all cases of sudden death associated with.^[6]

Cardiac Screening and Military Service

Medical Tests for Indian Army and Indian Air force

The following are The Medical Test for Indian Army and Indian Air force.

1. Height:
2. Weight:
3. Chest:
4. Eye Vision:
5. ENT examination
6. Dental Examination
7. Systemic investigations
8. Blood pressure
9. Blood test
10. Urine test
11. Chest x ray
12. Ultra sound scan

New recruits join the Army every year, Recruit must undergo complete physical examination, but this may not be sufficient to reveal hitherto unknown cardiac abnormalities,

The importance of the awareness of cardiac abnormalities in young people and raises questions as to the potential role of screening for these potentially lethal conditions in new recruits.

Despite the varying nature of these conditions, can be grouped them together to provide an illustration of the varying etiologies of sudden cardiac death and the difficulty this poses in detection and treatment of the conditions in the context of active military personnel.

More research needs to be undertaken on the causes of sudden cardiac death in serving military personnel, to assess the scale of the problem and evaluate the potential benefits of more stringent screening procedures, including the introduction of ECG analysis to baseline screening of military recruits. This will reduce the incidence of sudden cardiac deaths

ECG testing is a cheap and mobile screening method but is operator dependent, especially when considering rarer cardiac abnormalities; for an effective screening the ECG should be further analyzed by an experienced cardiologist. Further recommended additions to the Army's entry medical screening programme include dynamic ECG testing on recruits with known cardiac risk factors and a more detailed history of any episodes of chest pain, shortness of breath or syncope during physical exercises.

If there are uncommon and training-unrelated ECG changes the use of echocardiography and tread mill test, Considering the cost, the degree of operator dependence, time constraints and its usefulness in detecting structurally abnormalities only, can be used in specific patients where further testing is warranted is satisfactory and would be considered as a baseline screening test in future.

Common abnormalities seen on the ECG.

Group 1: common and training-related ECG changes

Sinus bradycardia
First-degree AV block
Incomplete RBBB
Early repolarization
Isolated QRS voltage criteria for left ventricular hypertrophy

Group 2: uncommon and training-unrelated ECG changes

T-wave inversion
ST-segment depression
Pathological Q-waves
Left atrial enlargement
Left-axis deviation/left anterior hemiblock
Right-axis deviation/left posterior hemiblock
Right ventricular hypertrophy
Ventricular pre-excitation
Complete LBBB or RBBB
Long- or short-QT interval
Brugada-like early repolarization

CONCLUSION

Sudden cardiac death during basic military training should raise concern because it implies failures at many levels: a potentially fatal cardiovascular abnormality that fails to generate symptoms or signs of the underlying disorder; the patient's failure to recognize and report unusual symptoms; the physician's failure to recognize nonspecific symptoms that may represent a serious underlying cardiovascular condition; routine screening methods that fail to detect obscure cardiovascular abnormalities; and finally, resuscitation efforts that fail to restore spontaneous circulation. However, most of these "failures" do not invoke blame; rather, they present a challenge to the medical and scientific community to prolong life by reducing the occurrence of sudden unexpected deaths.

ACKNOWLEDGEMENTS

Staff, Dept of Forensic Medicine, MS Ramaiah Medical College, Bangalore.

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How to cite this article: Satish NT, Vinay, Harish S et. al. Sudden death in a young army personnel- a case report. Int J Health Sci Res. 2014;4(3):255-260.
