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Suddent Death of Jawan/Trainee in Military/CRPF/ Police/Paramilitary Forces: Report of two Cases and Review of Literature

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Abstract

Sudden death of an individual has interested the medical community since the first report of an unexpected death of the Greek soldier Pheldippides on completing a historic run from Marathon to Athens to deliver the message of victory over the Persians in 490 B.C.

We report a case occurred when two trainees of CRPF died on 23 Aug 2010, after they were taken ill during training at the Opadila Mahadeo training centre of CRPF &Rapid Action Force in Allahabad. They were taking part in a 16 Km run which is a part of physical routine & mandatory for every trainee. They were identified as Surjit Rai of Vaishali district in Bihar &Sunil of Tamil Nadu. After they fell ill apparently due to severe dehydration and exhaustion they were rushed to SRN hospital in Alllahabad where they succumbed later.

Overt or concealed diseases are responsible for sudden death of jawans in field. Physicians should be able to recognize clinical symptoms of potentially fatal conditions. This is the first step in preventing the rare, but tragic, occurrence of death among jawans Moreover, since the large majority of the diseases responsible for death due to CVS causes are hereditary, and are already evident in post-pubertal age, pre-participation screening should be applied to young jawans starting competitive amateur career. The efficacy of screening depends mostly on the experience and competence of visiting physicians, but a simple and *low-cost protocol, consisting of a careful medical and familial history taking, a thorough physical examination, a rest ECG* and, when possible, a stress ECG can identify a large number of subjects with potentially lethal diseases. Further investigation to screen out other causes must consist of full Blood profile, BT, CT, PT, ESR, Electrolytes level, LFT, CXR, PFT, Lipid Profile, USG abdomen &pelvic area (in female jawans).

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INTRODUCTION

We report a case occurred when two trainees of CRPF died on 23 Aug 2010, after they were taken ill during training at the Opadila Mahadeo training centre of CRPF &Rapid Action Force in Allahabad. They were taking part in a 16 Km run which is a part of physical routine & mandatory for every trainee. They were identified as Surjit Rai of Vaishali district in Bihar &Sunil of Tamil Nadu. After they fell ill apparently due to severe dehydration and exhaustion they were rushed to SRN hospital in Alllahabad where they succumbed later. According to doctors of SRN hospital the recruits died of cardiac arrest. The family of CRPF trainee Sunil kumar was already going through a harrowing time after they got the news that their 19yrs old boy died in Allahabad. The family however was in for a bigger shock when the body that arrived in coffin was that of a 40yr old man with grey hair .Sunil's family refused to accept the body even though inspector Muthuswamy tried to convince that the body look different as it was bloated and decomposed. According to unconfirmed reports the bodies could have got exchanged after the post-mortem. The family fears that the Sunil's body may have been sent to Bihar by mistake and already cremated. Later the authorities decided to conduct other PM to establish the true identity of unclaimed body[1,2,3,4].In a similar incidence few trainees of CRPF died during marathon at a training camp in Gwalior also.

Whenever death occurs in MILITARY /CRPF/BSF/Police, it raises the public interest and attracts media attention. Not that at each time the death is due to natural causes or due to inadequate medical facilities or medical attention and diagnosis, or negligent behaviour of authorities or may be due to physical abuse and torture. Sudden death of a Jawan is a great loss and an irony of duties with a great emotional disturbance that shakes the other members and the communities nation-wide[5]. A jawan is trained to do exceptionally high levels of performance for long periods of time and constitutes the healthiest segment of our society.

So the sudden death of a young JAWAN is a dramatic event with a devastating impact on his family, nation authorities and society also.

SUDDEN DEATH

Sudden death of an individual has interested the medical community since the first report of an unexpected death of the Greek soldier Pheldippides on completing a historic run from Marathon to Athens to deliver the message of victory over the Persians in 490 B.C.

Sudden death has been defined as "an abrupt unexpected death of cardiovascular cause, in which the loss of consciousness occurs within 1 to 12 hours of onset of symptoms"[8,9] or in other words "Sudden death is a death which is not known to have been caused by any trauma, poisoning or violent asphyxia and where death occurs all on a sudden or within 24hrs of onset of the terminal symptoms".[7]

Of all cases of sudden death about 45% are due to pathology in the CVS system about 20% due to pathology of respiratory system and 15% due to CNS about 6% due to alimentary causes, about 4% due to genitourinary causes and rest 10% are due to miscellaneous causes.[7]

CAUSES OF SUDDEN DEATH

The incident of sudden death is about 10% of all cases of death of these again most of the deaths

in jawans are due to cardiovascular or circulatory causes. **Hypertrophic cardiomyopathy** (HCM) is a genetic disease which manifests itself by the thickening of the ventricular septum and/or other segments of the left ventricle with or without a partial obstruction to the blood flow out of the left side of the heart. HCM has consistently been the single most common cardiovascular cause of sudden death in jawan. HCM is relatively common in the general population (1:500)[10]. **Congenital coronary anomalies**, mostly a wrong origin of the left main coronary artery, are the second most frequent cause of field deaths. A diverse composition of**approximately 15 other diseases of the heart** account for the remaining athletic field deaths due to cardiovascular disease. These include rupture of the aneurysm of the aorta as a component of Marfan's syndrome, arrhythmogenic right ventricular dysplasia/cardiomyopathy, rare anomalies of coronary artery development ("bridging" of a coronary artery, congenital absence of one or more coronary artery, etc), degeneration of the structures of mitral valve (mitral valve prolapse), aortic stenosis, dilated cardiomyopathy, myocarditis, aneurysm, rheumatic heart disease, hypertensive heart disease, myocardial infarction and other pathologies.

Occasionally, jawans that die suddenly do not demonstrate any evidence of structural heart disease on autopsy[12]. Such deaths may be associated with the**disorders of the conduction system** of the heart, such as Wolff-Parkinson-White (WPW) syndrome, Long QT Syndrome, Brugada Syndrome, and arrhythmias related to exertion, such as catecholaminergic polymorphic ventricular tachycardia (CPVT)[12]. In other instances, exercise-induced coronary spasm, a heart block or asystole with loss of consciousness[13] may be the cause of death.

Other causes of sudden death that are not related to cardiovascular disease. These are Exercise-induced asthma and respiratory arrest, Exercise-induced anaphylaxis, Sarcoidosis, Malignant hyperthermia, Heat stroke, Sickle cell trait, Gastrointestinal bleeding, Rhabdomyolysis, Head trauma Spine trauma (in pole vaulting),Non-penetrating neck blow with rupture of cerebral artery.

There have been reports of sudden cardiac deaths related to vigorous exercise and starvation, semi-starvation and liquid protein diets.[16] It is believed that in those cases, severe weight loss results in a decrease of the skeletal and the heart mass. Accompanying inflammation and also deficiencies in magnesium and potassium may make the myocardium more susceptible to arrhythmias. An increase in sudden death and in QT interval was associated with a liquid protein diet in a recent study.[17]

PREPRELIMINARY EXAMINATION

Sudden deaths of jawans have substantially increased interest in the role of pre-participation screening for the detection of diseases that may not manifest themselves with symptoms or abnormal physical examination and the mechanisms of sudden death in jawan. The recent public health initiatives on physical activity and exercise, made these issues more relevant.

Responsibility lies on physicians to exercise prudent efforts and judgment to identify life-threatening diseases in jawans to minimize risks associated with training programs[18,19,20,21] .The extent to which pre-participation screening can be supported at any level is mitigated by the considerations of cost-efficiency and practical limitations. .Training centres are required to utilize reasonable care in their programs for the purpose of detecting medically significant abnormalities. However, there is no clear legal precedent regarding the duty to conduct such screenings. In the absence of legally-binding requirements to perform screening and/or to diagnose disease in jawans most of

the physicians are following old forums. However, in the event that a physician cleared a jawan with a potential (yet undiscovered) condition is not necessarily legally liable for an injury or death caused by the undetected disease. The failure to diagnose an asymptomatic condition requires a proof that a physician deviated from accepted medical practices in performing pre-participation screening of jawans and/or utilization of techniques that would have discovered the disease. American Heart Association came forward with the recommendations for cardiovascular pre-participation screening of athletes which represent the standard of care. But these standards will only be legally established as a standard of care if generally accepted and followed by physicians and relied upon by courts in determining the nature and the scope of legal responsibility in cases of sudden death. Most of the institutions either do not have recommended forms to serve as guides for the evaluation examination, or the forms used were judged inadequate against the recommendations of the American Heart Association.

A physician, a chiropractor, a nurse practitioner or a physician assistant can perform such examinations. As majority of sudden death occur due to cardiovascular causes proper screening must be done. To exclude these causes pre-participation history consisting of rheumatic fever in childhood must be taken because of its association with valvular heart disease. History of HT, DM, Dyslipidemias are important to rule out coronary artery diseases. Smoking is also a major risk factor for coronary artery disease. Alcohol abuse may predispose to cardiac arrhythmias and cardimyopathy. Family history should always be documented because coronary artery disease &HT often run in families, as do some of the rare disease like HCM.[22] A significant congenital aortic valve stenosis is highly likely to be detected during a routine physical examination. However, hypertrophic cardiomyopathy (HCM), which accounts for the majority of sudden deaths in field may not be identified at all. The majority of individual with HCM do not experience syncopal episodes, major arrhythmias or limitations of activity that would serve as clues for the evaluating specialist.[18] Genetic diseases, such as HCM, Marfan's syndrome, arrhythmogenic right ventricular cardiomyopathy and premature coronary artery disease can be suspected based on the assessment of family history. The physical examination may identify components of Marfan's syndrome, lesions that are associated with either aortic stenosis of partial obstruction to the outflow from the left side of the heart occurring at rest, the presence of systemic hypertension, to name a few. The history and physical examination have the theoretic capability of at least raising suspicion of cardiovascular abnormalities that may trigger a sudden death. Some investigations like ESR, ECG, STRESS ECG, ECHO, CXR must be done to exclude other cardiovascular causes.

To screen out the respiratory causes physician must take a past history of Tuberculosis, Bronchial Asthma, Hemoptysis, or any allergies. He must get a CXR, PFT done to exclude other fatal diseases.

CNS account for other set of important causes so to rule out these causes physician must take history of strokes, haemorrhage, any epileptic episodes, migraine attacks in the past. And get his blood pressure, electrolyte balance, lipid profile, BT, CT, PTT done.

For rest of the alimentary and genitourinary causes family history of carcinomas must be taken. In case of female jawans menstrual history is very important. USG abdomen and pelvic region (in female jawans) must be done.

Overall, the preliminary screening process as it is currently structured and carried out generally

lacks sufficient power to consistently recognize clinically important abnormalities in jawans. Screening must include above discussed points and investigations to avoid such deaths.

Overt or concealed diseases are responsible for sudden death of jawans in field. Physicians should be able to recognize clinical symptoms of potentially fatal conditions. This is the first step in preventing the rare, but tragic, occurrence of death among jawans Moreover, since the large majority of the diseases responsible for death due to CVS causes are hereditary, and are already evident in post-pubertal age, pre-participation screening should be applied to young jawans starting competitive amateur career. The efficacy of screening depends mostly on the experience and competence of visiting physicians, but a simple and *low-cost protocol, consisting of a careful medical and familial history taking, a thorough physical examination, a rest ECG* and, when possible, a stress ECG can identify a large number of subjects with potentially lethal diseases. Further investigation to screen out other causes must consist of full Blood profile, BT, CT, PT, ESR, Electrolytes level, LFT, CXR, PFT, Lipid Profile, USG abdomen &pelvic area (in female jawans).

As everyone has the right to live whether he is civilian or a jawan. If a jawan is saying that he is not feeling fit for physical exercise then it is responsibility of the officer to get his full check up done. It will also rule out any malingering done.

Every death from natural causes represent much sickness in the population at large, so does every violent death represent much bodily and mental suffering. Furthermore suffering of a victim and family does not end with the death. . The Asian Human Rights Commission recently pointed out that one of the most important rights of a dead victim is for their body to be preserved in a manner that will permit proper medical examination ('Forensic science, mortuaries and the rights of victims of crime', AS-01-2004, January 6).

PM should be done only on magistrate or police orders. These days the procedure for post-mortems is so defective that it only leads to further horrific abuse of the victim's dead body and contempt for the rights of the family. Most morgues in the state are located in sub-divisional and district hospitals. The conditions defy description: without air conditioning and freezers, or other equipment to deal with the bodies, corpses rot within hours. The doctors assigned to do the post-mortems generally have no training in forensic science, and sometimes are even eye surgeons or psychiatrists. They are not properly paid, and in fact do not actually do it themselves.This is left to a caste group, the Dom, a sub-group of Dalits (so-called untouchables) assigned the task of handling the dead bodies. The Doms, who are usually completely uneducated and often drunk on the job, open the bodies with hammers, rusty nails and axes, and call out what they see to the doctor, sitting 30, 40 or perhaps 50 metres away. The doctor then records their observations, and the body parts are discarded. Failure to treat a victim's body with due respect and diligence is a serious violation of the rights of the victim and their family. That an autopsy should be conducted in such a manner as described above not only defies common sense but is an affront to human dignity. Following guidelines must be followed as an ideal approach to find out the exact cause of death while conducting post-mortem examinationin case of sudden deaths:-

1. If possible the post-mortem should be conducted by a team of doctors.
2. The video recording of post-mortem is preferable.

3. As reported in above case there was some dispute in the identification of Sunil's body. To avoid such incidences proper labelling of body should be done with a name written on leucoplast attached to the chest of body.

4. Viscera should be preserved in all such cases, preferably.

5. Panchayatnama should be done by the magistrate & Investigating officer should be Deputy S.P. of police

6. All precautions for identification must be taken before dispatch/disposal of the dead body
(a) Two identification marks of the body.

(b) Photography of the face & body.

(c) Blood samples for D.N.A. & preservation of viscera.

7. The detailed post-mortem should be conducted and the cause of death should be concluded on the basis of external examination, internal examination, any injury present over the body and visceral examination of brain,heart,lungs,and kidneys along with histopathological tests to exclude the pathology. Blood test for electrolytes must be done. The detailed autopsy report should be done to find out the exact cause of death. If it is obscure autopsy then the team of doctors should follow the guidelines of obscure autopsy.

8. Sudden demise of a family member is a very painful condition for the family. In this situation they do require some emotional and spiritual support. Chaplaincy services enable these persons to identify and draw attention on his/her own spiritual strength& to understand religious meaning of illness to face such situations.

While conducting post-mortem in case of sudden death below mentioned points must be noted down to do a thorough PM examination and to find out the cause of death:-

a) HISTORY:-Following points must be inquired before dissection- Name of the deceased, age, sex. time, place, date of examination, Introductory comments regarding scene of crime, brief history of incident. Personal history (occupation, marital status) medical history (previous and current illness and treatment)social history (alcohol and drug consumption, smoking and other habits).

(b) EXTERNAL EXAMINATION:-

- Description of clothing
- Height ,weight
- General description (obesity, emaciation, dehydration, hygiene etc..)
- Identification features including scars, tattoos, hair and teeth
- Signs of medical intervention
- Description of external injuries
- Post-mortem changes lividity, rigidity, changes of decomposition.

(c) INTERNAL EXAMINATION

(i) CARDIOVASCULAR SYSTEm

PERICARDIUM:- description(thickening, adhesions) contents, volumes & nature HEART:-these points must be inquired in following structures

- Pericardium (Haemorrhage, adhesions, rupture)
- Myocardium (thickness, fibrosis, fresh infarcts)
- Endocardiuml (haemorrhage, fibrosis)
- Valves (length, thickening, vegetations, adhesions as indicated)
- Wall thickness (right and left ventricle)
- Weight of the heart after removing clots(total weight, separate weight of right and left ventricles)
- Coronary arteries description, distribution of right and left anterior descending and circumflex coronary arteries, atheromas, thrombi and severity of narrowing and bridging.

(ii) RESPIRATORY SYSTEM

- Pleural cavity-adhesions, contents, nature and volume should be described.
- Larynx, pharynx position, integrity and contents should be described.
- Trachea, Bronchial tree mucosa and contents (pus, blood, froth) should be described.
- Lungs:- Description of external surface, cut surface and any consolidation present must be noted. Weight of Rt. and Lt. lungs separately.
- Pulmonary vessels:-description of atheroma and thrombi

(iii) GASTRO INTESTINAL SYSTEM

- Oesophagus- Description of mucosa, erosions as indicated
- Stomach:- Description of mucosa (erosions, ulcerations, growth) , wall and contents (volume and nature)
- Small and large bowels:-description of mucosa, contents and wall as indicated
- Liver:-Weight, description of external surface, cut surface and texture.
- Gall bladder:- Description of nature and contents as indicated
- Pancreas:-weight, description of nature of surface and cut surface as indicated
- Spleen:- weight and description of the nature and texture
- Peritoneal cavity:- Description of contents, adhesions.

(iv) GENITOURINARY SYSTEM

- Kidneys:-Weight, description of the surface, cut section of cortex and medulla.

- Ureters and Bladder:- Description and contents
- Prostrate:-Assessment of size, description of cut surface and texture.
- Penis and Testicles:- Description as indicated
- Cervix and uterus:-Description and contents as indicated
- Ovaries:- Description as indicated

(v) CENTRAL NERVOUS SYSTEM

- Menninges:-Description of surface (bleeding, pus, thickening, adhesions)
- Major arteries in the neck and circle of Willis :-Description, distribution of atheromas and aneurysms
- Brain:- weight, description of surface and cut surface, ventricular surface and description of CSF should be noted.

(d) SPECIMENS (mainly case dependent)

- Histology:-organs should be targeted according the case.
- Heart:-One section from each chamber and ventricular septum .More sections from affected part .Sections from sinus and AV node sites. Section from coronaries as indicated.
- Lungs:-One section from each lobe and more section from affected sites
- Liver:- One section
- Brain:-Sections from cortex, cerebellum and brain stem.

(e) Summary of major anatomical and investigative findings

(f) Cause of death (according to international classification of disease)

Medical certificate of cause of death Part A: particulars of deceased.

Part B:-Cause of death.

(g) Comments:-Death due to natural disease or not.

Brief explanation of disease

Relevant medico-legal issues addressed

CASES WHERE CAUSE OF DEATH UNASCERTAINED AT AUTOPSY:-

Following guidelines in addition to those described under sudden death must be followed

INTERNAL EXAMINATION:-

1) Cardiovascular system:

- Heart:-measure left and right ventricle thickness at the level of papillary muscle.

2) Respiratory system:

- Lungs-specific comment on the contents in the airway, mucus ,foreign bodies if present must be given

3) Brain: Description of ventricular system and examination for colloid cyst must be done.

4) Spinal cord: Special dissection and description as indicated.

5) Adrenal glands: Description of glands as indicated.

6) Lymph nodes: Description of cervical, mediastinal, para-aortic and pelvic group of lymph nodes as indicated.

7) Pituitary: Description of gland

HISTOLOGY:-

Specimens of following parts will be collected:-

- Heart: At least one section from anterior, posterior and lateral septum of left ventricle must be taken. One section from right ventricle. Sections from SA node AV node and conducting system are taken.
- Lungs: One section from each lobe.
- Adrenal glands: on section from each gland
- Pancreas: one section
- Lymph nodes: one section from each lobe
- Bone marrow: one section and smear
- Brain: sections from cerebral cortex, midbrain, pons, cerebellum and hippocampus.
- Skeletal muscle:-one section including Quadriceps and Deltoid
- Pituitary:-One section
- Kidney:- one section from each kidney

TOXICOLOGY AND BIOCHEMISTRY

- Blood for full toxicological examination
- Vitreous for potassium, sodium, urea, glucose, acetone
- Bile for opioids and other drugs.
- Stomach contents for toxicology
- Urine for ketone bodies.

SEROLOGY

- Consider serum cholesterol

MICROBIOLOGICAL CULTURES and RADIOLOGICAL CULTURES: as indicated

References

1) www.findarticles.com/….20100829/crpf_trainees….allahabad/ai_n54978541/-

2) www.dnaindia.com/.../report_family_of_trainee_crpf_won_t_accept_body_1431836

3) www.telegraphindia.com/1100829/jsp/nation/story-12869173jsp

4) www.justsamachar.com/search?c=1&q=crpf

5) www.sudden death athletes.org/

6) www.aiba.org/documents/site1/commissions/..../sudden20% death.pdf

7) Nandy A. Principles of Forensic Medicine including Toxicology. New central book agency(P) ltd. 3rd Ed:2010; pp-226.

8) Myerburg RJ, Castellanos A. Cardiac arrest and sudden cardiac death. In: Braunwald E, Ed: Heart Disease: A Textbook of Cardiovascular Medicine. 4th edition. Philadelphia, PA, WB Saunders Co; 1992; pp-756-789.

9) Maron BJ, Roberts WC, McAllister HA, et al. Sudden death in young athletes. Circulation 1980; 62: 218-229.

10) Maron BJ. Hypertrophic cardiomyopathy: a systematic review. JAMA 2002; 287;1308-1320.

11) Davis JA, Cecchi F, Jones TK, Portman MA. Major coronary artery anomalies in a pediatric population: incidence and clinical importance. J Am Coll Cardiol 2001; 37:593-597.

12) Maron BJ. Sudden cardiac death in young athletes: epidemiology, screening and prevention. In: Aliot E, Clemety J, Prystowsky EN, eds. Fighting Sudden Cardiac Death: A Worldwide Challenge. Futura, Armonk, NY, 2000; pp- 211-237.

13) Hirata T, Yano K, Okui T, et al. Asystole with syncope following strenuous exercise in a man without organic heart disease. Ann Intern Med 1987; 106:280-283.

14) Maron BJ**,** Shirani J, Poliac LC, et al. Sudden death in young competitive athletes: clinical, demographic and pathological profiles. JAMA 1996; 276:199-204.

15) Katcher MS, Salem DN, Wang PJ, Estes III NAM. Mechanisms of sudden cardiac death in the athlete. In: Estes III NAM, Salem DN, Wang PJ, eds. Sudden Cardiac Death in the Athlete. Futura, Armonk, NY, 1998; 3-24.

16) Kloner RA. Illicit drug use in the athlete as a contributor to cardiac events. In: Estes III NAM, Salem DN, Wang PJ, eds. Sudden Cardiac Death in the Athlete. Futura, Armonk, NY, 1998; 441-452.

17) Surawics B, Waller BF. The enigma of sudden cardiac death related to dieting. Can J Cardiol 1995; 11:228-231.

18) Maron BJ, Thompson PD, Puffer JC, et al. Cardiovascular preparticipation screening of competitive athletes. Circulation 1996; 94:850-56.

19) Maron BJ, Mitchell JH. 26th Bethesda Conference. Recommendations for determining eligibility for competition in athletes with cardiovascular abnormalities. J Am Col Cardiol 1994; 24:845-99.

20) Pelliccia A, Maron BJ. Preparticipation cardiovascular evaluation of the competitive athlete: perspectives from the 30-year Italian experience. Am J Cardiol 1995; 75:827-31.

21) Maron BJ , Brown RW, McGrew CA, et al. Ethical, legal and practical considerations affecting medical decision-making in competitive athletes. In: Maron BJ, Mitchell H. 26th Bethesda Conference. Recommendations for determining eligibility for competition in athletes with cardiovascular abnormalities. J Am Col Cardiol 1994; 24:854-60.

22) Hutchinson's Clinical Methods. An Integrated approach to clinical practice Saunders(p) Ltd. 22nd ed. 2000;pp-70.

23) http//students.indlaw.com-A brief note on custodial death in India -*Niranjan Man Singh, Prashant Roy.*

24) http://www.unhchr.ch/html/menu3/b/a_ccpr.htm (last visited on 24 November 2005).