Malaysian Journal of Medicine and Health Sciences Vol. 8 (2) June 2012: 73-75

Lightning Strike Fatalities: Three Case Reports of Military Personnel in Malaysia

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ABSTRACT

Lightning strikes have been known to cause fatal injuries. However, these cases have not been adequately highlighted in Malaysia. This paper reports on three cases of military personnel who lost their lives after being struck by lightning while on operational duties. It is extremely important to implement adequate safety measures and ensure that all military personnel are adequately trained on emergency procedures, such as Cardio Pulmonary Resuscitation (CPR) to prevent casualties of lightning strikes in future. This paper addresses several issues to avoid similar occurrences; the importance of taking extra safety precautions and recognizing signs of lightning strikes, as well as the immediate administration of CPR on victims.

Keywords: Lightning-strikes, Military-personnel, Operational-duty, Safety-measures

INTRODUCTION

Lightning hazards are known causes of weather related injuries and death among civilians, [1] as well as among military personnel in developed and developing countries.[2, 3] Lightning is a natural atmospheric discharge that occurs between regions of net positive and net negative electric charges, and may cause injury or sudden death through direct strike, flash discharge (splash), contact current (step voltage) or blunt trauma. The most dramatic effects on the human body involve the cardiovascular and central nervous systems which may lead to significant morbidity and mortality.[4]

A retrospective study in Malaysia from 1996-2005 by Murty *et al* revealed that there were 27 fatal cases of lightning strikes which involved mostly foreign workers (59.3%) who worked as construction workers (40.7%). Most of the victims were brought in dead (37.0%) to the hospital.[1] A report from the Morbidity and Mortality Weekly Report (MMWR) of the Center for Disease Control and Prevention in 2002 revealed that approximately 350 active servicemen had been injured, with one death, due to lightning strikes between 1998 to 2001 in all United States military installations.[2] According to a report in the Malaysian Armed Forces, there have been about 9 deaths due to lightning strikes with single or multiple medical complications from 1985 to 2010.[3]

Malaysia is among the tropical countries in the world which has recorded the highest rates of lightning activity. The Meteorological Department of Malaysia recorded a few areas in Peninsular Malaysia that have had extremely high rates of 180 to 200 thunderstorm days per year as compared to other countries.[5] This significant number of lightning activities may increase the incidence of injuries and deaths related to lightning strikes. In view of the scarcity of reports, we would like to present three cases of sudden deaths due to lightning strikes among three military personnel. These incidents occurred while the personnel were carrying out their duties in operational areas in Malaysia. The aim of this paper is to highlight the hazards of lightning strikes and to prevent morbidity and mortality related to lightning strikes among military personnel in Malaysia.

CASE REPORT

Cases 1 & 2: These cases involved two soldiers, aged 21 years old and 33 years old respectively, who were struck by lightning (direct strikes) at the same time. The incident occurred while both of them, together with two other military personnel were patrolling in the frontline 'forward location' of Pos Batu Layar, Sabah. Both victims were patrolling by the sea side, under the Rhu trees with surrounding bushes. There was light rain with thunderclaps. After the lightning strike, the victims were found to be unconscious and brought to the nearest hospital, but were declared dead on arrival. The post mortem report confirmed that they died due to cardiac arrest secondary to lightning strike.

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Case 3: A 22 year old military personnel was struck by lightning while he and a few other military personnel from the same group (section size troopment) were having lunch under a tent. There was light rain with lightning and thunder. The deceased and the other military personnel were thrown to the ground when lightning struck their tent. The deceased was found to be unconscious and was immediately brought to the nearby hospital. He was pronounced dead on arrival. The post mortem report confirmed that he had cardiac arrest secondary to lightning strike.

DISCUSSION

All victims were military personnel deployed in operational areas in Sabah, East Malaysia. Military personnel are more prone to being struck by lightning due to their operational duties outdoors and in all types of weather conditions. Military attires worn during operations include a complete set of gear, support accessories, and equipments that include personal weapons. Most of the gear, accessories and equipments are made from metal; such as buckles, knives, radio equipments and cooking utensils. It has been reported that lightning easily strikes if certain types of metals are attached to the body. [4] It is worse if the ground in that area also contains certain metals and minerals which attract lightning. Since military duties require personnel to move in groups of at least two, cases of lightning strikes among military will usually involve multiple casualties in each incident.

The findings of this report are consistent with the study by Murthy *et al*, where the lightning strikes occurred in the evenings at the end of the year when the victims had taken shelter under trees.[1] In this paper, both victims (Cases 1 & 2) were struck by lightning when they sought shelter under the trees. In case 3 however, the victim was struck while he was in a tent.

All victims had sudden loss of consciousness after being struck by lightning. Edlich *et al.* described that the most dramatic effects of lightning strikes involve the cardiovascular as well as central nervous systems, in which cardiopulmonary arrest is the most common cause of death. This probable mechanism is due to primary injuries or burns of the myocardium without coronary artery occlusion. This then induces vasomotor spasm from direct sympathetic stimulation resulting in severe loss of pulse in the extremities. The vasoconstriction may also be associated with transient paralysis. Immediate resuscitation of people struck by lightning greatly affects the prognosis.[4]

In view of this, immediate action should be taken to attend to victims who are struck by lightning. Military paramedic and personnel must be able to recognize the signs and symptoms of lightning strikes, as well as be aware that immediate resuscitation of these cases as essential to save lives. In the above cases, all three victims were brought to the nearest government hospitals for continued resuscitation. As there was no record of any resuscitation done at the scene of the incidents, we were unable to ascertain if adequate resuscitative measures were performed prior to their arrival at the hospitals. Therefore, we strongly recommend that military paramedic and personnel should be competent in administering Cardio Pulmonary Resuscitation (CPR), such as securing the airway, as well as in reviving breathing and maintaining the circulation (ABC). Medical emergency guidelines, including CPR techniques should also be reviewed and implemented at operational field sites as these incidents often occur in remote areas. These areas are very far from the nearest hospitals and emergency facilities, with the possibility of poor roads and trails. Therefore, it is very difficult to ascertain the duration of the journey to transport the victims to the hospitals.

In order to prevent further mishaps, we would like to propose that precautions be taken when there is rain and thunder while carrying out duties at operational sites. All levels of command must be informed about not having foot patrols when it rains, especially in thunderstorms (unless during emergencies or conflict situations). Personnel should be advised to stay indoors or under an enclosed shed or guard house, instead of under open tents. The current advice on avoiding being in open spaces and under trees during a thunderstorm should be reinforced. The best place to be is in an enclosed building. All military personnel should be aware of the hazards of raining and lightning, and should take reasonable precautions to protect themselves and those under their command from becoming victims of lightning strikes.

We hope that by publishing this report, all cases of lightning strikes can be avoided in the future. More importantly preventive measures should be implemented and reinforced as soon as possible to avoid such occurrences among Malaysian military personnel. Monitoring of such cases, should they unfortunately occur again should be properly recorded with adequate compensation to the victims' families who have lost their breadwinners.

ACKNOWLEDGEMENT

We are grateful to the Director General of the Health Services Division, Malaysian Armed Forces for his support and permission to publish this paper.

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