

## FIELD MEDICINE

## PATTERN OF INJURIES IN COUNTER TERRORISM OPERATIONS: AN EXPERIENCE AT A TERTIARY CARE HOSPITAL

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## ABSTRACT

**Objective:** To determine the pattern of injuries sustained by military persons in counterterrorism operations.

**Study Design:** Descriptive study with retrospective data collection.

**Place and Duration of Study:** The study was carried out at Combined Military Hospital (CMH) Kohat over a period of four years from December 2008 to December 2012.

**Material and Methods:** Data of patients was collected by noting the injuries suffered by soldiers and officers evacuated from operational area and their outcome after treatment in tertiary care hospital from hospital papers.

**Results:** Total of 1226 patients were received from operational area over a period of 4 years from December 2008 to December 2012. One hundred and fifty seven (12.8%) were brought in dead while 1069 (87.2%) were received alive. Twelve (0.98%) patients died during hospital treatment. All patients were male. A total of 593 (48.4%) suffered limb injuries, 50 (4.1%) suffered neck injuries, 61(5%) had chest injuries, 30 (2.4%) suffered head injuries, 62 (5%) presented with abdominal injuries, 52 (4.3%) suffered eye and face injuries, 3 (0.2%) suffered acoustic trauma, 9 (0.7%) had vascular injuries while 366 (29.8%) suffered multiple injuries. In 480 (39.2%) patients mechanism of injury was fire arm injuries, 34 (2.8%) suffered road traffic accidents while in 712 (58.1%) injury was caused by Improvised Explosive Device.

**Conclusion:** There is a shift in the pattern of injuries in modern warfare therefore necessary training of medical staff is required along with speedy evacuation of patients to tertiary care hospitals.

**Keywords:** Counterterrorism, Improvised Explosive Device, Military.

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## INTRODUCTION

War has affected humans since the dawn of time and lust for control of power ,resources, land has led to military conflicts amongst various nations during the course of history. However with improvement in weaponry and introduction of various deadly weapons and their possession by many nations has led to change in pattern of injuries suffered during modern war era.

The pattern of war by terrorists is different from the conventional warfare and with no apparent enemy the injuries suffered by the military as well as civilian populations are

different than those inflicted by conventional warfare. Moreover injury patterns also depend upon type of terrain where operations are being carried out, weapons used by the terrorists, weather affecting the area and training of military personnel to fight such unconventional war. The changes in wound patterns can mostly be attributed to the enemy's unconventional tactics in this irregular war (e.g. widespread use of Improvised Explosive Devices (IEDS), as well as the wide spread use of individual body armour, Kevlar helmets and heavily armoured vehicles. Individual body armour and Kevlar helmets provide vital protection for the head, chest, and abdomen, mitigating the effect of what would otherwise be life-threatening injuries<sup>1</sup>. The reduction in thoracic injuries was first observed in Operation Desert Storm, when individual

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body armour was employed on a large scale for the first time. This operation saw a decline in thoracic injuries to 5% compared to 13% seen during the Vietnam War<sup>2</sup>. A continued reduction in thoracic injuries has also been demonstrated in several studies conducted during Operation Iraqi Freedom/Operation Enduring Freedom<sup>3</sup>.

Due to its specific geopolitical location and being a major ally of United States of America (USA) in war against terror, Pakistan is also one of the major countries affected by terrorism and its military and paramilitary forces are facing the gigantic task of fighting against terrorist activities. There is paucity of literature to identify

were also included in this study. Injuries occurring to the civilian population were excluded because of lack of availability of considerable data and difficulty in their follow-ups.

Initial treatment was provided by buddy or nursing staff present at the scene and further treatment provided by nearby field hospital. Triage was carried out and patients were transferred to tertiary care hospital by road as well as aerial route. All patients were received in the emergency by surgeon on duty, emergency doctor, ward nurse and other paramedical staff. On arrival of the patient primary survey was

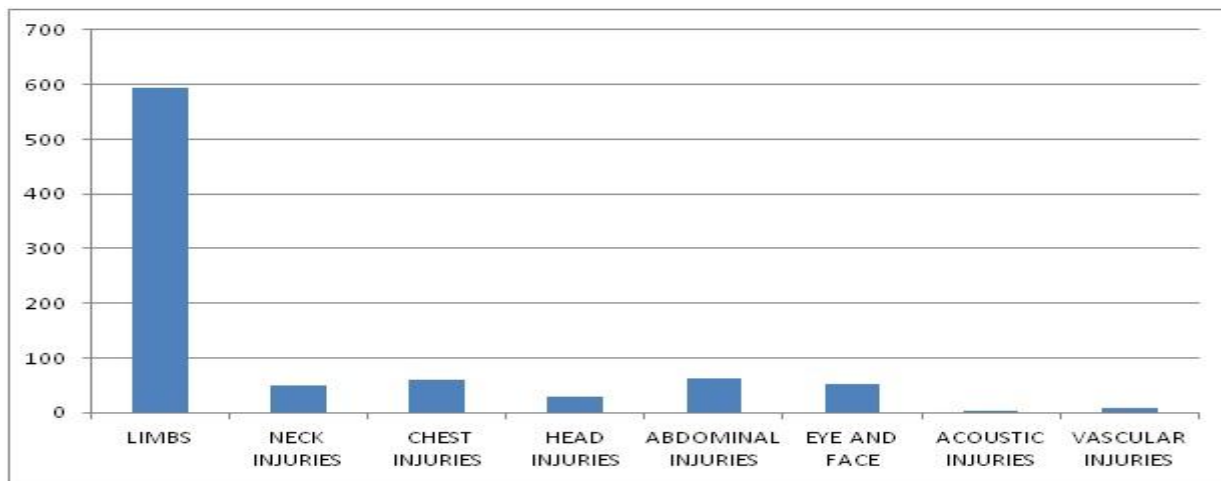


Figure-1: Pattern of injuries in counterterrorism operations.

the pattern of injuries suffered by military persons involved in counterterrorism operations and a need to know the pattern of injuries is strongly felt. This study was done to find out the pattern of injuries in counterterrorism operations, mortality rates and adequacy of treatment after reaching tertiary care hospital.

### MATERIAL AND METHODS

The descriptive study was carried out at Combined Military Hospital Kohat and included the army personnel of all ages brought from operational area to the tertiary care hospital over a period of four years between December 2008 to December 2012. Injuries occurring as a result of Road Traffic Accidents (RTA) related to militancy

carried out as per Advanced Trauma Life Support (ATLS) protocol. Initial resuscitation was carried out and patients were grouped as per the part of body injured including limbs, thorax, head and neck, abdomen, face, vascular and multiple injuries. Multiple injuries included more than one organ injured. The mode of injury was also noted. Those requiring emergency or immediate surgery were shifted to operation theatre and necessary surgery was performed while those not requiring surgery were shifted to the respective wards. Clinical data of all patients was documented on specific format particularly mentioning the details of their injuries and essentials of treatment. Data had been analysed using the statistical package for social sciences

(SPSS) version 13.0. Descriptive Statistics were used to describe the results.

## RESULTS

Total of 1226 patients were received from operational area over a period of four years. All were male. A total of 157 cases (12.8%) were received dead while 1069 (87.2%) were received alive. Twelve patients (0.98%) died during stay at hospital. Most common organs injured were limbs 593 (48.4%) followed by neck injuries 50 cases, (4.1%), chest injuries 61 cases (5%), head

terrorism, insurgency, and guerrilla warfare. There is no uniformed enemy, no defined front lines or order of battle, and allegiances can be fluid<sup>4</sup>. As a result, most combat casualties occur due to ambush, or increasingly from the use of IEDs<sup>5</sup> whereas most of the combat casualties in conventional war are due to fragments/splinters<sup>6</sup>. Peleg et al has reported 95% injuries as a result of small arms and explosive devices in hospitalized terrorist victims, when not taking Road Traffic Accidents into account<sup>7</sup>, whereas in our study (58.1%)

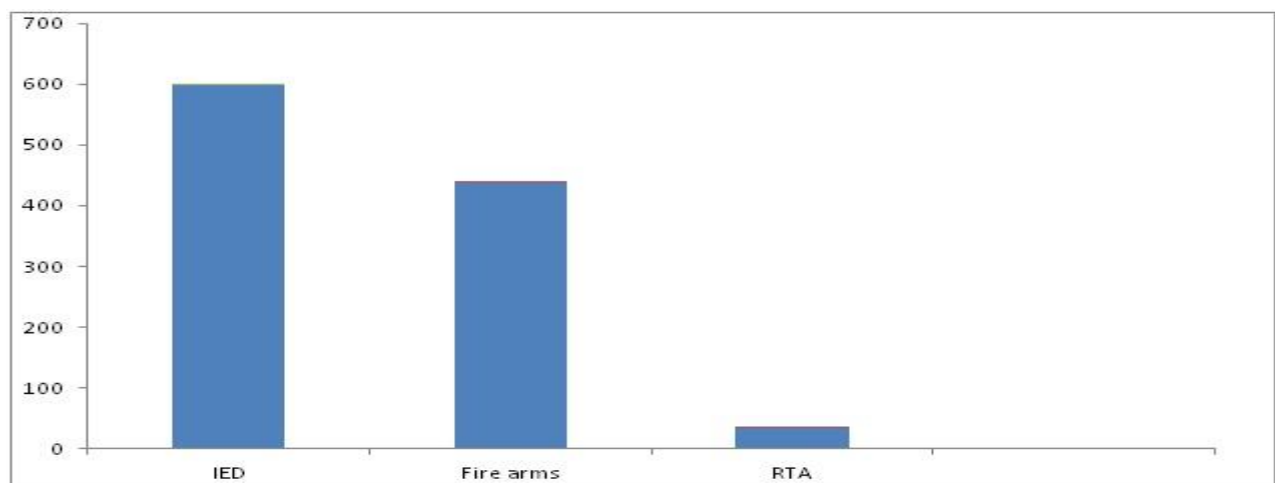


Figure-2: Cause of injuries in counterterrorism operations.

injuries 30 cases (2.4%), abdominal injuries 62 cases (5%), eye and face injuries 52 cases (4.2%), acoustic trauma 3 cases (0.2%), and vascular injuries 9 cases (0.7%) (fig-1). Amongst the injured 366 patients (29.8%) suffered injury to more than one organ and were grouped in category of multiple injuries.

Most common cause of injury was IED in 712 patients (58.1%) followed by 480 (39.2%) getting injured by firearms while in 34 (2.8%) the cause of injury was road traffic accidents (fig-2). Head injury was the cause of death in 3 cases while 9 deaths occurred due to multiple injuries.

## DISCUSSION

In counterinsurgency operations the patterns of injuries inflicted is different from conventional warfare because of an irregular war, in which enemy tactics are primarily based on

patients suffered injuries due to IEDs. Zouris et al has reported 75% injuries to small arms and explosives in US marines in Iraqi war<sup>8</sup>. Appenzeller has reported two-third injuries attributable to blunt trauma and only one-third to combat-type injuries; 74% of blunt injuries due to motor vehicle accidents, accounting for 47% of overall trauma<sup>9</sup>.

Extremity wounds and fractures traditionally comprise the majority of traumatic injuries in armed conflicts<sup>10</sup>. Half (48.4%) of our patients suffered limb injuries. Appenzeller, in Kosovo war, also reported extremity injuries to be the most common injuries occurring in 54% of all patients. Zouris, in Iraqi war, reported 70% of all injuries to upper and lower extremities, a percentage consistent for battlefield injuries since World War II<sup>8</sup>. Multiple injuries were the second

largest group of injuries (29.8%), followed by abdominal (5%) and chest (5%) injuries. Body armour has been shown to protect military personnel from most ballistic projectiles to the torso, thus increasing survival.

Early recognition, prompt management and adequate training of healthcare workers employed in these areas contribute a lot to better outcome of the injured personnel. Prehospital treatment of the injured should focus on resuscitation of the patient, control of haemorrhage and speedy evacuation to the nearby health facility. Management according to ATLS guidelines with specific emphasis on ABC greatly affects the outcome of injured patients and reduce mortality rate. Immobilization of cervical spine and maintenance of oxygen delivery are the primary and most important intervention<sup>11</sup>. Advanced life support (ALS) procedures can be performed by paramedics on major trauma patients without prolonging on-scene time. The speedy evacuation to better healthcare facilities is also a major determinant to the outcome of patients. Two different methods of transfer of trauma victims have been suggested; one, 'Scoop and scoot' other 'Stay and stabilize'. First one is ideal for urban settings, with short distances and good transportation facilities whereas second one is more helpful in difficult terrains and long distances. Another concept, 'In-transit stabilization, constitutes resuscitation during transfer to nearby hospitals. The option primarily depends on facilities available for transfer, distance to trauma centre and severity of trauma.

As in our study and many other studies conducted in case of counterterrorism injuries bulk of injuries occurred as a result of IEDs, so an armoured vehicle named "COUGAR" was developed as part of the U.S military's "Mine Resistant Ambush Protected" vehicle program and they observed that no soldiers had died in more than 300 IED attacks on Cougars<sup>12</sup>. Moreover identifying and disrupting the network

that create and initiate IEDs ,preparing and training soldiers for an IED environment can help in reducing the casualties.

## CONCLUSION

Since there is a shift in pattern of injuries suffered during modern warfare, so necessary changes are required to be inculcated amongst the training of medical staff dealing with such injuries. We stress on improved training of the healthcare workers and the soldiers employed in counterterrorism operations alongwith speedy and timely evacuation to tertiary care hospitals.

## CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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