

PATTERN OF INJURIES INFLICTED ON TROOPS FIGHTING, ON THE WESTERN FRONT

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ABSTRACT

Objective: To determine the pattern of fatal and non fatal injuries in soldiers and officers during the present war on Western front.

Study design: Descriptive study with partly retrospective data collection.

Place and Duration: The study was carried out at Combined Military Hospital (CMH) Peshawar, the tertiary care centre for Pakistan Armed Forces serving FATA and NWFP from March 2004 to May 2009.

Patients and Methods: Data of non-fatal injuries was collected by noting down the wounds inflicted on injured soldiers and officers evacuated from forward areas while the record of non-fatal injuries was noted from the hospital papers prepared for each patient.

Results: Due to reasons of confidentiality the analyses is based on percentages only, while actual figures can be provided by the authors on appropriate security cleared requests. The Lethality Index (LI) of wounds, calculated by dividing the fatal injuries by the total injuries, was 18% during these six years. Out of the total fatal injuries in all six years highest number occurred in 2008 (40%) while LI was highest in 2005 (25%). Only a small number of patients (1.86 %), who were evacuated alive, died in the hospital. Fifty one percent soldiers received multiple (> two) fatal injuries. Head (46%) and Chest (44%) were the commonest sites of fatal injuries while limbs were the commonest sites of non-fatal injuries. Gun shot wounds were the commonest (68%) mode of fatal and non-fatal injuries.

Conclusion: Head and chest injuries are the commonest sites of fatal injuries, while limbs injuries constituted the major portion of the non-fatal injuries indicating potential areas in need of improved protective

Keywords: War Injuries; lethality index, Fatalities.

INTRODUCTION

According to a WHO survey in 1990, war was the leading cause of Disability Adjusted Years of Life Lost (DALYs) and more than half a million people lost their life due to war in that year¹. Field of Medicine, in terms of injury management has made progress historically consequent to wars fought. Celsus worked on the management of battlefield casualties in the first century AD. At that time, it was estimated that three out of four injured did not survive their injury, a trend that has persisted well into the 19th century². Many of the technical advances in trauma care since World War I are attributed to knowledge and experience gained in armed conflicts that have occurred during the intervening years³. Another contribution to

arise from warfare is the beginning of nursing care of the wounded during the Crimean War (1853-1856) by Florence Nightingale. Until then nursing care was the duty of military physicians and their staff⁴. To learn from war experience it is very important to collect correct data of the wounded and the dead, the nature of injuries and the mode of damage. There is a steady decrease in the lethality of war wounds in the last about two hundred years. From 42 % lethality in US Revolutionary War against Britain in 1775-1783 to 10.2% in the present war in Iraq and Afghanistan⁵. During the Operation Iraqi Freedom (OIF) US Casualty status upto May 20, 2009 was 3443 fatalities out of total 34728 casualties (total killed and wounded in action) while in Operation Enduring Freedom (OEF) in Afghanistan 456 deaths occurred out of total 3299 casualties in action upto May 20, 2009⁶. This improvement in lethality index has been widely acknowledged by the press⁷ and is

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attributed to many novel concepts in Military Medicine e.g. doctrine of "essential care in theater" and highly technical protective measures⁸. These figures from neighboring theatres of war are useful for comparison with casualties data generated in our hospital. Although all hospitals and forward treatment centers located in NWFP and FATA areas are involved in the management of these casualties, CMH Peshawar provides the tertiary care facilities to casualties received directly or through the smaller medical centres. These facilities include surgical specialties e.g. Orthopaedics, Neurosurgery, Plastic Surgery and Vascular Surgery and supported by highly expert Anaesthesiology, Intensive Care, Blood Banking, Chemical Pathology and Radiology services.

The present study has been planned to collect and analyse the data regarding fatal and non-fatal injuries occurring in the Western Borders in our troops. Analysis of fatal and non-fatal injuries is an essential component of any war. It helps to learn lessons for planning ongoing and future medical strategies. Moreover, it enables medical authorities to plan chain of evacuation, placement of medical support units in the battlefield and formulation of recommendations for improvement in life and limb saving measures. This study will be helpful not only for evaluation of medical support plans for casualties but also for technical evaluation of protective measures, like helmets and Bullet Proof Jackets (BFPJ) etc.

PATIENTS AND METHODS

This descriptive study was carried out in CMH Peshawar from March 2007 to May 2009, while the data from March 2004 to March 2007 was also collected from hospital records.

Inclusion Criteria:

Soldiers and officers with fatal or nonfatal injuries in operations e.g. gun battles, blasts, splinters, burns etc evacuated to CMH Peshawar .

Injuries due to hostile weather (e.g. avalanche) in the above mentioned population.

Exclusion Criteria:

Injuries or deaths due to non-operational causes e.g. road traffic accidents

Mildly injured persons who were returned to duty from the peripheral medical facilities.

Data Collection Procedure:

Data of non-fatal injuries was collected by noting down the wounds inflicted on injured soldiers and officers evacuated from forward areas on Western Front (FATA and NWFP). The record of non-fatal injuries was noted from the hospital papers prepared for each patient. The fatal injuries were noted on dead bodies of soldiers and officers who died in action on the Western Front and who were received in this hospital. A proforma was designed for recording the details of the fatal injuries. Each dead body was examined by a Surgical Specialist and a Consultant Pathologist who filled the proforma independently. Then the descriptions were corroborated and recorded electronically.

Analyses of Data:

All the available details were tabulated in Microsoft Word® and frequencies and percentages were calculated to describe the data. Lethality Index (LI) was devised as a main tool for the assessment of fatality ratio of the casualties. It was calculated by dividing the number of fatally wounded persons by a total of fatal and non-fatal casualties received.

RESULTS

The results are presented in the form of percentages and actual figures are avoided for the reasons of confidentiality. The LI calculated for the last six years (March 2004 to May 2009) during the present operations on the Western Front was found to be 18 % (Table 1), LI was highest in 2005 (25%) while 40% of total fatal injuries occurred in 2008. The percentage of wounded who were evacuated alive and expired in the hospital remained very low during all these six years (1.86%). Figure 1 show year-wise distribution of such patients. While most of these patients had sustained head (44%) and chest (33 %) injuries (Fig. 2). According to the number of wounds on a single subject, the highest percentage was that of multiple injuries (> two injuries) amongst fatal injuries (Table 2). Head (46%) and chest (44%) injuries ranked the first and second commonest sites of fatal

injuries, respectively, in the persons who were brought dead in the hospital (Fig. 3). Amongst non-fatal injuries, limb were the commonest site (72%) (Fig. 3). Gunshot wounds (GSW) (68%), splinters (17%) and blasts (7%) were important modes of fatal and non-fatal injuries (Table 3).

a detailed pathological and surgical analysis. The most important finding of the present study is very low fatality percentage (1.86%) among patients who were evacuated alive after getting injured in the operations and died in the hospital. This percentage (1.86%) is comparable

Table-1: Comparison of Lethality of War Wounds Among U.S*. and Pakistani Soldiers.

Army	Theatre of War	No. Wounded or Killed in Action	No. Killed in Action	Lethality Of War Wounds
US Army	Revolutionary War, 1775-1783	10,623	4,435	42%
	Civil War (Union Force), 1861-1865	422,295	140,414	33%
	World War I, 1917-1918	257,404	53,402	21%
	World War II, 1941-1945	963,403	291,557	30%
	Korean War, 1950-1953	137,025	33,741	25%
	Vietnam War, 1961-1973	200,727	47,424	24%
	Persian Gulf War, 1990-1991 614 147 24	614	147	24%
Pak Army	War in Iraq and Afghanistan, 2001- present	10,369	1,004	10%
	FATA and NWFP (Operations Al-Mizan, Rah-e-Raast and others)	-	-	18 %

*US data adapted from: Gawande A, Casualties of War – Military Care for the Wounded from Iraq and Afghanistan. N Engl J Med, December 9, 2004:2471-5.

Table 2: Distribution of Casualties according to Number of Wounds per subject

	Single	Two wounds	Multiple (>2)	Others*
Fatal (%)	24	8	51	17
Non-Fatal (%)	73	7	9	11

*Casualties without discrete wounds e.g. Blasts, Burns, Avalanche, Decapitation

Table 3: Comparison of Modes of Injuries in US* and Pakistani Troops (Percentage)

Army	Operations	Improved Explosive Device	Splinter	Blast	Gunshot	Burn	Motor Vehicle Accident	Land Mine	Other
US Soldiers	Operation Iraqi Freedom	30	20	16	16	2	2	1.5	13
Pakistan Soldiers	Operations AL-Meezan, Rah-e-Raast and others	-	17	7	68	3	1	-	4

*US data Adapted from: James B. Peake. Beyond the Purple Heart - Continuity of Care for the Wounded in Iraq. N Engl J Med, February 12, 2009:219-22.

DISCUSSION

The present study provides the first-hand information on war injuries inflicted during the present operations conducted on the Western Front. The data used for present analyses does not include all the injured and death cases occurring on the Western Front, since some casualties and dead bodies go directly to large hospitals in Rawalpindi and Kharian. Moreover, the aim of the study was just to obtain a broad idea of nature of injuries, it is not

to 2.32% found in US soldiers in Iraq but there is marked difference in population of patients out of which this percentage has been calculated. In our study this percentage has been calculated in patients who were moderately or severely injured, as mildly injured patients are not usually evacuated to this hospital and treated in smaller medical facilities located in the forward areas, while US data is based on all war casualties including mildly injured patients who returned to units

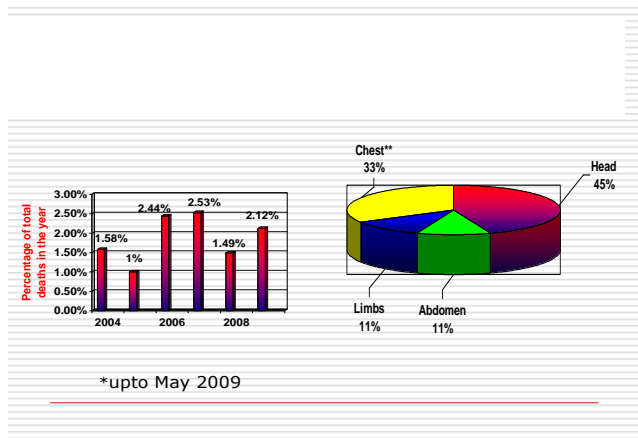


Figure 1: Year -wise and site-wise distribution of casualties

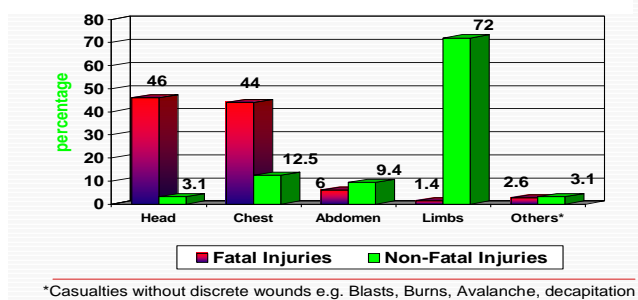
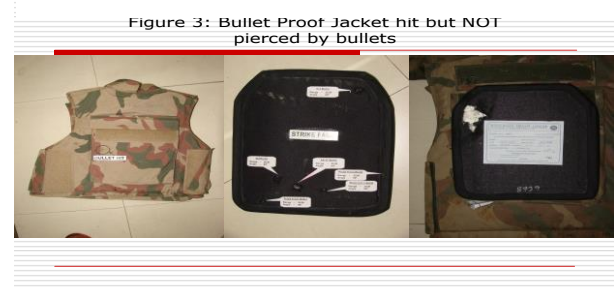


Fig. 2: Distribution of Fatal and Non-Fatal injuries site of wounds



Figures 3: Bullet Proof Jacket hit but NOT pierced by bullets

after initial treatment. Hence, very low mortality of moderately and severely injured patients speaks of a high standard of care which was provided in this hospital. The Lethality Index (LI) calculated on the basis of total population of wounded has been 18% during the last six years. Table 1 shows lethality of US soldiers wounded in various wars⁵ and as compared to our findings. In the present war the Lethality Index (LI) calculated on the basis of total population of wounded has been 18%

during the last six years. It is lower than the LI reported in US casualties during the First World War (21%), Second World War (30%), Korean War (25%) and Vietnam War (24%). It is, however, higher than the LI found in the present war in Afghanistan (13.9%) and Iraq (10.9%)⁵. One reason for this difference is that we have calculated LI in those casualties which were evacuated to this hospital, all these casualties were moderate to severe ones requiring evacuation to a tertiary care hospital, while LI reported in US soldiers is calculated on the basis of all the wounded i.e. wounded in action and returned to duty and wounded in action and not returned to duty. So the data of US soldiers include minor injuries, too⁵. A vast majority of fatal wounds in our soldiers are of chest and head while limb injuries are the commonest non-fatal wounds. This is consistent with the statistics quoted in the literature; Wall et al (2007) have reported that "majority of wartime injuries that survive to treatment are extremity injuries and not truncal (including head)"⁹. Non-fatal and fatal abdominal injuries were found to be 9.4% and 6%, respectively, in the present study. The percentage of non-fatal abdominal injuries is remarkably similar to the international statistics of 10% non-fatal abdominal injuries during wars¹⁰. The fatal abdominal injuries, however, are significantly less than the 10% fatal ones reported internationally¹⁰; which probably has been achieved due to better first responder care and tertiary management in this hospital. Nearly 50% of our fatalities occurred in soldiers who received multiple (more than two) injuries. This is obviously correlated to more blood loss and tissue damage in such cases. Our study shows that GSW has been the commonest mode of injury both in fatal and non fatal types. This is in sharp contrast to an analysis carried out in US casualties in Iraq where it was found that 30% casualties occurred due to Improvised Explosive Device (IED), while GSW occurred in only 16% cases⁶. Percentage of splinter or shrapnel injuries has been similar in two theatres of wars. (Table 3)

There can be several explanations of high percentage of head and chest fatal injuries inspite of helmets and BPJ, two protective

measures used by our troops for protection of head and chest, respectively. Firstly, the enemy is using the bullets which are capable of piercing these protective measures while ordinary bullets cannot¹¹, secondly, bullets can penetrate in BPJ from its sides which does not contain the protective material, thirdly our troops do not wear these protective gears because of lack of safety consciousness or because they are sometimes attacked off-guard when not in battle dress. A few fatal limb injuries cannot be ignored, too, as the commonest cause of death in such cases is excessive blood loss which necessitates the advocacy of training and use of protective measures like tourniquet.

CONCLUSION

The percentage of lethality in our soldiers and officers is remarkably low in the present war on Western Front. Head and chest being the commonest sites of fatal injuries while limb injuries were commonest in non-fatally wounded.

Based on observations made it is recommended that commanders at all levels to educate soldiers to use helmets and BPJ whenever they are vulnerable to fire, Placement of more medical support facilities e.g. blood

bank etc. further forward may be considered to further reduce the lethality percentage and use of Combat tourniquet may be considered in our set-up as an essential part of personal kit like that of US soldiers after instituting proper training protocols.

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