

Indian Soldiers Need Eye Protection

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ABSTRACT

Combat-related eye injuries entail enormous financial, social and psychological cost. Military Combat Eye Protection (MCEP) decreases both the incidence and severity of eye injuries. Experts have recognised the need for MCEP for Indian soldiers. We aim to review the combat-related eye injuries and combat eye protection among the Indian soldiers. Global practices of MCEP are also reviewed. We also aim to offer our recommendations for Indian soldiers.

We carried out Medline search for combat-related eye injuries and MCEP and separately searched for eye injuries among Indian soldiers during war and other operations. We present the findings as results. Recommendations are based on the opinions of the experts.

Combat-related eye injuries increased from 3% of injured in the 1965 Indo-Pakistan War to 4.8% in 1971 war. During peace-keeping operations in Sri Lanka (1987-89) eye injuries increased to 10.5% of the injured. Statistics on eye injuries during counterinsurgency operations are not available. MCEP have shown reduction in eye injuries, and thus MCEP forms a part of personal equipment of the soldiers in developed countries. Indian soldiers do not have provision of MCEP.

Combat-related eye injuries among Indian Army soldiers have been increasing. Data on eye injuries during counterinsurgency operations are not available. Indian soldiers do not have provision of MCEP. Provision of MCEP is therefore desirable. Awareness program among the commanders and the soldiers shall result in attitudinal changes and increased compliance.

Keywords: Combat-related eye injury, Eye injury, Military combat eye protection

INTRODUCTION

Combat-related eye injuries are common among the soldiers. They often render combatants unfit for military service and many civil occupations [1]. With each succeeding war, injuries to the eyes have been increasing [2]. Combat-related eye injuries are frequently bilateral and associated with globe perforation, retained intraocular foreign bodies (IOFBs), and visual impairment [1]. Unlike the data from Western world and the Middle East, data on combat-related eye injuries among Indian soldiers are scarce. There are no data either from the counterinsurgency operations on Indian soil [3]. This study aims to review the combat-related eye injuries and the status of combat eye protection among Indian soldiers. We also aim to briefly review the global practices of Military Combat Eye Protection (MCEP). Based on review of available literature we offer our recommendations for Indian soldiers.

Combat Eye injuries: Changing Scenario

Eye injuries are an important source of morbidity among military personnel during peace and war [4]. Estimated incidence of eye injuries in warfare is 20-50 times as high as what is found in civilian situations [5]. Combat-related eye injuries are generally secondary to Improvised Explosive Device (IED) explosion [6]. IED blasts are also associated with increase in the incidence and severity of eye injuries. Gun-shot wound, fragments of shell, grenade, and bombs, and mine blasts are other sources of combat-related eye injuries. In the 19th century, less than 1% of all battle casualties suffered eye injuries [7]. Wars in the 20th century have shown an increasing trend of eye injuries. In the ground phase of gulf war, the number of combat-related eye injuries accounted for 13% of the patient volume at a major combat support hospital [8]. Among the British Armed Forces deployed in Iraq or Afghanistan (2004-08), 10% of cases of major trauma suffered eye injuries [9]. In fact, with the advent of body armour and the helmet, injuries to the head, chest, and upper abdomen have decreased to some extent; the face, eyes, and extremities may be more susceptible to injuries [10]. Advances

in weapon systems and battle tactics may explain the increase. Counterinsurgency operations are other sources of combat-related eye injuries due to copious use of IEDs. Portable blinding lasers may confront the soldiers in the future wars. If lasers were used to inflict blindness, it is estimated, serious vision loss/eye damage could account for 25-50% of all casualties [5]. An international ban on blinding laser weapons, agreed upon in 1995 is, therefore, a welcome development.

Eye Injuries among Indian Soldiers

Eye injuries among Indian soldiers have followed an upward trend through the wars. Eye casualties at a referral hospital accounted for approximately 3% of injured in the 1965 Indo-Pakistan War; nearer the areas of hostility figures were higher (5.4%). In the 1971 war, the proportion of eye-injured rose to 4.8% of all casualties. During Indian Peace-Keeping Force (IPKF) operations in Sri Lanka during 1987-89 the eye casualty figures rose to a high of 10.5% [Table/Fig-1] [11-15]. Eye casualty figures from the low-intensity conflict and counterinsurgency operations on Indian soil are not available in public domain. Casualty figures in the low-intensity conflict and counterinsurgency operations likely follow the trends of guerrilla warfare in similar terrain of plains and mountains. In Vietnam War (1962-72), that witnessed both the conventional and guerrilla warfare, eye casualties accounted for 9% of injured [16]. During 2003-2004 in Iraq and Afghanistan, in terrains similar to Indian plains and mountains, medical evacuations of American soldiers due to combat-related eye injuries reached 15.8% [17]. It is, therefore, logical to extrapolate these figures to Indian Army engaged in counterinsurgency operations in plain and in mountains in India. Available data underline the magnitude of the problem and give an insight into the nature and aetiology of eye injuries. Yet, they cannot prove a substitute for the casualty data gathered among Indian soldiers. Ocular trauma Registry in Indian Armed Forces like Israel Trauma Registry (ITR) is therefore overdue. For long Israel has Israel Trauma Registry (ITR) functioning under the

Authors	Operation	Number of eye injuries in the series	Eye injuries (% of total casualty)	Unilateral injury (%)	Bilateral injury (%)	Blindness		Contusion of the Globe (%)	Perforating injury (%)	Perforating injury with IOFB (%)
						Bilateral (%)	Unilateral (%)			
Balakrishnan E [11]	Indo-Pak War 1965	33	5.4	84.8	15.2	Figures not stated			36.8	
Sihota [12]	1965	NA	3	Figures not stated			NA	NA	NA	
Sihota [13]	1971	NA	4.8				NA	NA	NA	
Boparai and Sharma [14]	1965	265	2.9				40	48	45	
	1971	266	3.1				38	51	47	
Singh NB et al., [15]	Sri Lanka IPKF operations 1987-89	90	10.5	30	5.5	5.5	31.0	5.7	25.4	14

[Table/Fig-1]: Eye injuries in Indo-Pakistan war and Sri Lanka IPKF operations.

Trauma and Combat Medicine Branch (TCMB), Surgeon General's Headquarters [2]. Availability of data on combat-related eye injuries help the authorities undertake appropriated preventive steps. Data in public domain shall promote ocular trauma-related research in both defence and civil domains.

Operational and Social Aspects of Combat Eye Injuries

Eye injuries during military hostilities have operational and psychological dimensions. Evacuation of injured during military operations entails risks to both the injured soldiers and their fellow combatants [2]. Apart from logistic burden, long-term disablement from combat eye injuries has medical, functional and socioeconomic implications. In the Vietnam War, only 25% of soldiers with eye injuries returned to active duty [18]. In recent years, in Israel, Defence Forces faced worse experience where 66% of the eye-injured combatants were rendered unsuitable for combat duties. Among those declared unsuitable for combat duties, 60% of were discharged from military service because of severity of ocular damage [2]. In the Indo-Pakistan Wars blindness from combat-related eye injuries has been high with 3.1- 5.5% of injuries resulting in bilateral blindness, and 20.6-39% of injuries resulting in unilateral blindness [12,13,15]. Thus, eye injuries impact both the employability and the military career of the combatants. Psychological stress from loss or impairment of vision proves another burden on the injured soldier.

Eye Protective Device and Eye Injuries

Ninety percent of all eye injuries, both military and non-military, can be prevented with proper precautions. US National Society of Prevention of Blindness advocates the use of eye protection by the military [16]. Protective devices decrease both the incidence and severity of eye injuries [19-21]. According to Joint Theatre Trauma Registry data from patients engaged in Operation Iraqi and Enduring Freedom, those wearing ocular protection sustained far less ocular injury (17%) compared to of those injured who reported not wearing eye protection (26%) at the time of injury. The difference was found statistically significant [22]. Yet, among soldiers low compliance with MCEP remains a problem [23]. During anti-insurgency operation of US Army in Iraq, 2004, in spite of strong recommendation to use ballistic eye protection only 26% cases of Improvised Explosive Devices (IEDs) injury personal were using eye protection at the time of injury [24]. Also, during the Iraq war (2004-2005), less than 10% of combatants treated for eye injuries admitted to wearing eye protection device at the time of injury [10]. Above data reveal 2 facts; one, combat eye protection conclusively decrease the incidence and severity of eye injuries; two, low compliance is a problem. The factors that influence compliance with Eye Protective Devices (EPDs) include operational situations- actual deployment versus non-deployment, organizational attitude toward eye protection programs, community influence, awareness about eye injury, and belief in the efficacy of eye armour [23]. Non-compliance results not from attitude alone. Restricted field of vision and fogging from eye protection also contributes to low compliance. In a study among US

military service personnel, ballistic protective eyewear was found to cause significant reduction in peripheral fields [25]. Yet, doubtless the benefits from protection outweighs functional restriction. Also, intense ocular protection education program has been shown to increase compliance. In a study, intense ocular protection education program resulted in 16% increase in compliance of eye protection use in combat [21].

Nature of Combat Eye Injuries and MCEP

The major combat threat to the eye is the small missile [26]. It is against these small missiles that eyes need protection. Therefore, La Piana and Ward define eye armour' as that component of the personal body armour that can protect the eyes of infantry from small missiles' [27]. With unquestionable benefits of the combat eye protection, developed countries undertook the task of developing an eye protective device - the eye armour-since the World War I. In their excellent review, La Piana and Ward have covered through the ages the development of eye armour [27]. The authors have considered 5 elements that impact the development of eye armour. Apart from the materials available for protection, the elements include funding for development, testing, modification, provision, maintenance and replacement of eye protective device. The task of infantry, the ocular threats, and the mindsets of the soldiers and the military leadership form the other factors [27]. It is known, the infantry suffers the preponderance of injuries during war. Therefore, the eye protection device is designed with infantry in focus [2]. Yet, it is the attitude of the soldier and commanders towards the eye protective device that proves the barrier in military combat eye protection programs.

Types of Military Combat Eye Protection (MCEP)

Eye protective devices fall into the categories of polycarbonate lenses, polycarbonate sports eye protectors, industrial safety glasses with polycarbonate lenses and side shields, industrial safety goggles with polycarbonate lenses, helmet or face protector combinations [28]. A detailed description on the subject that is outside the purview of this brief review can be found in the available literature [1,27]. In fact, no single eye protective device offers protection against all hazards in every situation. The theatre of operation, nature of operation, and individual role dictates the MCEP. Military leaders make choice as the situations demand.

MCEP for Indian Soldiers: Need, Practices, and Recommendations

Military eye surgeons in India felt the need of 'special combat glasses' as far back as in 1984 [14]. Singh and co-workers in 1990 again recommended 'an acceptable eye protective device' for future operations [15]. Today personal equipment of Indian soldiers does not include Military combat Eye Protection. We have no access to the research and development underway.

The primary methods of eye protection for soldiers in developed nations are low-impact sunglasses and medium impact goggles [29]. Polycarbonate lenses that are able to block 0.22-calibre bullet

from 20 feet are in use by the Armed Forces in the USA [27]. Such a device would offer adequate protection to our soldiers deployed in routine operations. Ordinarily a sand-dust-wind (SDW) goggles and snow goggles made of polycarbonate lenses may suffice for routine deployment in desert and snow bound areas. Deployment during active hostilities and counterinsurgency operations may require provision of ballistic eye protection. Rare situations may demand combined protection against the Sun, lasers, and ballistic fragments. Wide variety of freely marketed, affordable MCEP makes the choice easy; mindset is a bigger obstacle. Requirements can be individualised depending upon the role and the theatre of operation. Awareness program for the military leaders shall bring about attitudinal changes. Once the needs are felt and provisions made, soldier's education shall overcome the problem of compliance. It is noteworthy, the cost of the eye protective device is little compared to the protection offered; as per an estimate eye each lost in Vietnam war cost the US federal government \$ 3 million [16].

LIMITATION

Results and conclusions are based on literature available in public domain.

CONCLUSION

Combat-related eye injuries and disablement among Indian soldiers have been increasing. MCEP decreases combat-related eye injuries and disablement. Yet, MCEP does not form the part of personal equipment of the Indian soldiers. This is against the trend. Thus, provision of MCEP for Indian Army soldiers is desirable. Programs aimed at increasing awareness shall bring about attitudinal change among the commanders. Behavioural changes among the soldiers shall follow. Training, terrain, and operational role shall determine the nature of MCEP. MCEP available freely in global market offer the government and the Defence Forces ample choice.

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