

Injuries due to Landmine Blast Referred to Shahid Motahhary Hospital, Iran

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Abstract

Background: The health system faced a new problem of an increasing number of civilian victims of landmine explosions at the end of Iran-Iraq war .

Methods: In a descriptive survey from 1998 to 2004, data was collected retrospectively from medical records of Shahid Motahhary Hospital, Urmia University of Medical Sciences, Iran.

Result: The study covered 156 victims. 80% of the casualties were civilians of which 95% were male. Injuries led to amputation in 73.3% of the victims. The mortality rate was 3.8%. Blood transfusions was given to 93 (62%) victims. There were 52.6% pattern I, 14.6% pattern II and 32.6% pattern III injuries according to International Committee of the Red Cross (ICRC) classification.

Conclusion: Mine awareness programs should be conducted amongst civilians who live in high-risk areas. Improved health infrastructure with trained personals for emergency care and early transfer of the casualties would reduce morbidity and mortality. Studies are required to understand the social and public health consequences of this problem.

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Key Words: Landmine blast injuries; War wounds; Civilian victims; Iran

Introduction

With the sophistication of battlefield weapons, surgeons are facing new types of wounds caused by landmines. It is estimated that 70 countries are infested with landmines and it raises serious health problems. Iran is the second most landmine infested country with an estimated 16 million landmines [1]. Majority of the victims come from northwest region of Islamic Republic of Iran.

The International Committee of the Red Cross (ICRC) has identified three common patterns of injuries caused by antipersonnel landmines. In pattern I the victims trigger an explosion by standing on a buried landmine. They usually have a traumatic amputation of a part of the lower limb with less severe injury elsewhere. Earth, grass and a portion of the foot are blown upwards. Such mines consist of an explosive and may include fragments of metal or plastic. Pattern II injuries are a random collection of penetrating injury caused by multiple fragments from an exploding landmine. There is less chance of a traumatic amputation. Injuries to the head, neck or abdomen are common. Pattern III injuries result from the handling of a landmine. The victims sustain severe upper limb and facial injuries. Eye injuries are common in all groups [2].

In recent years, significant attention has been focused on landmines as a cause of human injury, but little data is available on the exact nature and severity of the injuries. We hope that raising awareness would lead to further studies on the subject.

Material and Methods

This retrospective study was conducted from 1998 to 2004, ten years after the cessation of 1980-1988 Iran-Iraq war. The hospital records of all patients admitted to Shahid Motahhary Hospital, Urmia University of Medical Sciences, Iran, with the diagnosis of landmine injury were reviewed. The hospital is a tertiary care referral centre, located in the west Azerbaijan province. The age, sex, civilian or combatant, time of injury, time between accident and treatment, method of evacuation to hospital, need for blood transfusion, whether the patient had an amputation, number of surgeries, days of hospital stay, and the pattern of injury according to the classification of ICRC developed by Coupland and Korver were recorded.

Result

This study covered 156 victims of landmines from 1998 to 2004. There were 148 (95%) males and eight (5%) females of which 125 (80%) were civilians and 31(20%) combatants. Some of the victims worked on agricultural lands as farmers or on pasturelands as shepherds while others were curious children. Other victims were smugglers who used obsolete borderland path to transfer their commodities, but due to fear

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of punishment, they denied their vocation and introduced themselves as shepherds. None of the accidents occurred on residential land. None of the victims were involved in demining activities. Forty four (28.2%) victims were under 15, 102 (65.3%) between 15 and 35 and 10 (6.4%) over 35 years of age. Of the total 156 victims, six died in the hospital. Three of them were under 15, and one between 15 and 35 years of age was in the military. Mortality rate was 3.8% and 128 victims suffered from injuries to their extremities. Pattern I was dominant in 79 (52.6%), followed by pattern III in 49 (32.6%) victims. There were 22 (14.6%) victims with pattern II injury. In the age group under 15, pattern III was dominant while in the age group of over 15 pattern I injury was dominant (Fig. 1). Fourteen (9.3%) victims suffered from shrapnel fragments to their torso and neck. They were managed with laparotomy, chest tube and exploration. Eye and face injuries occurred in 35 (24.3%) victims of which 25 suffered pattern III injury (Table 1). Ninety three (62%) of the victims had blood transfusion with a mean of 2.2 units. 65 (70%) suffered pattern I injuries while 110 (73.3%) victims had amputation. Seventy one (64.5%) of them had amputations to the lower limbs and below-knee amputation was the most common performed in 46 victims. Thirty nine (34.5%) of the amputees had upper limb amputations. Amputations at the wrist was commonest and performed in 19 victims. Twenty of the victims had various fingers amputated. Fifteen victims had bilateral amputations of the upper limbs. A total of 286 surgeries were performed for 150 victims (average 1.9 per victim). Open amputation was performed on 86 victims. The average length of hospital stay was 16.8 days (range 4 - 55 days). One hundred forty (90%) of the victims got first aid within six hours of accident. The victims were evacuated to the hospital by road. 118 (75.6%) victims were wounded during spring and summer (Fig 2). The type of explosive device was not known to the victims.

Discussion

The study reveals that even after ten years of Iran-Iraq war cessation, civilians in all age groups continue to sustain life and limb threatening injuries from landmines. Most (80%) of the victims were civilians

Table 1

Pattern of injuries:

Lower limb (pattern I)	79 (52.6%)
Shrapnel to body (pattern II)	22 (14.6%)
Upper limb (pattern III)	49 (32.6%)
Injury to torso and neck	14 (9.3%)
Injury to eye and face	35 (24.3%)
Death (in-hospital)	6 (3.8%)

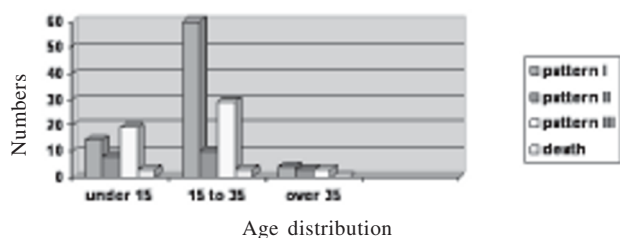


Fig. 1: Age distribution versus the pattern of injuries

and wounded during spring and summer (75.6%) when outdoor activities increase. The high number of civilian victims of landmine injuries after cease-fire might be explained by people's freedom to move into areas that had previously been inaccessible [3]. Mortality is higher in civilians than in combatants. Five out of six in-hospital deaths in our study were civilians. Children are more likely to die from landmine injuries than adults, due to their smaller size and vital organs being closer to the blast of an exploding mine. Children are less likely to survive as they sustain more blood loss than adults [1].

In a study in Eritrea, a high percentage of injuries were to the upper body due to the victims picking up suspicious objects [3]. According to ICRC data, 28% of mine injured patients end up with an amputation of the lower limb [4]. From a survey conducted by Jahunlu et al [5], in Eylam (another western province in Iran), in a subgroup of 138 survivors 78.5% had injury to their extremities with 24.6% having upper extremities and 54.4% the lower extremities involvement. Only 3.6% of the survivors had torso injuries [5]. The figures in this study also indicate that most of the victims had stepped on the landmines. Handling of the mine was the dominant cause of injuries in the group of victims under 15 years of agegroup. Pattern II injuries (injuries caused by shrapnel fragments) were least common.

Mine awareness programs should be conducted on how to avoid, recognize and report mines found. Signs around high-risk areas should be erected to avoid trespassing and maps of the mine infested areas should be widely distributed.

The delay in providing emergency medical care leads to death from haemorrhage within first few hours of the blast [5-7]. Therefore training in haemorrhage control with application of tourniquet and basic life support system will reduce mortality [8]. In the pilot study conducted by Jahunlu et al [5], case fatality rate was estimated to be 36.4%. In different studies, pre-hospital mortality is estimated to be one third to one half of the victims [1,6,7,9]. Case fatality rate in our study was not calculated, since this study was an in-hospital study.

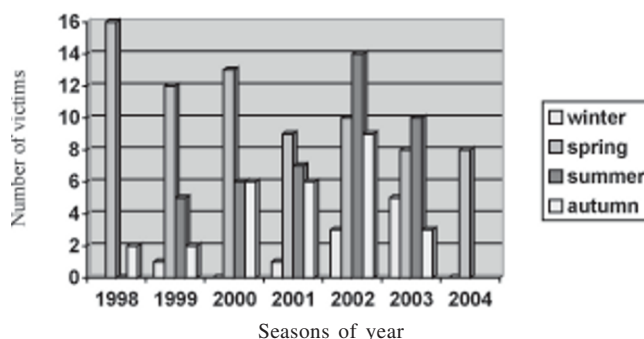


Fig. 2 : Number of victims referred to Shahid Motahhary hospital Urmia, Iran, Spring 1998- Summer 2004

Delayed access to medical care may cause severe infection that may then require a higher level amputation [10]. In comparison to other reports [1,4], the victims in this study had an average of 1.9 surgeries and shorter hospital stays because 90% victims reached the first medical facility in less than six hours and the surgeons were trained and experienced in managing war wounds.

Incidence of mine injuries varies according to the type (blast, fragmentation, bounding fragmentation) and the composition of the mine (explosive, metal fragments, plastic). Bounding mines produce more penetrating injuries to the torso, while blast mines cause traumatic amputations [5]. Severity of injury depends on body position (standing, kneeling, squatting, lying), body orientation to the blast (facing the blast, back or sides to the blast site), position and activity of the victim when the mine is activated (step on, handling, bystander), distance from the blast, and type of the ground (soil, sand, rock) [10]. This study was a retrospective study and such data was not available. A standard format for reporting of mine incidents and injuries should be developed and details of incidents, where mines detonated unintentionally without causing injuries should also be collected.

These observations support that most of the landmine victims are civilians and that injuries in most, result in upper or lower limb amputation. Land mines cause a substantial physical, mental, social, and economic disability [11]. Strategies should be established to prevent and reduce the casualties because landmine clearing is expensive and time consuming.

Mine awareness programs for civilians who live in high-risk areas is the best preventive care. Health infra-structures should be augmented by training personnel

for emergency medicare and transfer of the victims. The authors strongly recommend that further studies should be carried out to understand the impact of this problem and its consequences, in order to reduce the number of casualties and provide better care for the victims of landmine injuries.

Conflicts of Interest

None identified

References

1. Walsh NE, Walsh WS. Rehabilitation of landmine victims, the ultimate challenge. *Bull World Health Organ* 2003; 81: 665-70.
2. Coupland RM, Korver A. Injuries from antipersonnel mines: the experience of the International Committee of the Red Cross. *BMJ* 1991; 303: 1509-12.
3. Hanevik K, Kvale G. Landmine injuries in Eritrea. *BMJ* 2004; 321: 1189.
4. Molde A. Victims of war: surgical principles must not be forgotten (again)! *Acta Orthop Scand* 1998; 69: 54-7.
5. Jahanlu HR, Husum H, Wisborg T. Mortality in land-mine accident in Iran. *Prehospital Disaster Med* 2002; 17: 107-9.
6. Ascherio A, Biellik R, Epstein A, et al. Deaths and injuries caused by landmines in Mozambique. *Lancet* 1995; 346 : 721-4.
7. Coby J. Monitoring of the landmine treaty. *Lancet* 1998; 352: 1468.
8. Husum H, Gilbert M, Wisborg T, et al. Land mine injuries: A study of 708 victims in North Iraq and Cambodia. *Mil Med* 2003; 168: 934-40.
9. Sabri AA, Kaan E, Ethem G, et al. Below-knee amputations as a result of land-mine Injuries: comparison of primary closure versus delayed primary closure. *J Trauma* 1999; 47:724-7.
10. <http://www.humanitarian-demining.org/demining/pubs/protection/casualty/index.htm>
11. Anderson N, Sousa CP, Paredes S. Social cost of landmines in four countries : Afghanistan, Bosnia, Combodia and Mozambique. *BMJ* 1995; 311: 718-21.