Scarf-related injuries at a major trauma center in northern India

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Abstract

Purpose: Scarf is a long loose piece of cloth worn around the neck and shoulder. Despite cultural association of this apparel, it is part of numerous injury episodes of varying enormity. Entanglement of loose scarf in spoke wheels of bike, tricycle, belt driven machines like sugarcane juice machine, threshers, grinding machines, etc is observed both in social and industrial milieu. This study aims to investigate the scarf-related injuries at a major trauma center in northern India.

Methods: From June 2013 to May 2015, a hospital-based prospective observational study was done in patients who presented to a level 1 trauma center in northern India with the mode of injury involving scarf around the neck. Demographic profile, mode of trauma, contributing factors, injury pattern, and the early management as well as early complications were recorded.

Results: There were 76 injuries directly related from scarf with the mean age of patients being 32.4 years. The most common primary factor involved was rotating wheel of motorbike/tricycle (46.1%), followed by belt driven machines (28.9%). The spectrum of injuries was diverse, including minor abrasions or lacerations (53.9%), large lacerations (15.8%), fractures and spine trauma (18.4%), mangled extremity and amputations (7.9%) and death (3.9%). More severe injury patterns were noted with belt driven machines.

Conclusion: Scarf-related injuries constitute a sizable proportion of trauma, with varying degrees of severity. Devastating consequences in significant proportion of cases dictate the call for a prevention plan comprises both educational and legislative measures. Urgent preventive measures targeting scarf-related injuries will help reduce mortality and morbidity.

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Introduction

Scarf is a part of traditional apparel across the cultures. It is uniformly attired by masses in Asian continent due to its cultural associations. The loose and long floating ends of this attire invite trouble in varied common unforeseen situations in work place, home, farmyards, public places, etc. When it wraps the moving parts of machines or wheels, a spectrum of injuries may be caused, ranging from minor abrasions to mangled extremities, quadriplegias and even unattended strangulations to death.1,2 This sporadic but constantly reported hazardous entity calls for a diversified intervention and preventive measures both at social and industrial surroundings.

Materials and methods

From June 2013 to May 2015, patients attending a level 1 trauma center attached to a referral cum teaching hospital in northern India were prospectively screened and segregated for scarf-related injuries, which were defined as any injury where scarf was directly involved during the episode/mechanism. During the study period, this trauma center was visited by 43,962 patients with a 9.6% admission rate. Altogether 76 patients were identified as having scarf-related injuries, with 35 of them (46.1%) requiring admission for various indications.

Demographic profile of patients, mode of injury, mode of scarf involvement, contributing factors and pattern of injury were noted. Patient data were collected based on initial presentation or their first in-hospital stay. Injuries were categorized according to the severity grade with ascending magnitude (Table 1). Grade I injuries are simple and tend to heal uneventfully. Grade II injuries are more severe and usually do not result in any sequelae, but require more

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surgical measures. Bony injuries which heal without any functional loss are categorized in II b grade. Injuries causing permanent dismemberment of any body part are categorized in grade III. Any injuries resulting in death are regarded as the most severe type, grade IV.

An informed consent was obtained from all patients authorizing clinical examination, radiographic examination, treatment and photographic documentation. The study was authorised by institutional committee.

**Results**

The mean age of the 76 patients was 32.4 years (8–62 years). Majority of patients were females, comprising 69.8% (n = 53); while males constituted 30.2% (n = 23). The most common mode of scarf involvement was entanglement in spoke wheels of tricycle or motorbike (46.1%), followed by belt driven machines (28.9%). Detailed information is shown in Table 2. Among the 76 scarf-related injuries, 35 required admissions (Fig. 1) and the median length of hospital stay was 4.0 days (range 1–47 days). In motorbike/cycle related group, the majority of patients were treated in the outpatient department, implying simpler injuries. Another major etiological group was the involvement of belt driven machines, with majority of patients needing hospitalisation except 2 patients. This group comprised 3 mangled extremities and amputations, 1 quadriplegia, 1 death, 8 major soft tissue injuries, and 7 fractures. Sugar cane juice extractor caused 2 cases of amputation and mangled extremity. Fall on stairs/mechanised staircase/elevator also resulted in one fracture and 5 soft tissue injuries. While fall from train resulted in one death and one traumatic amputation. There were other lesser known incidents one record like fall from stairs, fall from bus while deboarding, which resulted in 2 closed fractures. One case of pregnancy loss was notable in tricycle group.

**Table 1**

| Injury severity grade | Injury pattern                                                                 | n (%)               |
|-----------------------|---------------------------------------------------------------------------------|---------------------|
| I                    | Minor soft tissue injuries treated on outpatient basis, e.g. small abrasions, small lacerations, etc. | 41 (53.9)           |
| II a                  | Major soft tissue injury or head injury treated on inpatient basis and requiring surgical intervention | 12 (15.8)           |
| II b                  | Fractures and dislocations                                                     | 14 (18.4)           |
| III                   | Mangled extremity and traumatic amputations                                    | 6 (7.9)             |
| IV                    | Deaths-pre-hospital or during first hospital admission                         | 3 (3.9)             |

**Table 2**

| Mode of injuries                        | n (%) |
|-----------------------------------------|-------|
| Injuries involving spoke wheels of tricycle or motorbike. | 35 (46.1) |
| Belt driven machines like tubewell machine, thresher, cattle feed chopper | 22 (28.9) |
| Fall on staircase/elevators             | 6 (7.9) |
| Sugar cane juice extracting machines    | 2 (2.6) |
| Fall from moving train                  | 2 (2.6) |
| Others                                  | 9 (11.8) |

**Discussion**

Scarf is an integral part of traditional attire of masses in Asian continent. Popularly, it's donned with long loose ends hanging from shoulder to back on both sides especially by females. Some females use it by twisting their hair in or around scarf and putting whole plait on back. This long loose piece of cloth is part of many cultural attires. It’s equally flaunted by males in their attire. It’s another variant, turban, is part of traditional male attire in Indian peninsula.

Such pattern of clothing increases the vulnerability towards injuries in social and industrial surroundings. Depending on their work place scenarios, people use such clothes differently with purposes like protection from dust, sand, sunshine over face and head. Such injuries are more likely to happen in people residing in rural area or with lower socioeconomic strata.1–3

There are various scenarios where scarf-related injuries have been reported. Uncovered wheel spokes of cycle rickshaws, motor cycles, poorly protected thresher machines, grass chopping machines, sugarcane juice extracting machines and flour mills are potential culminating factors for such injuries.1–3 Roller machines, and conveyer belts are part of numerous manufacturing units. Protective measures prescribed in legislation are practiced in compromised manner in manufacturing units. Consequently, such manufacturing units in semi organised sector put their workers at more risk. Cohorts at risk are many e.g. mill workers, household members, school children, etc (Figs. 2 and 3).

Mode of injury is identical in almost all situations. The loose long piece of cloth is often entwined in rotating component of machinery and momentum of moving parts pulls body part towards it or and causes a variety of injuries to victims by either ligature effect around neck or being pulled towards rotating...
machine part. The limb parts are often crushed despite futile efforts to escape from accident.

Spectrum of injuries by this mechanism is diverse. One end of spectrum constitutes simpler injuries like abrasions, contusion, or some blunt trauma to the body part. But graver part of spectrum has injuries like crush injuries of limbs, traumatic amputations, strangulations near to death, scalp avulsions, traumatic quadriplegias, post traumatic foetal demise etc. Deaths from such bizarre incidents are also in list.3

The history also reminds us of strangulation of world famous dancer Isadora Duncan by long scarf in 1929. She is acclaimed as a respected figure in modern dance and was fond of flaunting long

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**Fig. 2.** Belt driven sugarcane juice machine with poor protection of machine parts (arrows); thereby making passer-by’s and its customers prone to scarf-related injuries.

**Fig. 3.** Typical scenario for motorbike or tricycle related scarf injury when the loose end of the scarf is accidently entangled in ill-protected spoke wheels (arrows) and may culminate in spectrum of injuries.
scarves. She died due to accidental strangulation and laryngeal rupture by long loose scarf which got entangled in spokes of her car.7

This form of injury is sporadic but constantly reported. This particular variety of occupational hazard gains importance not only by virtue of its enormity but also by its occurrence in common unforeseen situations and scope of prevention.

These peculiar injuries with almost singular common mechanism are very amenable for preventive actions. The ever increasing number of such incidents both from public and industrial milieu and amount of morbidity and burden attached with it dictates scope for intervention.4,6

The intervention plan has to be directed both for public and occupational domains. There is a need to raise awareness level of public about such avoidable injuries. Incriminating factors like public transport system, poorly shielded machines for households can be deemed safe with a blend of education and legislation.7

Industrial environment can be made safer with the help of uniform safety measures, awareness of personal protection, protective barrier application in roller machines, conveyer belts, etc. Increasing the amount of automation in high risk industrial processes will also be a promising step against this bizarre form of workplace harm. More and more participation of semi-organised small scale industrial units will promise more prevention. To summarise, this particular form of injury needs to be identified as a separate entity in public and industrial work fields and intervention plans should be accordingly directed towards it.7,8

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