

Analysis of ear, nose and throat injuries reporting to a tertiary care hospital in Sikkim

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Abstract: *Aims:* This study aims to analyse the pattern of ENT injuries in patient presenting to the institute. *Settings and Design:* This study was conducted in the department of ENT, Sikkim Manipal Institute of Medical Sciences, Gangtok. *Methods and Material:* Data was collected from patient record files and post mortem data. Information about the intent, mode, mechanism and examination findings of nasal, maxillofacial, temporal bone and neck injuries was recorded. *Results:* A total of 505 patients were evaluated in this study (male: female; 4:1. Accidental intent followed by assault was most common. There were 21 cases of suicidal hanging. Injuries by blunt injuries and Road Traffic Accident (RTA) were the commonest. Among maxillofacial injuries, nose was most commonly fractured bone. In temporal bone injuries, post aural injuries were most common. Neck injuries were predominantly due to hanging. *Conclusions:* Maxillofacial injuries are most common ENT injuries in Sikkim. Maxillofacial injuries to nose are the most common ENT injuries in Sikkim. Suicidal hanging is an unusually common mode of neck injury.

Keywords: Trauma, maxillofacial injury, temporal bone injury, neck injury, ENT injury.

Introduction

Sikkim is one of the smallest states of India located in the sub Himalayan region of north east India, bounded by Nepal, Tibet and Bhutan on the east, north and west respectively. On account of the mountainous terrain, transportation in the state is exclusively by road. The altitude ranges from 270m to 8580m. It is a heavy rainfall zone, with annual rainfall upto 5000mm [1]. This is a cause of widespread damage to roads during the rainy season, increasing the probability of accidents [2]. The population of Sikkim is 6,10,000 as per 2011 census and population density is 86 per square kilometre as compared to 382 per square kilometre in India. Sikkim has a greater proportion of rural population than India [3].

Trauma is a major cause of morbidity and mortality in any society [4]. The National Commission for Macroeconomics and Health (NCMH) describes injury as damage to a body organ which occurs rapidly and is visible, with the causative mechanism being sudden energy transfer [5]. It can be either accidental or intentional, in the form of assault or self inflicted and is preventable to a large extent by creating

awareness and by legislation. The incidence of traumatic injuries continues to increase in contrast to cardiac disorders and cancer [4]. The incidence, mechanism, and severity show significant variations in different demographic groups across the globe. Age groups, socioeconomic status, local and religious beliefs and practices, implementation of local laws and regulations, geography, all influence the incidence and severity of injury. World Health Organization (WHO) reported that globally, injury was a leading cause of death and morbidity for all age groups except those above 60 years of age. Among these, road traffic accidents (RTAs) and suicidal injuries were the leading causes of mortality and morbidity. Road traffic accidents were reported to be the 9th most common cause of death and morbidity in the world and are expected to rise to 3rd position by 2020 [6].

In 2010, injuries accounted for 12% of all deaths in India [7]. An increase of 17.4% was reported between 2010 and 2014 [8]. Road traffic accidents were the leading cause of death (18%) followed by suicides (17%) among all injuries in 2004. WHO has reported that 13% Disability Adjusted Life Years

(DALYs) were lost due to injuries in India in 2004. RTAs and self inflicted injuries were the major contributors to the loss of DALYs [9]. Although Sikkim reported only 0.1% share in total number of accidental deaths in India, the rate of deaths (deaths per 1 lakh population) due to injuries in Sikkim in 2011 was 49.5 i.e. 10th position among all Indian states [8]. ENT injuries are frequently associated with head injuries and may lead to loss of form and function of the sense organs and hence lead to serious impairment of the quality of life of survivors. These injuries might even be rapidly fatal, especially if the airway is compromised. Currently available literature has no studies on the epidemiology of ENT injuries from eastern part of India and from Sikkim. In such a scenario, this study would provide valuable insights into an affliction that is expected to be fairly common in this part of the world.

On account of the geographical and demographic differences from other parts of India, an analysis of ENT injuries is necessary to formulate strategies to reduce the severity and incidence of such injuries in Sikkim and similar Himalayan and sub Himalayan regions. The investigators attempt to analyse the pattern of ENT injuries presenting to a tertiary care hospital in Sikkim.

Material and Methods

Clearance was obtained from Sikkim Manipal Institute of Medical Sciences Institutional Ethics Committee prior to starting the study. Confidentiality of all the patients whose data has been incorporated in this study was maintained throughout. This retrospective study was conducted in the department of ENT, Sikkim Manipal Institute of Medical Sciences (SMIMS), Gangtok, India from Jan 2011 to May 2012. The data included patients reporting with injuries from Sept 2010 to Feb 2014. All individuals who presented with ENT injuries were included in the

study. Retrospective data was collected from the medico-legal records in the medical records department and the autopsy reports from the Forensic Medicine department of CRH.

Detailed information about the intent, mode, and mechanism of injury, and ENT examination findings was recorded on a performa designed specifically for the study. Nasal, maxillofacial, temporal bone and neck injuries were included in the study. Soft tissue injuries and fractures were categorised separately. Hanging and strangulation related injuries were included in the study. Burn injuries were excluded. Head injuries were also excluded. However, supraorbital region injuries were included in the study. The data was transferred to MS Excel worksheets and analyzed. As far as possible, the data were recorded as per suggestions of the core module of the International Classification of External Causes of Injuries (ICECI) system [10].

Results

A total of 505 patients were evaluated in this study (age: 2- 84 years; mean age: 29.03 years). Details of 43 patients were drawn from post mortem data (age: 11-70 years; mean: 31.33 years). The rest 462 patients were alive at the time of discharge (age: 2-84 years; mean: 28.82 years). Out of the total subjects, 394 (78%) were male and the rest 111 (22%) were female (4:1). The maximum number of injuries were of accidental intent, followed by assault in all age groups, except 11-20 years. Suicidal intent was observed in 21 cases, five of whom survived. Eight patients had injuries of uncertain intent. Seven suicides were recorded in the 11-20 year age group too. The injuries were least common in the elderly and most common in young adults (21-40 years) (Tables 1 & 2).

Table-1: Age distribution				
Age distribution	Frequency		Total (%)	Cases died
	Male	Female		
<10	25	8	33 (7.1)	0
10-20	69	24	93 (18.4)	12
20-40	238	56	294 (58.2)	21
40-60	53	20	73 (14.4)	8
>60	9	3	12 (2.3)	2

Table-2: Intent of Injury

Intent of injury	<10 years	11-20 years	21-40 years	41-60 years	>60 years	Total	Cases survived	Percent
Accident	28	37	150	47	9	281	259	55.64
Assault	4	49	130	20	2	195	194	38.61
Suicide	0	7	10	4	0	21	5	4.2
Unknown	1	0	4	2	1	8	4	1.6
Total	33	93	294	73	12	505	462	100.0

The injuries were most commonly caused by blunt objects (accidental and assault) and by road traffic accidents (RTAs). However, among the 0-10 years age group, fall was a more common cause of injury compared to blunt injury. Among the 70 cases of injuries due to fall, 62 (88.5%) cases survived and the rest eight were brought dead or died during the course of treatment. Sixty nine cases of fall were of accidental and one of unknown intent. Out of ten crush injury cases, five survived. Among the cases of attempted suicide, 20 (95.2%) were by hanging and one by attempted cut throat. Injuries were caused by

hanging in 22 cases, five of whom survived. There was one case of accidental hanging, who died and one case of unknown intent, who survived. Three post mortem cases had ligature marks on their necks. Intent and mode of injury were not established till the time of recording of data. No case with ligature injury was reported only in the 0-10 years age group (table 3). Twenty five cases were documented to be under the influence of alcohol at the time of injury. None of these cases lost their lives on account of injury. None of the suicide cases were under the influence of alcohol.

Table-3: Mode of injury

	Frequency						Percent
	<10 yrs	11-20 yrs	21-40 yrs	41-60 yrs	>60 yrs	Total	
Blunt injury	4	41	130	23	2	200	39.6
Blunt and sharp injury	0	0	2	0	0	2	0.3
Crush injury	0	1	9	0	0	10	1.7
Drowning	1	0	0	0	0	1	0.3
Fall	11	14	27	15	3	70	13.6
Ligature	0	8	10	3	1	22	4.9
RTA	17	29	108	30	6	190	31.1
Sharp injury	0	0	3	3	0	6	1.2
Unknown	0	0	4	0	0	4	0.1
Total	33	93	293	74	12	505	100.0

Site of injury (table 4): Maxillofacial injuries were seen in 353 (69.9%) cases. Fractures were documented in 69 (19.5%) cases. The rest had solely soft tissue injuries. Maxillofacial injuries account for the maximum number of injuries across all age groups. Out of these, facial region was the most commonly afflicted, followed by the nose. No mandibular fractures were recorded

in the 0-10 years age group. Temporal region injuries were observed in 160 (45.3%) cases. Out of these, 17 were post mortem findings. Twelve cases had fractures of the temporal bones; 8 of these were from post mortem data. Pinna injuries were seen in 34 cases. Traumatic perforations of the tympanic membrane were observed in eight cases. The

post auricular region was the most commonly affected part of temporal region across all age groups. Fractures were also the most common in this region. No temporal region injury was recorded in the elderly patients. Ligature mark on the neck was observed in 25 cases and cut injury in three cases. Neck injuries were the least

common in the 0-10 years age group. They were commonly observed in the 11-20 years age group. An overwhelming majority of patients were young adults (21-40 years), who also reported the maximum number of deaths on account of injuries. The elderly population reported the least number of injuries (Table 4).

Table-4: Site of injury

Site of injury	Type of injury		Frequency (n)					Total
			<10 years	11-20 years	21-40 years	41-60 years	>60 years	
Temporal region (n=160)	Pinna	Soft tissue injury	4	1	21	9	0	34
	EAC	Soft tissue injury	4	3	15	4	0	24
		Fracture	0	0	1	0	0	1
	Tympanic membrane	Perforation	0	3	3	2	0	8
	Pre auricular region	Soft tissue injury	1	0	10	2	0	22
		Fracture	0	0	2	1	0	3
	Post auricular region	Soft tissue injury	5	9	38	6	0	60
		Fracture	0	2	7	3	0	8
Maxillofacial region (n=353)	Nose	Soft tissue injury	10	22	97	20	5	83
		Fracture	2	7	13	5	1	38
	Facial region	Soft tissue injury	24	83	239	60	10	256
		Fracture	1	1	12	6	1	20
	Mandibular region	Soft tissue injury	5	10	50	4	0	63
		Fracture	0	4	6	1	0	11
Neck		Soft tissue injury	1	15	37	5	1	62

Discussion

Synopsis of key/new findings: The current study suggests a higher incidence of ENT injuries in young men. Children (<10 years) and elderly (>60 years) were less affected. Accidental injuries were the most common. Blunt injuries followed by RTAs were the most common causes of injuries. However, in older children and teenagers (11-20 years), assault was the commonest cause of injuries. In children, fall was the second most common cause. Almost all hanging cases were

suicidal. The maxillofacial region was the most commonly injured, the facial part being the most commonly involved across all age groups. However, nose was the most commonly fractured. In the temporal region, tympanic membrane perforations were uncommon. The post auricular region was most commonly injured, followed closely by the external ear. The elderly did not have any injuries of the temporal region. The neck injuries were most commonly due to hanging.

As in the current study, young men are known to be more injury prone than women and men at extremes of age. This is largely because of the fact that due to the current social systems, men are more likely to be involved in outdoor activities and be physically active [11]. Most of the previous workers have, like the current study, concluded that accidental injuries are most common. The current study reveals blunt injuries as the most common cause of injuries. Blunt injuries includes accidental as well as assault cases. It does not include RTA cases. The findings can be explained by the fact that blunt injuries include a wider spectrum of causes of injuries than only RTA. Since RTAs are very common, they were included as a separate group. Assault has been implicated as the leading cause of injuries in older children and teenagers. This can be attributed to tendency of persons of that age group to indulge in physical violence at school and college [12].

Various studies have implicated RTAs and falls. One author also described domestic violence as a leading cause of injuries [13-18]. The current study reports that falls are a common cause of injury in children. This can be attributed to an increased and normal tendency among children to fall as a part of growing up. Most of such injuries are non-fatal [19]. A paediatric study in north India reported that fall was the most common cause of maxillofacial injuries, with mandible being most commonly involved [14]. An African study also reported falls as the second most common cause of paediatric injuries after foreign body ingestion [20]. A Pakistani study also reported similar findings [21].

Maxillofacial injuries were the most common injuries reported in the current study. This was true for all age groups. Face was the most commonly injured site in all age groups. Fractures most commonly involved the nasal bones. Nasal fractures might be common because of the prominent position of the nose and its structural weakness [22]. Mandible, zygomatic bone and nose have all been found to be most commonly involved by various authors. However, most of the studies reported mandible as most commonly fractured [11,16,23-24]. An African study reported a low incidence of maxillofacial injuries following RTAs [25]. Another study reported a predominance of dentoalveolar injuries

[26]. RTAs have also been implicated as the most common cause of maxillofacial injury in the geriatric population. Most of the victims were men. Soft tissue injuries were reported to be most common, followed by mandibular fractures [13]. The observations were unchanged for children too in the current study. This was at variance with other studies that report mandible as the most commonly fractured bone in children [14, 27]

Studies from north India also reported a higher incidence below 40 years of age and mandible was reported to be most commonly affected. Other studies from the region have reported RTAs and interpersonal violence to be the most common causes [16, 28-30]. Studies from Nepal, a region with similar ethnicity as Sikkim, report a greater prevalence of maxillofacial trauma in men below 30 years of age. RTAs were most common causes, followed by fall. Dentoalveolar injuries, mandibular injuries and soft tissue injuries were reported to be the most common in separate studies [31-33]. A Pakistani study also reports a higher incidence of injuries occurring on account of RTAs in young men [34].

In the current study, neck injuries due to hanging were the most common cause of injuries, followed by lacerations and abrasions due to assault. Neck injuries may occur because of blunt trauma, penetrating trauma or longitudinal tearing injury. A German study reported that blunt trauma was the most common cause of neck injury and that homicidal or suicidal strangulation was the most common mechanism [35]. Jha et al reported in a study from south India that face and limbs were the most commonly involved regions in RTA, whereas, neck was least commonly involved (0.9%) [36].

In the temporal region, tympanic membrane perforations were uncommon in the current study. The post auricular region was most commonly injured, followed closely by the external ear. The elderly did not have any injuries of the temporal region. Temporal bone trauma is a common affliction in cases of head injury. A small north Indian study reported RTA to be the most common cause

of temporal bone injury. Temporal bone fracture was reported in 18% patients out of whom 42% had hearing loss. Mixed hearing loss was most common [37]. Epidemiological studies on temporal bone injury in India could not be accessed. Haug et al reported that a substantial number of patients with midfacial fractures had associated temporal bone fractures [38]. The findings were similar to a literature review which reported that 18-40% patients with skull base fractures had a temporal bone fracture. Although the incidence of temporal bone fractures on account of RTA has reduced in the western world, similar reports from India are not available in published literature. Assault and falls are also major causes of temporal bone fractures [39].

Clinical applicability of the study: The need of the hour is continuous data collection on injuries to enable translation into policy changes and refinements. The state needs to upgrade trauma management facilities to enable local treatment of injuries. A high number of suicides, particularly those in older children and teenagers is alarming. The issue needs to be addressed by augmenting and promoting mental health care, preventive as

well as curative. Injuries on account of RTAs can be minimized by adequate implementation and strengthening of existing traffic laws. Accident prevention awareness needs to be made a part of daily discourse in public life. Reasons for cases of assault need to be analysed and assessed, apart from law enforcement.

Conclusions

Maxillofacial injuries are most common ENT injuries in Sikkim. Maxillofacial injuries to nose are the most common ENT injuries in Sikkim. Suicidal hanging is an unusually common mode of neck injury.

ENT injuries are relatively less common in extremes of age. Assault is more common in younger boys and men. Maxillofacial injuries are the commonest.

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