

A Descriptive Study on the Common Causes of Neck Injuries, their Treatment and Outcome at a Tertiary Hospital in India

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ABSTRACT

Introduction

ENT experts manage neck traumas, particularly penetration neck injuries or cut throat injuries, which violate the platysma muscle layer. The aim of this study was to assess further in detail about the sociodemographic status, etiology, presentation of patients, treatment provided and its outcome.

Materials and Methods

This study was carried out in the Department of ENT at a tertiary care hospital from January 2020 to January 2023. The study is retrospective. Total 17 cases of cut throat injuries, irrespective of age and sex, were included in the study. Patients with insignificant injuries to neck and those with multiple traumas to other body parts were excluded from this study.

Results

Among the 17 patients included in the study, most of them were males and belonged to upper lower socioeconomic class according to modified Kuppuswamy scale. The most common mode of neck injury was by suicide and four of them were suffering from depression. The most common site involved was the zone II.

Conclusions

Poor socioeconomic status and unemployment negatively impact mental health, leading to homicidal injuries. Resolving societal issues like poverty and drug addiction, implementing government enforcement measures, and improving communication systems can reduce complications and death rates.

Keywords

Neck injury; Suicidal; Tracheostomy; Zone II; Asphyxia

Traumas to neck are one of the most critical conditions managed by ENT experts.¹ Penetrating neck injury (PNI) or cut throat injuries is defined as any trauma to the neck that violates the platysma muscle layer. As per the data by world Health Organization (WHO), more than 5 million people all over the world have lost their lives due to neck injuries.²

The common causes of neck injuries in this part of the world are suicide attempts. The provoking factors in suicide attempts can be issues in family, psychological disorders, joblessness and privation. The motives for homicide may include land-related disputes, sex related crimes and familial disharmony.^{3,4} Falling from a height and road traffic incidents are the main causes for accidental neck injuries.⁵

Urgent and optimal management is paramount to good clinical outcomes. Management of neck injuries is an arduous job. The vital organs like larynx, trachea, pharynx, carotids and nerves are situated in this vulnerable compact zone. Prompt establishment of airway by tracheostomy/ intubation, immediate control of bleeding, blood transfusion and apt surgical repair must be done.³ In case of delay in treatment, patient can lose his life from asphyxia and hemorrhage.⁶ The anesthetist helps in establishing the airway; the ENT expert does the repair

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of the distorted anatomy. Later the psychiatrist takes care of the mental health of the patient during and after surgical treatment.^{3,4,7,8}

The treatment approach to neck injuries has changed with the help of current advancements in radiology techniques. In these days, neck injuries are managed more conservatively.⁹

This study was conducted in our setup to study further in detail about the sociodemographic status, etiology, clinical presentation of patients, treatment provided and its outcome.

Materials and Methods

This study was carried out in the Department of ENT at a tertiary care hospital from January 2020 to January 2023. The study type was retrospective and Institutional Ethical Committee approval was taken for this study. Total 17 cases of cut throat injuries, irrespective of age and sex, who were admitted in the ward, were included in the study. Patients with insignificant injuries such as minor contusions and abrasions on neck and those with multiple traumas to other body parts were excluded from this study. Patients and their relatives were approached and an informed written consent was obtained from them to participate in this study. In case of loss to follow up the necessary data needed for the study was collected from the record section of the hospital with permission from Medical Superintendent. The details of the patients including age, gender, socioeconomic status, cause behind the injury, injury inflicted by, anatomical zone involved, condition of patient at the time of admission, structures damaged, treatment given, complications and outcome were documented. The Socio-economic classification was done using modified Kuppaswamy scale.¹⁰ Findings of clinical examination, blood investigations, x rays and CT scans were also noted.

All the data regarding study population were collected and compiled in a predesigned case record form. All the data pertinent to the patients were kept confidential. After doing the necessary investigations, all patients were immediately shifted to operation theatre and managed as

per the ATLS (Advanced Trauma Life Support) guidelines. All patients received psychiatric counselling.

The data was collected and analyzed by descriptive statistical methods. The data was analysed statistically using the Microsoft Excel software. Descriptive statistics like mean and percentage were used to interpret data. All the data was depicted as the figures and tables that follows.

Results

Present study includes total 17 patients of neck injury. Out of which, 14 of the patients were males (82.3%) and three were (17.6%) females (Fig. 1). The majority of patients (41%) were between 31- 40 years and most of them belonged to upper lower socioeconomic class (Fig. 1 & 2).

Regarding the causes and motives behind the neck injury, majority of patients attempted suicide (52.9%) and four of them were suffering from depression (Table I). Many patients were under influence of alcohol and were not aware of their actions. Five patients (29.4%) were victims of homicidal attack (Fig. 3). Associated medical co-morbidities were reported in 7(41.1%) patients, these included; psychiatric illness in 4 patients and diabetes mellitus, hypertension and chronic chest infection in one patient each respectively. Zone II was the most commonly injured zone (64.7%). Four patients (23.52%) were injured in the zone I and the remaining two patients (11.7%) in zone III. Nine out of 14 patients of suicidal/homicidal modes were injured by using agricultural tools (Table II). Injuries with sickle caused more damage to anatomy and vessels because of its curvature. Though injuries with kitchen knife and scissors had a small point of entry, but it caused airway puncture and surgical emphysema. 52.9 % of patients were presented with laryngeal injury as shown in table III. Distribution of patients according to the structures injured is depicted in table III.

At the time of presentation to the hospital, all had open wounds. In case of an open wound to trachea we found it better to intubate the patient immediately to give support to the structural framework. This acted like an intra-

tracheal stent and we repaired the injury over that. Twelve patients came with respiratory distress. 16 patients presented with active hemorrhage and one had gone to hemorrhagic shock. Most of the patients (58.8%) reported to the hospital within 12 hours after injury (Table IV). None of the patients received any pre-hospital care and majority of them (76.4%) were brought in by relatives, friends or Good Samaritans, 17.6% by police and only one patient (5%) was brought in by a ambulance.

All patients in this study underwent surgical procedures as depicted in Table V. Surgical site infection was the

most common complication and it was seen in 70.5 % of patients. Permanent voice change, respiratory distress, hemorrhagic shock and laryngeal stenosis were seen in one patient each and 4 patients had ugly scar. One patient had to keep a permanent tracheostomy (Table VI). The majority of patients stayed in the hospital for less than 2 weeks. In this study, two patients died, 13 patients (76.4%) had full recovery without any permanent defects and others had recovery with permanent defects like voice change, upper airway stenosis, ugly scar and tracheostomy.

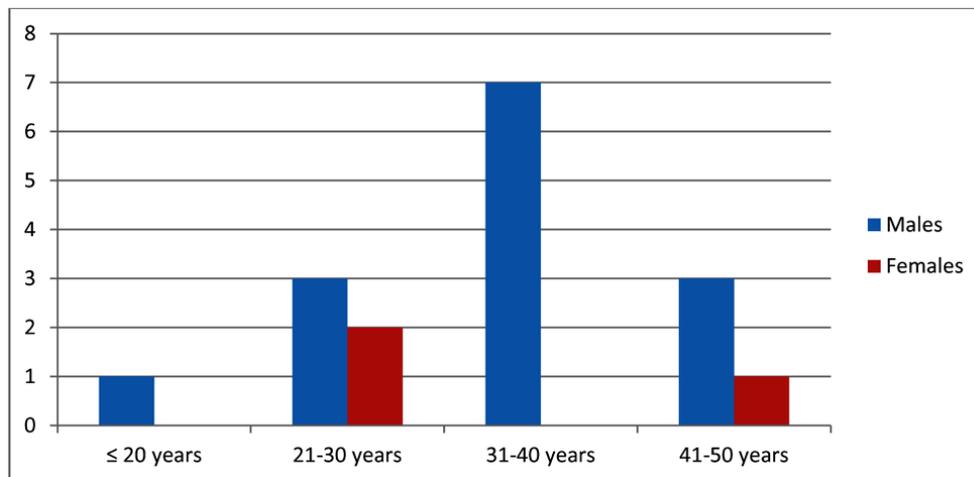


Fig. 1. Distribution of patients on age and gender.

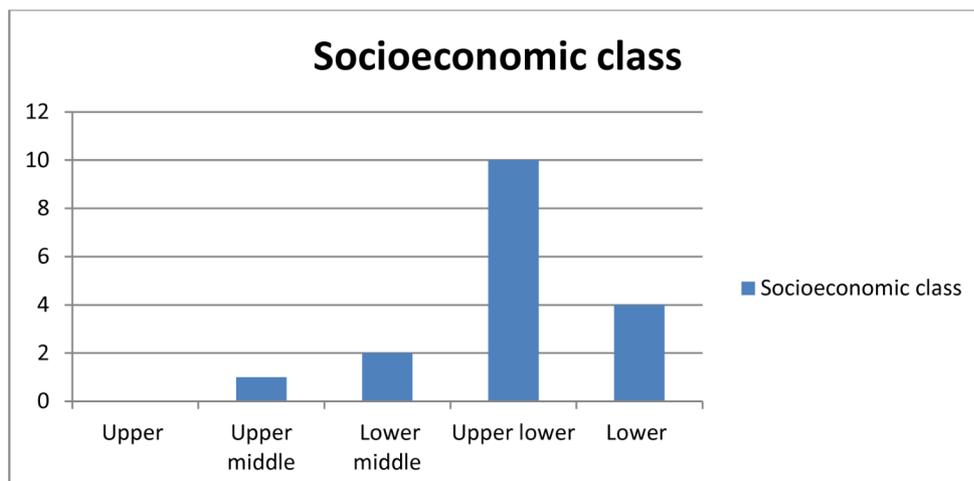


Fig. 2. Distribution of patients based on socioeconomic class

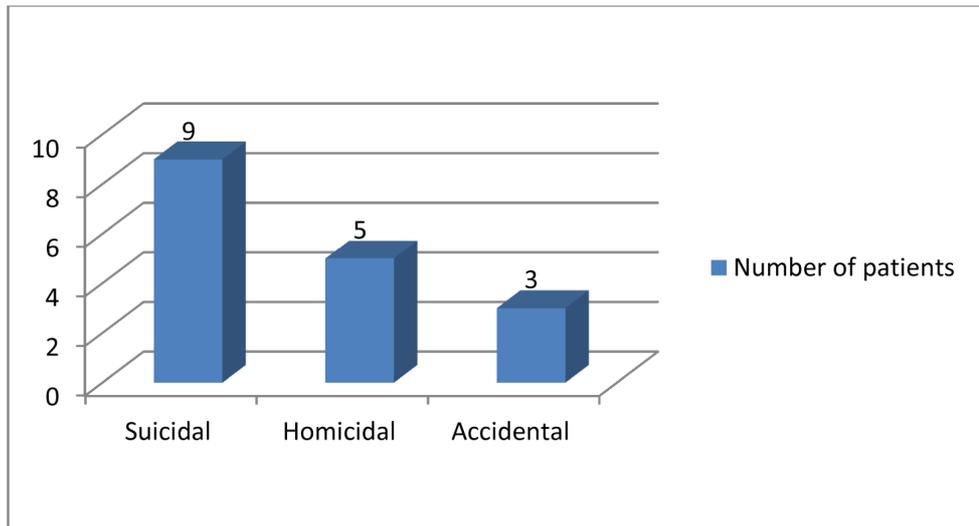


Fig 3. Distribution of patients according to the cause of the cut throat injury

Table I: Distribution of patients on the basis of mode of injury

MODE OF INJURY	MOTIVATING FACTOR	NUMBER OF PATIENTS	PERCENTAGE (%)
Suicidal	Depression	4	23.53
	Low socio-economic status	1	5.88
	Substance abuse	3	17.64
	Family abuse	1	5.88
	Total	9	53
Homicidal	Robbery	1	5.88
	Land dispute		5.88
	Interpersonal conflict	3	17.64
	Total	5	29.4
Accidental	Road traffic accident	2	11.76
	Fall from height	1	5.88
	Total	3	17.6

Table II : Type of weapons used for inflicting injury (suicidal/ homicidal)

WEAPONS	NO. OF PATIENTS	PERCENTAGE (%)
Agriculture tools	9	64.3
Kitchen knives/ butcher knives	3	21.4
Scissors	1	7.1
Axe	1	7.1

Table III: Distribution of patients according to structures injured

STRUCTURES INJURED	NUMBER OF PATIENTS	PERCENTAGE (%)
Skin, soft tissue, small vessels	17	100
Hypopharynx	10	58.8
Larynx	9	52.9
Thyroid gland	3	17.6
Trachea	2	11.7
Great vessels	1	5.8
Recurrent laryngeal nerve	2	11.7

Table IV: Distribution of patients according to delay in hospital arrival

TIME OF DELAY IN HOSPITAL ARRIVAL	NUMBER OF PATIENTS	PERCENTAGE (%)
< 6 hours	3	17.6
6 – 12 hours	10	58.8
13 – 24 hours	3	17.6
>24 hours	1	5.8

Table V: Distribution of patients according to treatment provided

TREATMENT PROVIDED	NUMBER OF PATIENTS	PERCENTAGE (%)
Simple wound closure	8	47
Repair of larynx and hypopharynx	1	5.8
Tracheostomy	9	52.9
Blood transfusion	15	88.2
Ligation of great vessels	1	5.8
Psychiatric consultation	17	100

Table VI: Distribution of patients based on the complications

COMPLICATIONS	NUMBER OF PATIENTS	PERCENTAGE (%)
Surgical site infection	12	70.5
Permanent voice change	1	5.8
Respiratory distress	1	5.8
Hemorrhagic shock	1	5.8
Ugly scar	4	23.5
Laryngeal stenosis	1	5.8
Permanent tracheostomy	1	5.8

Discussion

The neck accommodates vital vascular, aerodigestive and neurological structures. Hence, the surgical repair of neck injuries is a demanding task.⁹ Thrombosis is the most common complication of blood vessel injury, and the most common sites are the internal jugular vein and carotid artery. Blood extravasation, pseudo aneurysm and AV

(arteriovenous) fistula are the other vascular problems.¹¹ Around thirty percentage of patients with neck injuries present with aerodigestive injury. The death rate of patients with pharyngo-oesophageal injuries and tracheal injuries are around twenty percentage. Spinal cord, cranial nerves VII–XII, the sympathetic chain, peripheral nerve roots and brachial plexus are the neurological structures that are prone to get injured from neck trauma.⁹

Neck injuries are usually seen in males more than females. In this study, most of the victims were males and were in their third decade of life. This is in accordance with the studies by Onotai LO et al and Manilal A et al.^{12,3} Male preponderance in this age group is attributed to their active participation in risk taking behaviors and their frequent involvement in interpersonal violence. This has great economic impact as they are the valuable members of the society and in most cases the sole bread winners for their family. These are people in their most productive years and the injuries impose a considerable burden on their families and the society as a whole.¹³

Most of the patients in this study belonged to lower socioeconomic status. In this study, the most common weapon used was agricultural implements and in majority of cases the motivating factor behind the neck injuries was suicidal. Similar findings were reported in Western studies by Simpson et al and Gordon O et al.^{14,15} On the contrary, in a study by Japhet M Gilyoma et al, the most common cause of neck injury was homicidal attacks.¹³ Psychiatric disorders were the most frequent cause for suicidal attempts. Similar finding was also reported in Bangladesh by Manilal et al.³

In the present study, associated medical comorbidities were reported in 41.1% of patients. Of these, psychiatric illnesses accounted for more than 50% of cases. As found in our study, psychiatric conditions has been reported to be associated with suicidal attempt in studies done by Mohanty S and Terra JL et al also.^{16,17} Psychiatric ailments are the strongest predictors of.¹³ Suicide occurs 20.4 times more frequently in individuals with psychiatric illness than the general population.¹⁶⁻¹⁸ In this study, psychiatric evaluation was sought to all patients to help

them cope up with their symptoms and to lead a normal life.

The final result of the condition of the patient is significantly decided by the care they receive before reaching the hospital or on the way to the hospital.¹⁹ 76.4% of the patients in this study were brought to hospital by relatives, friends or good citizens. Only 1 patient was brought in an ambulance. This is a very usual scenario in many other developing countries as well.^{19,20} The insufficiency of paramedic services on transportation to these patients can lead to further deterioration of their condition and negative impact on the outcome of their treatment.¹³

The assessment and management of neck injuries is decided on the anatomical zone-based classification.²¹ Roon and Christiansen classification is most frequently used:¹²

- Zone 1: Area from the clavicles to the cricoid cartilage.
- Zone 2: Area from the inferior margin of the cricoid cartilage to the mandibular angle.
- Zone 3: Area from the mandibular angle to the skull base.

Though it provides a useful guideline, it has certain disadvantages, such as making it difficult to determine zones in multiple injuries, and offering poor correlation between surface location and internal organ involvement.²²

In the present study, site of injury of most of the patients was the zone II. In contrast to other zones, zone II is more susceptible to injuries as it is not secured by bony covering.²

The most common presentation of patients in this study was with open lacerated wounds and hemorrhage. Studies by Onotai LO and Manilal et al had similar findings.^{12,3} The main reasons for death in our patients of neck injuries were due to damaged hypopharynx and/or larynx and active bleeding which can lead to shock and asphyxia. The study done by Iseh et al recommended that the surgical management of the exposed hypopharynx, larynx and any other vital structures in neck should be carried out within 24 hours to save the life of the patient.²³ Likewise in our study also, the patients who were

managed within the first 24 hours had better chances at survival. With time the probability of the injury getting infected increases.

In this study, simple wound closure and tracheostomy were the most common treatment provided. The researches by Ezeanolue BC et al and Akpan E et al also displayed the importance of tracheostomy in the treatment of patients with neck injuries.^{24,25}

After the treatment few patients had permanent disabilities like hoarse voice, stenosis and a tracheostomy but some could return back to living their normal life. These permanent complications can affect the quality of one's life. The most common complication in this study was infection of the sutured site. This result was also in accordance with the study by Gilyoma JM et al.¹³

The chances of patients ending up with complications were notably related to the late presentation and also the zone involved. This can be prevented by quickly securing the airway either by intubation or tracheostomy and control of active bleeding site and blood transfusion. Promptly diagnosing the condition and apt surgical management are of prime importance in order to decrease the morbidity and death of such patients.¹³

Neck injuries demand a combined approach treatment from the anesthetist, psychiatrist and otolaryngologist. With early presentation and immediate care, the prognosis of the patients can be improved.² In the present study, a psychiatric counselling was given to all patients who were treated for self-inflicted neck injury. As the act of intentionally hurting one's own body indicates an unstable mental health condition and there are high chances of repeating the incident.³ Similarly the patients who were assaulted also received psychiatric assistance to overcome the trauma of the disturbing experience they had to face.^{3,16}

Conclusion

Cut throat injuries are usually rare but very challenging cases. It has high patient mortality and morbidity. In this study we analyzed the demographic pattern, cause of the injury, structures injured, treatment given, complications

and outcome of the injury. As per the findings of this study, incidences of self-induced neck injuries were seen to be more frequent in young males. This is mainly due to psychiatric illnesses. Unemployment and poor socioeconomic status also affects the mental health of an individual. Homicidal injuries are mainly due to low socioeconomic status. The number of such cases can be reduced by resolving the underlying problems of society like poverty, unemployment and drug addictions. Appropriate measures should be taken by the government agencies for enforcement of law and order. Proper communication system, adequate knowledge about first aid and prompt ambulance services can reduce the complications and reduce the death rate of patients with neck injuries.

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