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### RESEARCH PAPER

# Patterns of cut neck injury in a tertiary care centre

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**Background and aims:** Cut-neck injury (CNI) is a frequent scenario in Ear-Nose-Throat (ENT) casualty services and needs emergency care to limit the deteriorating effects of such injuries. The present study was conducted to assess the extent of CNI, its manner, and management in a tertiary care centre in Northeastern India. **Materials and methods:** This prospective study was undertaken by the Departments of ENT and Forensic Medicine and Toxicology, including 50 cases attending the emergency services in ENT casualty with CNIs during the study period from July 2021 to August 2022. Informed consent was obtained from the patient before data collection, along with ethical clearance from the ethics committee. Data on patients, primarily the demographics, manner of injury, presenting complaints and treatment, were collected and analysed. **Results:** Majority (70%) of the participants belonged to the 20-40 age group and were male (80%). Psychiatric illness (40%) was the most common presenting symptom, while suicidal CNI (40%) was the present study's most typical manner of injury. The other manner of injuries was homicidal and accidental. Involvement of the thyrohyoid membrane (50%) was the mostly encountered extent of injury, followed by injuries to the strap muscles, skin and subcutaneous tissue. **Conclusion:** CNIs are grave injuries requiring timely management and failing to, which may lead to life-threatening complications. Individuals in the adult age group of 20-40 years and predominantly males were found to be most affected. Suicidal injuries were the most common injuries.

**Keywords:** Neck injury; tracheostomy; advanced trauma life support.

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## INTRODUCTION

Cut neck injury (CNI) is common in the ENT casualty department in India. CNI significantly impact the patient's morbidity and mortality as the neck is one of the least protected body parts. Control of bleeding to secure the airway requires minutes for a case to deteriorate if not given emergency care.<sup>1</sup> Nearly 5% to 10% of all traumatic injuries belong to CNI. The WHO estimates that of the nearly

900,000 people who die from suicide globally every year, 170,000 are Indians.<sup>2</sup>

The hazards of a CNI patient are indispensable. From blood spurting to haemorrhagic shock to respiratory distress, it can take away lives if not attended as per Advanced Trauma Life Support(ATLS) guidelines. Haematoma formation is also an associated finding. Emergency tracheostomy may be required for those cases

where the trachea is breached. Neck lacerations require interdisciplinary management, starting from ENT specialists, nurses, anaesthetists, psychiatrists, medicine specialists, and forensic experts.<sup>3</sup>

The neck zones have been divided into three anatomical zones. They are Zone 1 extends from the sternum to the cricoid cartilage. It is dangerous as it contains many lethal anatomical sites like great vessels, mediastinum, and cervical and thoracic oesophagus. Zone 2 extends from the cricoid cartilage to the angle of the mandible, which is the largest and most common zone to be injured. Zone 3 extends from the angle of the mandible to the skull.<sup>4</sup>

The present prospective study was conducted from July 2021 to August 2022 among patients with neck injuries. Patients who died in casualty or after repair were treated medico-legal, and measures were taken as per the existing rule of the land. The study aimed to determine the extent of CNI, its manner, and its management in a tertiary care centre.

## MATERIAL AND METHODS

A total of 50 cases were recorded during our study period from July 2021 to August 2022 who attended emergency services in ENT casualty Assam Medical College and Hospital (AMCH). This prospective study was done by the departments of ENT and Forensic Medicine and Toxicology, AMCH, Dibrugarh. Prior informed consent was obtained before data collection and ethical clearance from the ethics committee. The data on patient

demographics, mode of injury, presenting complaints and treatment were recorded.

The initial factors to be dealt with were hypoxia, haemorrhagic shock, airway compromise, and sometimes associated pneumothorax.<sup>5</sup> Treatment included fluid replacement to overcome the haemorrhagic shock, removal of blood clots to estimate the extent of injury, compression bandages over the cervical region to arrest spurting bleeding, blood transfusions, antibiotic coverage, tetanus toxoid, and airway rescue like an emergency tracheostomy.

The manner of the cases was determined by the history of the cases, police and their documents, and autopsy reports in a case of death.

Patients with superficial injuries involving up to strap muscles were repaired with vicryl 3.0 and ethilon 3.0 under local anaesthesia- lignocaine and 2% adrenaline in the ratio 1:200000. Any deep cuts and airway compromise were shifted to emergency operation theatre (OT) for repair under General Anaesthesia (GA).

The data were analysed using Statistical Package for the Social Sciences (SPSS) Version-16. The distributions of the data were presented as frequencies and percentages.

## RESULTS

Out of the 50 study participants, the majority (70%) belonged to the 20-40 age group. Also, gender distribution showed a male preponderance with a male: female ratio of 4:1, as shown in **Table 1**.

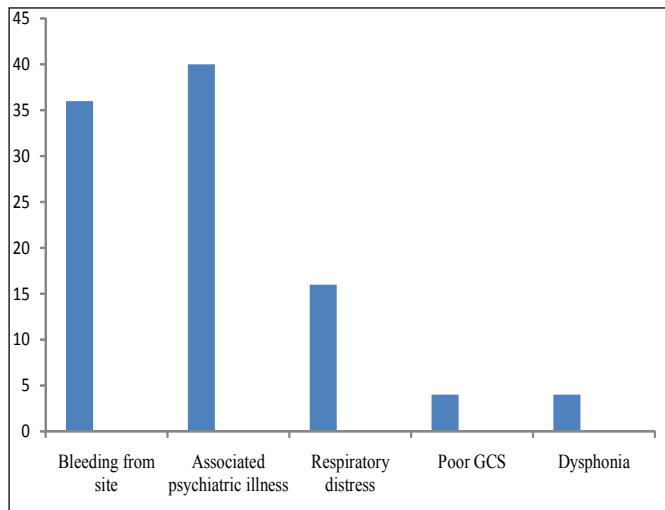
**Table 1** Age and gender-wise distribution of cases

Age (in years)	No of cases (n=50)	Percentage(%)
≥ 20	5	10
20-40	35	70
41-60	10	20
Gender		
Male	40	80
Female	10	20

Most patients (50% of cases) underwent treatment and emergency repair in the triage zone of casualty of AMCH as per ATLS protocols. Some of them (30%) were shifted to an ENT operation theatre for repair under GA. At the same time, a few (20%) patients were re-explored

for surgical emphysema who received initial repair in a primary health centre or periphery.

The most common presenting symptom associated with a CNI was psychiatric illness (40%), followed by bleeding from the wound site (36%) and respiratory distress (16%), as shown in **Figure 1**.



**Figure 1** Distribution of cases as per presenting symptoms. Suicidal (40%) CNI was the present study's most typical manner of injury. The other manners of injuries reported were homicidal, accidental and road traffic accidents (Table 2).



**Figure 2** Cut-neck-injury extending up to the thyrohyoid membrane

**Table 2** Distribution of cases as per the manner of injury

Manner of injury	Number (n=50)	Percentage (%)
Homicidal	15	30
Suicidal	20	40
Accidental	10	20
Road traffic accident	5	10
Total	50	100

The involvement of the thyrohyoid membrane (Figure 2) was a commonly reported injury (50%). Injuries to the strap muscles and platysma (Figure 3) were present in 24% of the cases. Injury to the larynx and trachea (Figures 4a and 4b) was found in 8%, as shown in Table 3.

**Table 3** Distribution of cases as per the extent of the injury

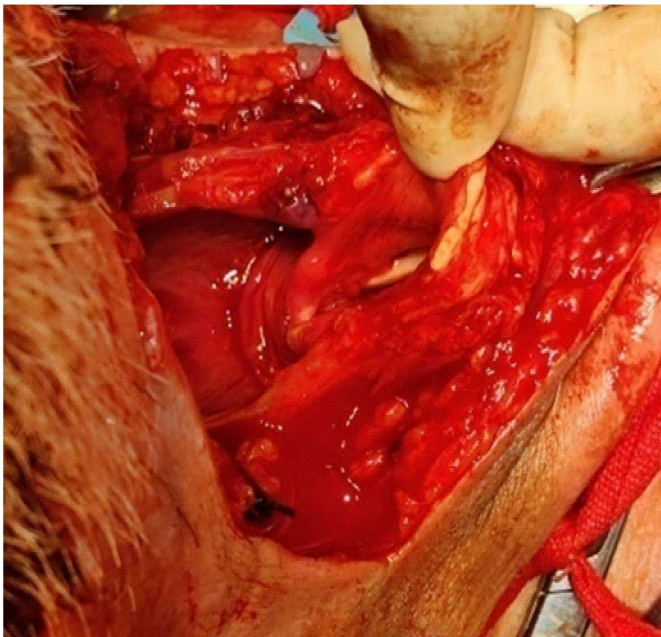
Extent of injury	Number (n=50) of cases	Percentage (%)
Skin and subcutaneous tissue	8	16
Strap muscles and platysma	12	24
Thyrohyoid membrane	25	50
Larynx and trachea	4	8
Neurovascular injury	1	2
Total	50	100



**Figure 3** Cut-neck injury extending skin and subcutaneous tissue involving platysma

As shown in Figure 3, the patient presented with a suicidal CNI after inflicting a homicidal attack on his wife. There was severe bleeding, and a compression bandage was applied to stop the bleeding for some time. Fluids and haemocoel transfusions were

given to overcome fluid insufficiency. After stabilising vitals and arranging two units of whole blood, the patient was operated on and explored under general anaesthesia. An emergency tracheostomy was done. The larynx was open, exposing the epiglottis, vocal cords, and aryepiglottic folds. The clots were removed, and the extent of the injury was identified. The wound was repaired in layers with pharyngoplasty and a Ryle's tube. But owing to unstable vitals and poor GCS, the patient expired after 6 hours of post-operative care.



**Figure 4a** Cut-Neck-Injury of neck extending larynx and vocal cords



**Figure 4b** After the repair

In another instance, a patient previously repaired with laryngoplasty in the Department of ENT came with a second incidence of suicidal CNI. The patient was examined; clots were removed, and the tracheal breach was found with a suspected laceration of significant vessels. The cuffed tracheostomy tube was applied, the wound was covered with a compression bandage, fluid resuscitation was done, and it was planned for shifting to ENT-OT for emergency repair. But owing to excessive blood loss, the patient died within 7 minutes after receiving it in casualty.

In the present study, nearly 60% of injury to the neck was found in zone II, followed by 30% in zone I, and 10% in zone III.

## DISCUSSION

According to WHO, almost 5 million people succumb to various injuries worldwide.<sup>6</sup> Although managing a CNI is complicated as many crucial organs are in that constrained space, literature on the topic is very scarce. The present study evaluated the extent of CNI, manner, and management in a tertiary care centre in Northeastern India.

In the present study, the most common age group affected in this clinical spectrum was 20-40 years of age. Also, male preponderance with a male: female ratio of 4:1 was observed among the study patients. Various other studies reported similar findings, with most CNI patients in their third and fourth decades of life, specifically males.<sup>1,3,7,8</sup> Male preponderance, especially young adults' involvement in CNIs, may be attributable to their risk-taking behaviours and interpersonal disputes.<sup>1</sup>

Associated psychiatric illness was the most common symptom found in the patients who presented in casualty services in the present study (40%). At the same time, bleeding from the injury site was the second most common presentation. A similar study reported bleeding from the site as the most common symptom.<sup>3</sup> Another study by Parida et al., reported respiratory distress in the form of breathing difficulties and stridor as the most common clinical symptom at the presentation time.<sup>2</sup>

In our study, a suicidal self-inflicted CNI was the most common manner of injury (40%), followed by homicidal CNI (30%), accidental injury (20%) and road traffic injury (10%). Unlike western populations, cut neck injuries using sharp weapons are the most uncommon method of suicide in India. The most popular methods of suicide include hanging, poisoning, burning, jumping, drowning, injuries from firearms, stab wounds, etc.<sup>9</sup> Chakraborty et al., in their study, found that 50% of cases were self-inflicted CNIs, followed by accidental injuries

(40.91%).<sup>1</sup> In contrast to our findings, a study from Bangladesh reported homicide as the most typical cause.<sup>10</sup> Parida et al., found road traffic accidents the most common cause of neck injury (46.1%).<sup>2</sup> Psychiatric illnesses, financial troubles, marital conflicts and family disputes play a significant role in suicidal CNIs.<sup>7,10,11</sup>

Breach in the thyrohyoid membrane was the most common clinical presentation in 50% of the participants. Breach in the skin and subcutaneous tissue (16%) and breach in platysma and strap muscles (24%) were the other clinical presentations among the study participants. Injury to the larynx, trachea (8%), and neurovascular injury (2%) were also observed in a few cases. According to Parida et al., the most common neck exploration finding noted in CNI patients was an injury to the thyroid cartilage.<sup>2</sup>

The incidence of CNI is linked with the socio-demographic and socio-psychological lifestyles of the masses. The factors such as depression in life due to failure in work, failure in love relationships, poverty, and ill health, play an essential role in crimes of homicidal cut-neck and suicidal tendencies. Besides, poor infrastructure of roads leads to road traffic accidents and neck trauma. Accidental injuries follow a lack of carefulness in handling sharp weapons and tools.

Patients with CNIs require early arrival at the hospital and a multidisciplinary treatment and management approach for immediate care.<sup>1,12,13</sup> Such cases should be managed as per ATLS, securing airway, breathing, circulation, disability and exposure. Emergency fluid resuscitation and securing the airway by endotracheal intubation and tracheostomy are golden steps in saving a life.

Our study found that most of the injury was confined to zone II, which was 60%. This study was discordant with the one done by Phookan et al.,<sup>3</sup> where they reported most of the cases in zone I. However, our study was similar to the one done by Chakraborty et al.,<sup>1</sup> where they found 72.73% of cases with injury in zone II.

**Limitations:** The present study is conducted at a single tertiary care centre and comprised a small sample size. Multicentric studies with larger sample sizes may be instrumental in understanding the spectrum of CNIs among the study population and helpful in identifying the influential underlying factors of such incidents. Also, the psychiatric evaluation was not included in our study though it referred to psychiatric management of the cases.

## CONCLUSION

CNI is a frequent cause of morbidity and mortality among adult males. Also, the present study findings suggest that most CNIs were suicidal, which is alarming. Also, psychiatric illness was the most common presenting symptom. Involvement of the thyrohyoid membrane followed by injuries to the strap muscles and platysma were the frequently encountered extent of the injuries.

Early arrival to the hospital and immediate and prompt intervention with a multidisciplinary approach may be essential for successfully managing such cases. Besides providing critical care, it's also the need of the hour to prevent such incidences through psychological upliftment. Moreover, the post-mortem reports prove the genuine grounds of trauma costing human lives.

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**Contribution of authors:** We declare that this work was done by the authors named in this article, and the authors will bear all liabilities about claims relating to the content of this article.

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