



# A Study on Evaluation and Management of Neck Injuries at a Tertiary Care Center

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## Abstract:

**Background:** Any neck injury that disrupts the platysma muscle is classified as a penetrating neck injury. The neck area is particularly vulnerable to various types of injuries due to its dense concentration of vital organ structures in a relatively small and exposed anatomical space.

## Material & Methods:

**Study Design:** Hospital-based, cross-sectional study.

**Study Area:** The study was conducted at Subbaiah Institute of Medical Sciences, under Department of ENT.

**Study Period:** 1 year.

**Sample Size:** The study consisted of 60 subjects.

**Sampling Technique:** Simple Random technique. The data regarding the study population were collected from the Hospital database and the registers of operation theatres, they were compiled in a proforma. The study population were selected by purposive sampling from those patients who were admitted to the hospital and matched the inclusion criteria. All the data pertinent to the patients is kept confidential. Data were categorized according to the socio-demographic pattern of the patient, cause for the injury, site of the neck injury (according to the defined zone of the neck), type and extent of the injury, presentation at the time of admission, delay in the hospital arrival, duration of the hospital stay, records of mortality, treatment and outcome.

**Results:** Skin, soft tissue and small vessels were severed in all the cases (100%). 4 cases (6.67%) had laryngeal injury. Hypopharynx was injured in 3 cases (5%). Thyroid cartilage was injured in 13 cases (21.67%). The breach in the cricothyroid membrane was seen in 12 cases (20%). The submandibular gland was injured in 3 (5%) cases.

**Conclusion:** The occurrence of cutthroat injuries, along with related complications and fatalities, is increasingly prevalent in today's society. Predominantly affected are agricultural equipment users, unemployed young adults, from low-income backgrounds who experience suicidal and homicidal neck injuries.

**Keywords:** Penetrating Neck Injury, Evaluation, Management

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## 1. Introduction

Any neck injury that disrupts the platysma muscle is classified as a penetrating neck injury. The neck area is particularly vulnerable to various types of injuries due to its dense concentration of vital organ structures in a relatively small and exposed anatomical space. There has been a notable rise in the incidence of such injuries in recent years [1,2]. Neck injuries account for 5–10% of all trauma cases. The mortality rate associated with neck injuries can be as high as 11% [3].

Approximately 25% of penetrating neck injuries lead

to arterial damage [4]. Spinal cord injuries are uncommon, occurring in less than 1% of cases, while aerodigestive injuries are seen in about 23% to 30% of instances [5, 6]. A solitary penetrating wound can cause significant harm. Essential neck structures face serious risks from penetrating neck trauma [7]. Creating a well-considered interdisciplinary approach and understanding the various presentations of neck injuries are crucial for enhancing patient outcomes and reducing morbidity and mortality [8].

Injuries to the neck can be particularly difficult due



to the presence of multiple critical organs involved in speech, and swallowing, and the intricate vascular and nerve structures located in this small, unprotected area. Many structures are close to the skin's surface, making them especially susceptible to harm. Neck injuries often present a complex set of challenges for treatment. Addressing these injuries necessitates a collaborative effort that involves otolaryngologists, vascular surgeons, anaesthetists, and psychiatrists working together closely.

**Objectives:**

To describe neck injuries in terms of

- Etiology
- Clinical presentation
- Involvement of vital Structures
- Surgical repair
- Need for tracheostomy
- Hospital stay
- Complications and their management.

**Material & Methods**

**Study Design:** Hospital-based, cross-sectional study.

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**Sample Size:** The study consisted of 60 subjects.

**Sampling Technique:** Simple Random technique.

**Inclusion Criteria**

All cases of neck injuries that needed emergency admission irrespective of their age and sex were referred from casualty to the department of ENT - Head and neck surgery.

**Exclusion criteria:**

1. Minor injuries of the neck.
2. Patients unwilling to participate in the study
3. Cases lost for follow-up (6 months post admission).

**Study tools and Data collection procedure**

The data regarding the study population were

collected from the ENT department and the registers of operation theatres and were compiled in a proforma. The study population were selected by purposive sampling from those patients who were admitted to the hospital and matched the inclusion criteria. All the data pertinent to the patients is kept confidential.

Data were categorized according to the socio-demographic pattern of the patient, cause for the injury, site of the neck injury (according to the defined zone of the neck), type and extent of the injury, presentation at the time of admission, delay in the hospital arrival, duration of the hospital stay, records of mortality, treatment and outcome. The accumulated data were compiled and analyzed by standard statistical methods and then presented in the following tables.

The evaluation of a patient with a throat injury should start with advanced trauma life support (ATLS), which begins with a primary survey giving importance to airway, breathing, and circulation (ABC).

After the patient's vitals are stable, they undergo a secondary survey which includes a complete history and a thorough physical examination. These steps help to identify the likely injury complex and to direct further treatment or diagnostic testing.

The patients with superficial cut injuries, the wound was closed in layers under aseptic precautions. Those patients who had their larynx trachea or pharynx severed were taken to the operation theatre for repair and reconstruction under tetanus toxoid and broad-spectrum antibiotic coverage. In such cases emergency tracheostomy was done. The defect in the laryngeal cartilage was reconstructed by 3-0 proline. The mucous membrane, muscles, thyroid gland and soft tissues were approximated by 3-0 vicryl. The skin was closed with 3-0 silk.

**Observations & Results**

**Table 1: Sex Distribution**

| Sex    | Number | Percentage |
|--------|--------|------------|
| Male   | 55     | 91.67%     |
| Female | 5      | 8.33%      |

Out of 60 cases, 55 are males constituting around 91.67% and 5 cases are female (8.33%) population

with a male-to-female ratio of 11:1.

**Table 2: Age Distribution**

| Agegroup | Male | Female | Total |
|----------|------|--------|-------|
| 0-20     | 4    | 0      | 4     |
| 21-40    | 45   | 4      | 49    |
| 41-60    | 5    | 1      | 6     |
| >60      | 1    | 0      | 1     |



The majority of the patients were young adults aged between 21 to 40 years both males and females. Age ranged from 16 years to 72 years with mean age of 31.76 years.

**Table 3: Habitat**

| Habitat | Number | Percentage |
|---------|--------|------------|
| Rural   | 33     | 55%        |
| Urban   | 27     | 45%        |
| Total   | 60     | 100%       |

In our study, there is a slight predominance of neck injuries in the rural population (55%) when compared to the urban population (45%).

**Table 4: Mode of Injury**

| Mode of injury | Male | Female | Number | Percentage |
|----------------|------|--------|--------|------------|
| Suicide        | 27   | 1      | 28     | 46.67%     |
| Homicide       | 15   | 4      | 19     | 31.67%     |
| Accident       | 13   | 0      | 13     | 21.66%     |
| Total          | 55   | 5      | 60     | 100%       |

The most common cause of cutthroat in our study was suicide (46.67%), followed by homicide (31.67%), and accidents (21.66%). Suicides are more common in males when compared with females. In the female population, homicides are more common than suicides.

**Table 5: Anatomical Zone**

| Anatomical zone | Number | Percentage |
|-----------------|--------|------------|
| Zone I          | 5      | 8.33%      |
| Zone II         | 52     | 86.67%     |
| Zone III        | 3      | 5%         |

According to the anatomical site, 52 (86.67%) cases had an injury in Zone II, 5 (8.33%) cases in Zone I and 3 (5%) cases in Zone III.

**Table 6: Source of Injury**

| Source of injury | Number |
|------------------|--------|
| Razor blade      | 23     |
| Knife            | 17     |
| Glass            | 10     |
| Steel rod        | 4      |
| Axe              | 3      |
| Wood cutter      | 1      |
| Screw driver     | 1      |
| Marble stone     | 1      |

As suicide followed by homicide was the common mode of neck injuries in our study, 38.33% used a Razor blade, 28.33% used a knife, and 16.67% used a glass piece to inflict the neck wound.

**Table 7: Time of Delay in (Hours) Seeking Medical Attention**

| Time of delay | Number | Percentage |
|---------------|--------|------------|
| <6 hours      | 33     | 55%        |
| 6-12 hours    | 22     | 36.67%     |
| 12-24 hours   | 3      | 5%         |
| >24 hours     | 2      | 3.33%      |



A study was done to determine the time required to reach our hospital. The majority of patients 33 (55%) arrived in less than 6 hrs following injury, whereas

37% of patients arrived between 6 to 12 hours after injury, and only 3% of patients arrived after 24 hours of injury.

**Table 8:** Clinical Presentation

| Clinical presentation           | Number |
|---------------------------------|--------|
| Open wound                      | 15     |
| Open wound with active bleeding | 45     |
| Respiratory distress            | 10     |
| Change in voice                 | 2      |
| Difficulty in swallowing        | 2      |
| Air leak                        | 17     |
| Shock                           | 6      |

The most common presentation was with an open wound and bleeding in 45 (75%) cases, and cut-throat injury with respiratory distress was 10

(16.67%) cases. 6 cases (10%) were with cutthroat injury in shock.

**Table 9:** Structures Injured

| Structures injured      | Number |
|-------------------------|--------|
| Strap muscles           | 45     |
| Sternocleidomastoid     | 15     |
| Thyroid cartilage       | 13     |
| Cricoid cartilage       | 6      |
| Thyrohyoid membrane     | 7      |
| Cricothyroid membrane   | 12     |
| Cricotracheal membrane  | 3      |
| Thyroid gland           | 2      |
| Trachea                 | 6      |
| Larynx                  | 4      |
| Hypopharynx             | 3      |
| Esophagus               | 1      |
| Vertebrae               | 2      |
| Submandibular gland     | 3      |
| Mylohyoid muscle        | 1      |
| Facial artery           | 3      |
| Superior thyroid artery | 2      |
| Common carotid          | 1      |
| Anterior jugular        | 30     |
| External jugular        | 3      |
| Internal jugular        | 2      |

Skin, soft tissue and small vessels were severed in all the cases (100%). 4 cases (6.67%) had laryngeal injury. Hypopharynx was injured in 3 cases (5%). Thyroid cartilage was injured in 13 cases (21.67%). The breach in the cricothyroid membrane was seen in 12 cases (20%). The submandibular gland was injured in 3 (5%) cases. The trachea was injured in 6 cases (10%). Carotid vessel and oesophageal injury observed in 1 case each (1.67%).

Treatment provided at our hospital was analyzed. Simple wound closure was done in 15 (25%) cases.

Laryngeal repair was done in 7 (11.67%) cases. Laryngeal and hypopharyngeal repair was done in 3 (15%) cases. Tracheostomy was done in 24 (40%) cases. Blood transfusion was given for 9 (15%) cases. Psychiatric consultation was obtained for 28 (46.67%) cases.

A hypertrophied scar was seen in 6 (10%) patients. Postoperative wound infection was seen in 4 (6.66%) cases. 3 (5%) cases had laryngeal stenosis and had to undergo permanent tracheostomy, and 3 (5%) cases had changes in voice quality.



50% of cases had to stay for less than 7 days and 20% of cases had to stay for 2 weeks in the hospital whereas another 20% of cases had to stay for more than 3 weeks in the hospital. Out of 6 patients the cause of death in 4 patients was hemorrhagic shock and 2 patients died due to aspiration pneumonia and cardiopulmonary arrest.

### Discussion

In our study out of 60 cases, 55 are males constituting 91.67% and 5 cases are female (8.33%) population with a male-to-female ratio of 11:1. According to Panchappa et al., [9] males were 44 (84.3%), females were 7 (13.72%) and one male child (1.96%). Male to female ratio was 6.2:1. According to ManilalAichet al., [10] total of 67 cutthroat victims were included in the study. A total of 47 male and 20 female cases were found. Male to female ratio was 7:3. According to Rajesh KumarKunduet al. [11], most of the patients were male (68.4%) Male to female ratio was 2.1:1.

In our study majority of the patients were young adults aged between 21 to 40 years in both males and females. Age ranged from 16 years to 72 years with mean age of 31.76 years. According to Panchappa et al. [9] age ranged from 4 years to 80 years (mean 25.2). The majority of the patients were young adults aged between 20 to 40 years. According to ManilalAich et al. [10], the majority of victims were young adults 41 (61.19%), aged between 21 to 30 years. According to Rajesh KumarKunduet al. [11] majorities (60%) of the patients were young adults, aged between 16 to 30 years. According to Japhet m Gilyoma et al. [12], the median age of patients was 26 years (range 8 to 78 years).

In our study, there is a slight predominance of neck injuries in the rural population (55%) when compared to the urban population (45%). According to Panchappa et al. [9] 43 (84.31%) cases were from rural communities. According to ManilalAich et al., [10] 52 (77.61%) were from rural communities. According to Rajesh KumarKundu et al., [11] 43 (71.6%) were from rural communities.

In our study, suicide 28 (46.67%) is the most common mode of injury followed by homicide 19 (31.67%) and accidental injuries 13 (21.66%). According to Japhet m Glioma et al., [12] 54 (55.1%) patients were due to homicidal injury, 34 (34.7%) victims were due to suicidal attempts and only 10 (10.2%) persons were due to accidental injury. In our study zone II injuries 52 (86.67%) are most common followed by zone I injuries 5 (8.33%) and zone III injuries 3 (5%). According to Japhet m Gilyoma et al., [12], the majority of injuries were in Zone II accounting for 65.3% of cases.

In our study suicides followed by homicide were the most common mode of neck injuries 38.33% used a Razor blade, 28.33% used a knife, and 16.67% used a glass piece to inflict the neck wound. According to ManilalAichet al. [10] most injury due to broken glass or the sharp projection of the distorted metallic part of the vehicles. There were two victims (one of them was a child) who had a history of falling over the sharp objects (Botti-a special kitchen knife and a sharp edge of the fence made of tin). According to R Harris et al., [13] five patients sustained gunshot wounds and 22 sustained stab wounds. Four other cases included screwdriver, key, nail gun and snooker cue injuries.

In our study, the most common presentation is with an open wound and bleeding seen in 45 (75%) cases, Cutthroat injury with respiratory distress was 10 (16.67%) cases. 6 cases (10%) were with cutthroat injury in shock. According to Panchappa et al., [9], the most common presentation was with open wounds and bleeding & 19 (37.25%) cases presented with this finding. Cutthroat injury with respiratory distress was 16 (31.37%) cases. Referred patients with inadequate wound management at the primary centre were 6 cases (11.76%). 6 patients (11.76%) were referred to the hospital with proper wound management and 4 cases (7.84%) were with severe cut injury in shock.

In our study Skin, soft tissue and small vessels were severed in all the cases (100%). 4 cases (6.67%) had laryngeal injury. Hypopharynx was injured in 3 cases (5%). Thyroid cartilage was injured in 13 cases (21.67%). A breach in the cricothyroid membrane was seen in 12 cases (20%). The submandibular gland was injured in 3 (5%) cases. The trachea was injured in 6 cases (10%). Carotid vessel and oesophageal injury observed in 1 case each (1.67%). According to Panchappa et al., [9] Skin, soft tissue and small vessels were severed in all the cases (100%). 12 cases (23.52%) had laryngeal injury. The pharynx was injured in 4 cases (7.84%). Thyroid and thyroid vessels were injured in 8 cases (15.68%). The trachea was cut in one case (1.96%). Carotid vessel injury was observed in 2 cases (3.92%).

In our study treatment provided at our hospital was analyzed. Simple wound closure was done in 15 (25%) cases. Laryngeal repair was done in 7 (11.67%) cases. Laryngeal and hypopharyngeal repair was done in 3 (15%) cases. Tracheostomy was done in 24 (40%) cases. Blood transfusion was given for 9 (15%) cases. Psychiatric consultation was obtained for 28 (46.67%) cases. According to Panchappa et al., [9], Simple wound closure was done in 35 (68.62%) cases. Laryngeal repair was done in 12 (23.52%) cases. Laryngeal and hypopharyngeal repair was

done in 16 (31.37%) cases. Tracheostomy was done in 16 (31.37%) cases. Tracheal reconstruction was done in 1 (1.96%) case. Blood transfusion was given for 5 (9.80%) cases. Psychiatric consultation was obtained for 13 (25.49%) cases.

In our study hypertrophied scar was seen in 6 (10%) patients postoperative wound infection was seen in 4(6.66%) cases, 3 (5%) cases had laryngeal stenosis and had to undergo permanent tracheostomy, 3 (5%) cases had a change in voice quality. According to Panchappa et al., [9], the most common causes of morbidity were wound infection, change of voice, dysphagia, tracheal stenosis and permanent tracheostomy. According to ManilalAich et al., [10], patients developed some form of morbidity (e.g. wound infection, scar, persistent voice changes and dysphagia, permanent tracheostomy due to laryngeal stenosis) later on.

In our study Out of 6 patients, the cause of death in 4 patients was hemorrhagic shock and 2 patients died due to aspiration pneumonia and cardiopulmonary arrest. According to Panchappa et al., [9], two patients died. The cause of death in one patient was hemorrhagic shock and a second patient died on post-operative day one due to cardiopulmonary arrest. According to ManilalAich et al., [10], a total of six (8.96%) victims of CTI died within 24 hours after admission due to haemorrhage, hypovolemic shock, and aspiration. Three victims died only due to massive blood loss. One victim died due to septicaemia with multi-organ failure.

## CONCLUSION

The occurrence of cutthroat injuries, along with related complications and fatalities, is increasingly prevalent in today's society. Predominantly affected are unemployed young adults from low-income backgrounds who experience suicidal and homicidal neck injuries. Tackling the underlying factors of violence, such as poverty, joblessness, and substance abuse, along with providing timely psychiatric support to high-risk behavioural groups, could help decrease the rate of these injuries in our communities. Additionally, systematically gathering and sharing data among the nation's trauma centres may lead to improved treatment strategies that align with the needs and available resources of similarly situated institutions across the country.

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