



PATTERNS, CLINICAL PRESENTATIONS AND OUTCOME OF HEAD AND NECK INJURIES – A COMPREHENSIVE STUDY

Otorhinolaryngology

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ABSTRACT

Aims And Objectives

1. To analyse the pattern and outcome of Head and Neck injuries in patients in ENT department
2. To study the incidence of various Head and neck injuries in patients attending ENT department.
3. To evaluate the distribution in age, sex, modes of presentation and nature of injury (suicidal, homicidal or accidental)
4. To categorise neck injuries according to zones of involvement.

Type Of Study – A Prospective Clinical Study **Materials And Methods** Patients admitted in ENT WARD/attending ENT OPD, NIIMS, Greater Noida between Jan 2021 to Jan 2024 with head and neck injuries are selected for the present study. A prospective study is conducted over the selected group for their age, sex and modes of presentation. Study on investigations required, various treatment modalities either conservative or surgical and their outcome is done. **Observation And Results.** The Head and Neck injuries were more common in males and in most of the cases belonged to lower socioeconomic status. Most common intent was Homicidal with Edged weapon as the choice. Penetrating wound was seen to be most common type. Commonest mode of presentation was bleeding. The most common investigation done was blood grouping and hemoglobin. Repair of soft tissue was done in maximum cases. Morbidity with left vocal cord paresis in 1 case and subglottic stenosis in 1 case were observed. Mortality in our study was 1.23%. **Conclusion** Urban violence and accidents account for increase in Head and Neck injuries. While managing the cases we found that clinical examination is more important than any other investigations. Multidisciplinary approach is required in management of Head and Neck injuries. Consultations were taken from the department of CTVS, Psychiatry, Neurology and other departments as per requirement.

KEYWORDS

INTRODUCTION

Since a myriad of organ systems (airway, vascular, digestive) are compressed into a compact conduit, a single penetrating wound is capable of considerable harm. Therefore head and neck injuries pose a challenge for surgeons. Furthermore, seemingly innocuous wounds may not manifest clear signs or symptoms till late. Also lethal injuries could be easily overlooked.

Airway occlusion leading to respiratory distress and hemorrhage leading to hypovolemic shock pose the most immediate risks to life. Hence anatomy of the neck and awareness of the various presentations of neck injuries and establishment of a well-conceived multi disciplinary plan prior to the traumatic event is critical for improving patient outcome.

The purpose of this study is to analyse the age, sex, modes of presentation, investigations and the various modalities of treatment and their outcome.

Anatomy

Since vital structures are present in the neck regions, awareness of anatomy of neck is extremely important.

Boundaries Of Neck

The neck contains many important organs, blood vessels and nerves, and is richly endowed with lymph nodes and lymphatics. The neck extends superiorly (anterior to posterior) – from midline of the mandible to external occipital protuberance. In midline (superior to inferior) it extends from midline of the mandible to sternum. Inferiorly (anterior to posterior) it extends from suprasternal notch to seventh cervical spine¹.

The neck has been classically divided into two main triangles Anterior triangle and Posterior Triangle.

Serving as the line of demarcation, the sternocleidomastoid muscle divides the neck into anterior and posterior triangles. Most of the important vascular and visceral organs lie within the anterior triangle formed by the anterior border of sternocleidomastoid muscle posteriorly, the midline of the neck anteriorly, and the lower border of ramus of mandible superiorly. Few vital structures cross the posterior triangle, which is bounded by the posterior border of sternocleidomastoid anteriorly, anterior border of the trapezius posteriorly, and middle one third of the clavicle inferiorly.

The anterior triangle is divided by the digastric muscle and the superior belly of omohyoid into four smaller triangles. The submental, submandibular, carotid and muscular triangles form the ANTERIOR TRIANGLE².

The occipital and the subclavian triangles form the POSTERIOR TRIANGLE.

ROON and CHRISTENSEN'S classified neck into three principal anatomic zones¹².

Zone 1 – superiorly from the sternal notch and clavicles to the cricoid cartilage. Zone 1 contains the vascular vital structures (carotid, vertebral, and subclavian arteries, jugular and subclavian veins)

Zone 2 – cricoid cartilage to the angle of mandible. Zone 2 contains carotid, vertebral arteries, digestive structures (pharynx and esophagus), and larynx and trachea.

Zone 3 – between angle of mandible to base of skull. It includes distal carotid and vertebral arteries.

All three zones contain major vascular and aerodigestive structures and their management is both diagnostically and surgically very challenging³.

RESULTS AND OBSERVATIONS IN MY STUDY-

The present study was done in the department of E. N. T for duration of 3 years from 1st Jan 2021 – 1st Jan 2024. During this period 81 cases of neck injuries were admitted in the department/attended ENT OPD.

The results and observations are made according to the following tables & charts.

Table 1

AGE DISTRIBUTION	NO. OF CASES	PERCENTAGE
1 -10 YRS	2	2.46%
11 – 20 YRS	11	13.58%
21 -30 YRS	37	45.67%
31 – 40 YRS	15	18.51%
41 – 50 YRS	8	9.87%
51 – 60 YRS	6	7.40%
61 – 70 YRS	2	2.46%

The present study shows commonest age group to up the third decade followed by fourth decade. The youngest victim 8 years of age and the oldest Was 69 years of age

Table 2 - Sex Distribution

SEX	NO. OF CASES	PERCENTAGE
MALE	55	67.90%
FEMALE	26	32.09%

The injuries were more common in males in 55 (67.90%) cases.

Table 3- Intent

INTENT	NO. OF CASES	PERCENTAGE
HOMICIDAL	30	37.03%
ACCIDENTAL	27	33.33%
SUICIDAL	24	29.62%

Homicidal injuries were most common in 30 (37.03%) cases The accidental injuries were either road or household. Household injuries were common in children. Suicidal intent was found in 24 cases.

Table 4 - Type Of Wound

TYPE OF WOUND	NO. OF VASES	PERCENTAGE
INCISED	16	19.75%
PENETRATING	28	34.56%
LACERATED	14	17.28%
CLOSED WOUND	10	12.34%
LIGATURE MARK	10	12.34%
BURNS	3	3.70%

The penetrating wounds were most common in 34.56% cases.

Table 5 - Zones – out of 28 penetrating neck injury cases,

ANATOMICAL ZONES	NO. OF CASES	PERCENTAGE
ZONE 1	11	39.28%
ZONE 2	9	32.14%
ZONE 3	8	28.57%

Table 6 - Mode Of Presentation

MODE OF PRESENTATION	NO.OF CASES	PERCENTAGE
BLEEDING	57	70.37%
NECK SWELLING	29	35.80%
DYSPHONIA	23	28.39%
RESPIRATORY DISTRESS	19	23.45%
DYSPHAGIA/ODYNOPHAGIA	11	13.58%
EXPOSED/INJURY CARTILAGE	20	24.69%
OPEN PHARYNX	13	16.04%
EXPOSED /INJURED BONE	13	16.04%
STRIDOR	17	20.98%
MENTAL IMBALANCE	22	27.16%
EXPOSED NERVE	1	1.23%

Clinical Presentation

The commonest presentation was bleeding (57 cases), followed by neck swelling (29 cases), In exposed nerves, only 1 patient presented with facial nerve paralysis.

Table 7 - Investigations

TYPE OF INVESTIGATION	NO.OFCASES	PERCENTAGE
BLOOD GROUP& HAEMOGLOBIN	67	82.71%
SOFT TISSUE NECK	60	74.07%
PA VIEW CHEST	17	20.98%
CT SCAN NECK	34	41.97%
USG NECK	5	6.17%
CT BRAIN	30	37.03%
CT SCAN THORAX	5	6.17%
ENDOSCOPY/FLEXIBLE LARYNGOSCOPY	26	32.09%
BARIUM SWALLOW X. RAY	11	13.58%

In the present study among the laboratory investigation evaluation of blood grouping & hemoglobin percentage were important especially in open injury cases for proper management. Soft tissue neck was the second most common investigation done in 60 cases.

Table 8 - Mode Of Treatment

MODEOF TREATMENT	NO. OF CASES	PERCENTAGE
CONSERVATIVE	22	27.16%
INTUBATION/ TRACHEOSTOMY	19	23.45%
LIGATION OF VESSELS	52	64.19%
LARYNGOTRACHEAL REPAIR	15	18.51%
REPAIR OF PHARYNX	15	18.51%
REPAIR OF SOFT TISSUE	55	67.90%
FOREIGN BODY REMOVAL	7	8.64%
PSYCHIARY CONSULTATION	25	30.86%
BLOOD TRANSFUSION	17	20.98%

Cases explored under GA were lacerated neck injury with bleeding and aero digestive tract violation in 2 cases ,1 penetrating injury neck with hematoma (reexploration and hemostasis) was done, 7 cases of foreign body removal . Airway was managed by tracheostomy in 19 cases of open neck injury. In maximum cases soft repair was done (67.90%), followed by ligation of vessels (64.19%) . Drainage was provided by negative suction drain or corrugated rubber drain in some cases.

Table 9 - Complications

TYPE OF COMPLICATION	NO.OF CASES	PERCENTAGE
INFECTION	3	3.70%
SUBGLOTTIC STENOSIS	1	1.23%

In the present study we have encountered a few complication also. All the complications were treated conservatively.

FOLLOW UP: Our cases were followed up after 2 weeks and 1 month of discharge from hospital.

Table 10 - Mortality

CAUSE	NO. OF CASES	PERCENTAGE
HANGING	1	1.23%

Mortality in our study was 1.23%

Images With Legends





DISCUSSION

The present study of 81 cases of head and neck injuries have been discussed in accordance with the available literature. Comparison have been made with relevant literature to find out the differences or similarities of evaluated results. Around 5% of all admitted trauma patients had a head and neck injury, and 1% sustained an isolated head and neck injury⁴.

In our study commonest age group was 21-30 years (37 cases) followed by 31-40 years (15 cases). Nilson P et al (2006) in his study also found the commonest age group to be in third decade⁵.

Patterns of head and neck injuries in our study were consistent with global patterns of head and neck trauma. They were more frequent among males and young individuals. The preponderance of males and young people in head and neck trauma is well documented and attributed to their behavioral and occupational patterns of these groups that predispose them to injury

Viswanatha B (2007) in their study of cut throat injury found that commonest presentation was in third decade (11 cases) which coincides with our study⁶. Borah SR et al (2004), who did a prospective study of open neck injury also found commonest incidence to be in third decade⁷.

In our study the most common intent was homicidal i.e. in 30 cases (37.03%) followed by accidental in 27 cases (33.33%) and suicidal in 24 cases (29.62%). Shingai J et al (2018) found equal number of cases (11) in suicidal and homicidal category and 4 cases of accidental intent⁸.

In the present study penetrating wound was most common in 28 cases (34.56%) followed by incised wounds in 16 cases (19.75%).

Falls and RTAs were the 2 most common mechanisms of head and neck injuries in our cohort.

Malik S et al (2017) also found penetrating trauma as the most common type of wound in 87.4% cases⁹. Penetrating trauma was also

found as the most common wound in the studies done by Nilson P et al (2006)⁵, Viswanatha B (2007)⁶, Borah et al (2004)⁷.

In the present study the most common presentation was bleeding in 57 cases (70.37%) followed by neck swelling in 29 cases (35.80%).

Roy N et al (2016) while reviewing 16 penetrating lesions found that in 56% cases vascular structures were involved¹⁰. Borah SR et al (2004) also reported bleeding as the commonest mode of presentation in 73.08% cases⁷.

In study of penetrating trauma of neck Minja et al (2019) found Zone 2 involvement was the commonest in 81% cases¹¹. Shingai J et al (2018) also found Zone 2 to be most frequently involved in 60%-70% cases⁸. In our study also penetrating injury was most common in Zone 2; among 28 cases of penetrating injury 9 cases (32.14%) found in Zone 2, 11 cases (39.28%) in zone I, 8 cases (28.57%) in Zone 3.

In our study mode of treatment were conservative in 22 cases (27.16%), tracheostomy in 19 cases (23.45%), ligation of vessels in 52 cases (64.19%).

There is a lot of debate regarding management of neck injuries, especially open neck injuries. Some authors advocate for mandatory exploration and some are in opinion for selective exploration.

Amato S et al (2021) said that mandatory exploration should be done in cases presenting with airway obstruction and unstable hemodynamics¹².

Shingai J et al (2018) in their review of trauma to larynx and trachea, control of airway was achieved by emergency tracheostomy or intubation followed by tracheostomy, after that prompt operation and primary repair was done⁸.

Minja et al (2019) in their study of management of upper airway injuries stated that elective intubation should be attempted only with a surgical team present and prepared for emergency tracheostomy¹¹.

The respiratory rate and signs of airway distress, including dyspnea and stridor, require immediate assessment, and if required a tracheostomy should be done where possible.

Whenever there is suspicion of laryngotracheal injury, intubation should be carried out with great care as further damage to the airway may occur and false passages can be created. Tracheostomy under local anesthesia is always preferred. Flexible laryngoscopy, CT Scan, Direct laryngoscopy, and tracheostomy may be needed in Laryngotracheal trauma patients.

We also followed the same protocol. In our study tracheostomy was done in 19 cases (23.45%) of open injury neck. Viswanatha B did intubation/tracheostomy in 12 cases out of 20 cases of airway injuries⁵. Roy N et al (2016) also did tracheostomy in 15 cases (57.69%)¹⁰. Shingai J et al (2018) did tracheostomy in 83% of the explored patients⁸. Borah SR et al (2004) did tracheostomy in 8 cases (30.77%)⁷.

Approximately 50% of patients with an airway injury have been seen to have a digestive tract injury as well. Tracheostomy is done if airway compromise results. Laryngeal injuries are classified on the basis of location (supraglottic, transglottic, cricoid, or tracheal) and type (hematoma, mucosal tears or lacerations, cartilage fractures and/or dislocations, or laryngotracheal disruption).

Minor lacerations, small hematomas, and undisplaced single fractures are mostly managed with observation and serial examination.

Shingai J et al (2018) in their study of upper aerodigestive tract injury did immediate surgical exploration in 55% and managed rest without surgery⁸. Their findings showed that suspected upper aerodigestive tract injury can be managed without surgery but a high index of suspicion for airway compromise and associated facial injuries must be kept in mind. Borah SR et al (2004) performed laryngeal framework repair in 10 cases (38.46%)⁷.

In our study repair of soft tissue was done in 55 cases (67.9%). WU CA et al (2021) has done soft tissue repair in 100% cases in their study of open neck injury¹³. Though in our study there were 19 blunt trauma

cases, none was severe enough for surgical treatment. All recovered with conservative treatment.

Morbidity in our study was observed in 2 cases (2.62%). The patient who presented with the penetrating neck injury developed left vocal cord paresis postoperatively. Another case who had injury back & side of the neck (left) above the angle of mandible developed lower motor neuron facial palsy after operation. Mutze S et al (2005) also reported morbidity due to facial palsy and loss of voice in 2 cases (7.70%)¹⁴.

In our study there was no mortality due to laryngotracheal injury. Mutze S et al (2005) while reviewing hanging victims stated that cerebral hypoxia rather than spinal cord injury is the probable cause of death and should be the primary concern in treatment¹⁴.

In a study by Singhai et al (2018), who prospectively examined 200 head and neck trauma patients, he found an 8% mortality rate⁸.

CONCLUSION

The present study was done because of observation of increasing number of head and neck injury cases attending emergency department in recent years. Up to 5% of traumatic injuries to the head and neck are due to blunt trauma¹⁵. Injuries to zone 1 have the highest morbidity and mortality¹⁶. Most common are the zone 2 injuries after penetrating trauma, but they have the best prognosis since they are readily accessible¹⁶.

Clinical examination is more important than any other investigations while investigating a case of head and neck injuries. The investigations should be in accordance to the presenting symptoms. Life threatening symptoms initially need restoration of airway, breathing & circulation and then repair of the injuries should be the aim¹⁵.

Moreover, early neck exploration should be done in patients with deeper neck injuries to avoid serious complications and worst outcomes¹⁷.

Exploration was done in all open injury cases in our study mostly under local anaesthesia. Surgeons should be vigilant, for early recovery and uneventful post operative period by proper assessment and repair of the wound.

Management of head and neck injuries requires multidisciplinary approach and consultations are required from the department of CTVS, Psychiatry, Neurology and other departments¹⁸.

However, to come to a definite conclusion a longer study is required; an observation of three years is not enough for the same.

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