



ECHOES OF IMPACT: THE OTORHINOLARYNGOLOGICAL SPECTRUM OF HEAD AND NECK TRAUMA

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ABSTRACT

Background: Head and neck trauma is a common cause of morbidity and frequently involves otorhinolaryngological (ENT) structures. Early recognition of ENT manifestations is essential for timely intervention and prevention of complications. **Objectives:** To evaluate the spectrum of otorhinolaryngological manifestations in patients with head and neck trauma and to assess associated injury patterns, radiological findings, and special complications. **Methods:** A total of 247 patients with head and neck trauma were evaluated through detailed clinical examination, ENT assessment, and appropriate radiological investigations. Demographic characteristics, mode and site of injury, clinical findings, imaging results, and associated complications were analyzed using descriptive statistics. **Results:** Among 247 patients, 205 (83.0%) demonstrated ENT manifestations. The majority belonged to the 31–45 year's age group (31.2%) with a slight male predominance (53.4%). Road traffic accidents were the leading cause of injury (52.2%), followed by falls (27.3%). The nose was the most commonly affected site (44.9%), followed by the ear (28.8%), oral cavity (18.5%), and neck (7.8%). Associated head injury was present in 89.8% of patients, while loss of consciousness occurred in 31.7%. Nasal bleeding and nasal fractures were the predominant findings. Radiological evaluation revealed nasal bone fractures as the most common skeletal injury (51.2%). Facial nerve palsy, orbital injuries, and visual impairment were less frequent but clinically significant complications. **Conclusion:** ENT manifestations are highly prevalent in head and neck trauma and frequently indicate underlying craniofacial, neurological, orbital, or airway injury. Early ENT assessment, appropriate imaging, and multidisciplinary management are crucial for reducing morbidity and improving patient outcomes.

KEYWORDS

Head and Neck Injuries; Otorhinolaryngological Manifestations; Facial Injuries; Craniocerebral Trauma.

INTRODUCTION

Head and neck trauma constitutes a significant cause of morbidity due to the anatomical complexity and functional importance of structures within this region.[1] Otorhinolaryngological (ENT) manifestations are common and may range from minor soft-tissue injuries to life-threatening conditions involving the airway, major vessels, and cranial nerves.[2,3] Nasal trauma is among the most frequent presentations, often manifesting as nasal fractures, septal hematoma, or epistaxis, which may indicate underlying vascular or skull-base injury.[4]

Midfacial and paranasal sinus injuries can result in fractures of the maxilla, zygoma, and orbital walls, presenting with facial asymmetry, diplopia, infraorbital nerve hypoesthesia, and nasal obstruction. Oral and oropharyngeal trauma may cause mucosal lacerations, dental injuries, and airway compromise, while laryngeal and cervical injuries can lead to respiratory distress, hemorrhage, and neurological deficits. [5,6] Cranial nerve involvement may further impair facial movement, swallowing, speech, and sensory function.

Despite advances in diagnosis and treatment, ENT-related morbidity remains substantial, particularly when injuries are overlooked or diagnosis is delayed. Missed conditions such as septal hematoma or temporal bone fracture may result in permanent deformity, hearing loss, or facial nerve paralysis. [7] Rehabilitation, including audiological support, speech therapy, reconstructive procedures, and psychological care, plays an important role in optimizing recovery and quality of life. [8]

Given the potential severity of these injuries, early recognition, prompt intervention, and a multidisciplinary approach are essential for reducing morbidity and improving outcomes in patients with head and neck trauma. [9]

MATERIALS AND METHODS

The prospective observational study was conducted in the Emergency Department and Outpatient Department of the Department of Otorhinolaryngology at Government Medical College and Hospital, Nagpur. For a duration of 24 months. 247 patients were selected for the study based on the fulfillment of inclusion criteria using a non-probability sampling technique. The study was conducted after receiving ethical clearance from the Institutional Ethics Committee.

The study adhered to the principles of the Declaration of Helsinki and ensured that patient care was not compromised at any stage.

Inclusion Criteria

Trauma patients aged 2–80 years presenting with ENT injuries associated with head and neck trauma in the Casualty or Outpatient Department (OPD) were included in the study.. Only those patients who provided informed consent and were willing to participate in the study were included.

Exclusion Criteria

Patients aged less than 1 year or more than 80 years, those who did not provide consent to participate, unconscious patients, patients whose neurological status required more than 4 weeks to recover (as assessed by the Glasgow Coma Scale [GCS]), patients who were brought dead or died within 15 minutes of presentation, patients with severe systemic illness, and those with pre-existing ENT disorders.

All patients presenting with head and neck trauma were initially evaluated in the emergency or outpatient department. A detailed clinical history was obtained, including the mechanism and timing of injury. A thorough general and ENT examination was performed. The severity of head injury was assessed using the Glasgow Coma Scale. Based on clinical findings, appropriate investigations were carried out. Patients received standard treatment as per institutional protocols. Clinical photographs were taken where necessary for documentation. Patients were followed up in the outpatient department after discharge to monitor progress and identify complications.

Data was collected using a structured case record proforma. Information regarding patient demographics, clinical presentation, examination findings, and investigation results was systematically recorded. The collected data were compiled and analyzed using statistical software (STATA version 14.0). Categorical variables were presented as frequencies and percentages, while continuous variables were expressed as mean and standard deviation. Appropriate statistical tests were applied to determine associations and significance where necessary.

RESULT

The study included 247 participants. Majority of the patients belonged to the 31–45 year's age group with 77 patients (31.2%), followed by

18–30 years with 52 patients (21.1%). Patients aged >60 years accounted for 45 cases (18.2%), while those aged <18 years constituted 39 cases (15.8%). The least affected age group was 46–60 years with 34 patients (13.8%). Male patients constituted the majority of the study population with 132 cases (53.4%), while female patients accounted for 115 cases (46.6%) resulting in a male-to-female ratio of 1.15:1. Urban patients constituted 126 cases (51.0%), while rural patients accounted for 121 cases (49.0%). The urban-to-rural ratio was 1.04:1. The distribution was nearly equal between urban and rural populations, indicating that head and neck trauma with ENT manifestations affected both populations almost equally.

Table 1. ENT Manifestations and Injury Characteristics Among Head and Neck Trauma Patients

Variable	Category	Number of Patients (n)	Percentage (%)
ENT Manifestations (n=247)	Present	205	83.0
Alcohol intoxication	Yes	39	19.0
Mode of Injury (n=205)	Road Traffic Accident	107	52.2
	Fall	56	27.3
	Assault	33	16.1
	Sports Injury	9	4.4
Site of Injury (n=205)	Nose	86	42.0
	Ear	54	26.3
	Oral Cavity	36	17.6
	Neck	17	8.3
	Combined ENT Injury	12	5.8

Otorhinolaryngological manifestations were observed in 205 of 247 patients (83.0%) with head and neck trauma. Alcohol intoxication was seen in 39 patients (19.0%). Road traffic accidents in 107 patients (52.2%) were the predominant mechanism of injury, and the nose with 86 patients (42.0%) being the most frequently affected anatomical site, followed by the ear 54 patients (26.3%), oral cavity 36 patients (17.6%), and neck 17 patients (8.3%). Combined ENT injuries involving more than one anatomical site were noted in 12 patients (5.8%). These findings highlight the high burden of ENT injuries in craniofacial trauma.

Table 2. Distribution of Otorhinolaryngological Findings by Anatomical Site Among Patients with Head and Neck Trauma (n = 205)

Anatomical Site	Finding	Number of Patients (n)	Percentage (%)
Ear (n = 59)	Ear bleed	14	6.8
	Laceration	7	3.4
	Pinna abrasion	6	2.9
	Hearing loss	4	2.0
	Tinnitus	4	2.0
	Tympanic membrane perforation	3	1.5
	Temporal bone fracture	3	1.5
	Ear bleed + tympanic membrane perforation	3	1.5
	Facial palsy (immediate onset)	2	1.0
	Facial palsy (delayed onset)	3	1.5
	Facial palsy (unspecified)	2	1.0
	Vertigo	2	1.0
	Ear bleed + laceration	2	1.0
	Ear bleed + pinna abrasion	2	1.0
	CSF Otorrhoea+ Temporal Bone fracture	1	0.5
	Ear bleed + impaired hearing	1	0.5
Nose (n = 92)	Nasal bleed	28	13.7
	Nasal fracture	16	7.8
	Laceration	11	5.4
	Nasal bleed + laceration	9	4.4
	Abrasion	7	3.4
	Nasal obstruction	5	2.4
	Swelling	4	2.0
	Nasal bleed + abrasion	3	1.5

	Nasal bleed + fracture	3	1.5
	Nasal fracture + CSF rhinorrhoea	2	1.0
	CSF rhinorrhoea +temporal bone fracture	2	1.0
	Anosmia	2	1.0
Oral Cavity (n = 38)	Oral bleed	13	6.3
	Lip injury	9	4.4
	Tooth fracture	6	2.9
	Oral bleed + lip abrasion	4	2.0
	TMJ injury	3	1.5
	Oral bleed + tooth injury	3	1.5
Neck (n = 16)	Neck laceration	6	2.9
	Abrasion	3	1.5
	Swelling	3	1.5
	Change in voice secondary to strangulation	2	1.0
	Tracheal stenosis	2	1.0

The nose was the most commonly affected anatomical site (44.9%), followed by the ear (28.8%), oral cavity (18.5%), and neck (7.8%), indicating that nasal injuries constituted the predominant otorhinolaryngological manifestation of head and neck trauma. Nasal bleed (13.7%) and ear bleed (6.8%) were the most frequent individual findings, while nasal fractures, lacerations, oral bleeding, and lip injuries were also commonly observed. Less frequent but clinically important injuries, including tympanic membrane perforation, temporal bone fracture, facial palsy, CSF otorrhoea, and CSF rhinorrhoea, were identified, underscoring the wide spectrum and potential severity of ENT injuries associated with head and neck trauma.

Table 3: Distribution of Fracture Sites Among ENT Trauma Patients (n = 41)

Fracture / Bony Injury Site	Number of Patients	Percentage of ENT Patients
Nasal Bone Fracture	21	51.2%
Orbital	6	14.6%
Zygomatic Fracture	2	4.9%
Temporal Bone Fracture	4	9.8%
Maxilla / Mandible	6	14.6%
Tracheal Injury	2	4.9%
Total	41	100.00%

Fracture or bony injuries were observed in 41 patients with ENT trauma with nasal bone fracture with nasal bone fractures (51.2%) being the most common, followed by orbital and maxillomandibular fractures (14.6% each), indicating the predominance of mid-facial skeletal injuries.

Head injury was present in 184 patients (89.8%), with loss of consciousness noted in 65 patients (31.7%) and alcohol-related trauma in 39 patients (19.0%) representing common associated clinical features. Radiological evaluation predominantly comprised X-ray and CT imaging, with nasal bone radiography and CT brain/head being the most frequently performed investigations, facilitating accurate detection of craniofacial injuries. Although less frequent, facial nerve palsy, orbital injuries, and visual impairment constituted clinically significant complications, with delayed-onset facial palsy and closed-globe injuries being the predominant presentations. These findings underscore the importance of comprehensive clinical assessment, appropriate radiological evaluation, and multidisciplinary management for early diagnosis and prevention of long-term functional morbidity.

DISCUSSION

The present study was conducted to evaluate the spectrum of otorhinolaryngological manifestations associated with head and neck trauma in patients presenting to a tertiary care hospital.

The present study demonstrated that head and neck trauma predominantly affected young and middle-aged adults, with a slight male predominance (male: female ratio 1.15:1) and an almost equal urban–rural distribution. Similar demographic trends have been reported by Chalya et al. [10] and Adeyemo et al. [11], who observed that craniofacial trauma occurs predominantly among economically productive males.

ENT manifestations were identified in 83.0% of patients, highlighting the high burden of otorhinolaryngological injuries following head and neck trauma. Road traffic accidents (52.2%) were the leading mechanism of injury, and the nose (44.9%) was the most frequently affected anatomical site. These findings are consistent with Hogg et al. [12], who also reported road traffic accidents as the predominant cause of craniofacial trauma. The predominance of nasal injuries is attributable to the exposed anatomical position of the nose, making it particularly susceptible to blunt facial trauma.

Among specific ENT injuries, nasal bleed and ear bleed were the most common clinical findings, while nasal bone fracture represented the predominant bony injury. Less frequent but clinically significant injuries, including tympanic membrane perforation, temporal bone fracture, facial palsy, CSF otorrhoea, and CSF rhinorrhoea, reflected the diverse spectrum and severity of ENT trauma. Similar injury patterns have been described by Sakthignanavel et al. [13] and Desai et al. [14].

The predominance of nasal bone fractures, followed by orbital and maxillomandibular fractures, emphasizes the vulnerability of the midface in craniofacial trauma. Similar patterns have been reported in previous epidemiological studies. Furthermore, a recent systematic review and meta-analysis by Ferreira Cavalcante et al. [15] demonstrated that helmet use significantly reduces both the occurrence and severity of facial fractures among motorcyclists, highlighting the importance of strict helmet compliance in preventing craniofacial injuries.

CONCLUSION

The present prospective observational study demonstrated that otorhinolaryngological manifestations are highly prevalent among patients with head and neck trauma, emphasizing the importance of routine ENT evaluation as an integral component of trauma assessment. Nasal injuries were the most common ENT manifestation, followed by ear, oral cavity, orbital, and neck injuries. The findings indicate that ENT manifestations frequently reflect underlying craniofacial, neurological, orbital, and airway involvement. Early recognition and management of conditions such as ear and nasal bleeding, facial fractures, tympanic membrane perforation, CSF leak, facial nerve palsy, tracheal injury, and visual disturbances are essential to prevent long-term morbidity and improve outcomes. Strengthening trauma care systems, enhancing road safety measures, and adopting a multidisciplinary approach with appropriate radiological evaluation and structured follow-up can substantially reduce morbidity, improve functional recovery, and enhance overall quality of life.

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