

A Clinical Study of ENT Manifestations in Cases of Head Injury Patients Coming to Tertiary Care Centre

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Abstract

Introduction: Head injury is a major cause of morbidity and mortality worldwide, frequently resulting from road traffic accidents, falls, and assaults. The ear, nose, and throat (ENT) region is commonly affected due to its anatomical proximity to the craniofacial structures. ENT manifestations in head injury patients may include epistaxis, CSF rhinorrhea, otorrhea, hearing loss, facial nerve palsy, temporal bone fractures, and vestibular dysfunction. Early recognition of these manifestations is crucial as they may indicate underlying skull base fractures and intracranial complications. Prompt ENT evaluation plays a vital role in reducing long-term complications and improving patient outcomes in tertiary care settings.

Aims: To study the various ENT manifestations in patients presenting with head injury at a tertiary care centre and to evaluate their clinical patterns and associated complications.

Materials and methods: This was a hospital-based prospective observational study on 100 head injury patients with ENT manifestations. Detailed history, ENT examination, and required radiological investigations were done. Data were analyzed using descriptive statistics and chi-square test, with $p < 0.05$ considered significant.

Result: The study included 100 head injury patients with ENT manifestations, predominantly males aged 21–40 years. Road traffic accidents were the most common cause. ENT involvement increased significantly with severity of injury. Epistaxis was the most frequent manifestation, followed by hearing loss and vertigo, with no significant association with sex.

Conclusion: ENT manifestations are common in head injury patients and often serve as important clinical indicators of underlying cranial and skull base trauma. Early diagnosis and multidisciplinary management involving otorhinolaryngologists and neurosurgeons are essential for optimal patient care and prevention of long-term sequelae.

Keywords: Head Injury, ENT Manifestations, Skull Base Fracture, CSF Rhinorrhea, Temporal Bone Fracture, Epistaxis, Hearing Loss, Trauma.

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Introduction

Head injury is a major public health concern and a leading cause of morbidity and mortality, particularly in emergency and tertiary care settings. It commonly results from road traffic accidents, falls, assaults, and other traumatic events, [1] often leading to a wide spectrum of neurological and extra-neurological complications. Among these, ear, nose, and throat (ENT) manifestations are frequently encountered due to the close anatomical relationship between the cranial cavity, skull base, and facial structures. These manifestations may include epistaxis, CSF rhinorrhea, otorrhea, hearing impairment, vertigo, facial nerve palsy, [2] and

complications related to temporal bone and skull base fractures. Clinical evaluation of ENT involvement in head injury is crucial because these signs often serve as early indicators of more severe underlying intracranial or craniofacial trauma. However, diagnosis may be challenging, particularly in resource-limited tertiary care settings, where subtle presentations and overlapping symptoms can lead to delayed or missed identification of significant injuries. [3] Accurate and timely ENT assessment is therefore essential to reduce complications and improve clinical outcomes. Head injury patients may also

present with a range of associated systemic and inflammatory conditions that mimic or complicate ENT findings, further emphasizing the importance of a thorough otorhinolaryngological evaluation.[4] Conditions involving chronic granulomatous disease,[5] systemic inflammatory disorders, and infectious pathologies demonstrate that ENT manifestations often overlap across multiple disease processes, making differential diagnosis critical in trauma settings. Post-traumatic vestibular disorders such as benign paroxysmal positional vertigo are commonly reported following head injury and contribute significantly to patient morbidity, affecting balance and quality of life. [6] Similarly, traumatic brain injury may be associated with systemic complications that reflect the severity of injury and further highlight the need for multidisciplinary management. ENT specialists play a vital role in early detection, stabilization, and long-term follow-up of these patients. Understanding the full spectrum of ENT manifestations in head injury patients is essential for clinicians working in emergency and tertiary care centres. Early recognition, appropriate imaging, and coordinated care between otorhinolaryngologists, neurosurgeons, and critical care teams are key to reducing long-term disability and improving patient prognosis. [7,8]

Materials and Methods

Study Design: Prospective observational descriptive study

Place of Study: burdwan medical college burdwan

Period of Study: 12 months

Study Population: All patients presenting with head injury and associated ENT manifestations attending the emergency and outpatient departments of a tertiary care centre during the study period, who fulfill the inclusion criteria.

Sample Size: 100 patients

Inclusion Criteria:

- Patients of any age and gender presenting with head injury and ENT manifestations.
- Patients admitted to or attending the tertiary care centre and giving informed consent.

Exclusion Criteria

- Patients with pre-existing ENT diseases unrelated to head injury.
- Patients with polytrauma or severe systemic instability preventing proper ENT evaluation.

Study Variable

- Age and sex of patients
- Mechanism and type of head injury
- Severity of head injury (mild, moderate, severe)
- Ear manifestations (hearing loss, otorrhea, temporal bone fracture)
- Nasal manifestations (epistaxis, CSF rhinorrhea, nasal fracture)
- Throat and other ENT manifestations (facial nerve palsy, vertigo, vestibular symptoms)

Statistical Analysis: For statistical analysis, data were initially entered into a Microsoft Excel spreadsheet and then analysed using SPSS (version 27.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism (version 5). Numerical variables were summarized using means and standard deviations, while Data were entered into Excel and analyzed using SPSS and GraphPad Prism.

Numerical variables were summarized using means and standard deviations, while categorical variables were described with counts and percentages. Two-sample t-tests were used to compare independent groups, while paired t-tests accounted for correlations in paired data. Chi-square tests (including Fisher's exact test for small sample sizes) were used for categorical data comparisons. P-values ≤ 0.05 were considered statistically significant.

Result

Table 1: Demographic Profile of Study Population (N = 100)

Variables	Categories	Frequency (n)	Percentage (%)
Age Group	<20 years	20	20.0
	21–40 years	50	50.0
	41–60 years	22	22.0
	>60 years	8	8.0
Sex	Male	68	68.0
	Female	32	32.0

Table 2: Sex-wise Distribution of ENT Manifestations by Site (N = 100)

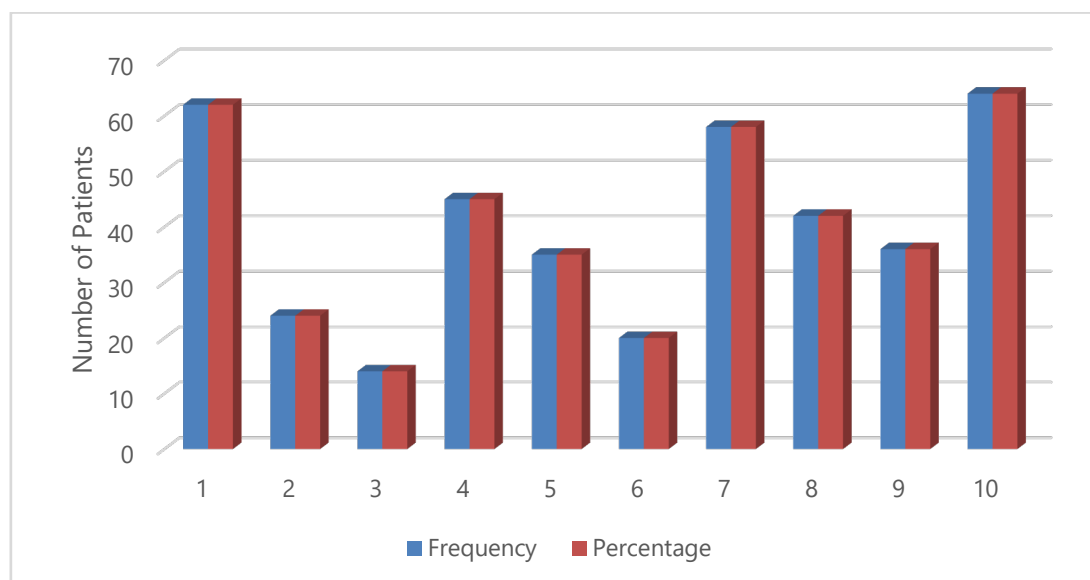
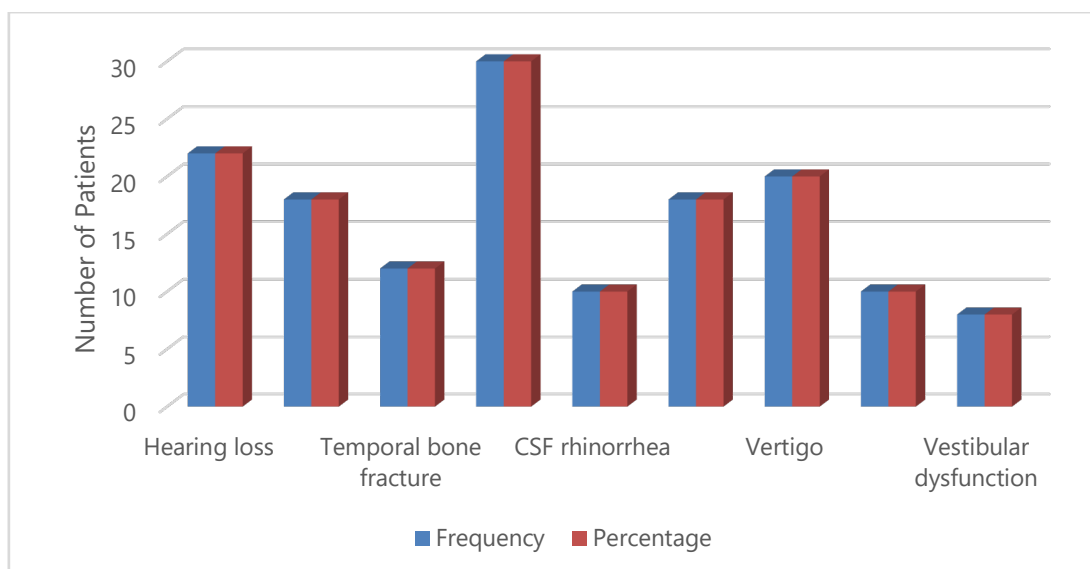
ENT Site	Male n (%)	Female n (%)	p-value
Ear manifestations	32 (47.1)	18 (56.3)	0.290
Nasal manifestations	28 (41.2)	14 (43.8)	
Other ENT findings	20 (29.4)	10 (31.3)	

Table 3: Association of Severity of Head Injury with ENT Manifestations (N = 100)

Severity of Head Injury	ENT Present n (%)	ENT Absent n (%)	Total	p-value
Mild	18 (40.0)	27 (60.0)	45	0.002
Moderate	28 (62.2)	17 (37.8)	45	
Severe	18 (81.8)	4 (18.2)	22	

Table 4: Sex-wise Distribution of ENT Manifestations in Head Injury Patients (N = 100)

ENT Manifestations	Male n (%)	Female n (%)	Total	p-value
Present	40 (58.8)	24 (50.0)	64	0.142
Absent	28 (41.2)	24 (50.0)	36	

**Figure 1: Clinical Profile of Head Injury Patients (N = 100)****Figure 2: ENT Manifestations Distribution (N = 100)**

The study included a total of 100 head injury patients presenting with ENT manifestations at a tertiary care centre. In terms of age distribution, 20 patients (20%) were aged less than 20 years, 50 patients (50%) were in the 21–40 years age group, 22 patients (22%) were in the 41–60 years age group, and 8 patients (8%) were aged above 60

years. Regarding sex distribution, 68 patients (68%) were males and 32 patients (32%) were females, showing a male predominance in the study population. [Table 1] In the present study, 100 head injury patients were analyzed for sex-wise distribution of ENT site involvement. Ear manifestations were observed in 32 male patients

(47.1%) and 18 female patients (56.3%). Nasal manifestations were noted in 28 male patients (41.2%) and 14 female patients (43.8%). Other ENT findings were present in 20 male patients (29.4%) and 10 female patients (31.3%). Although slightly higher proportions of ENT site involvement were observed in females for ear and nasal manifestations, the difference between male and female patients was not statistically significant ($p = 0.290$), indicating no meaningful association between sex and site-specific ENT manifestations in head injury patients. [Table 2] In the present study, a total of 100 head injury patients were analyzed for the association between severity of head injury and ENT manifestations. Among patients with mild head injury, 18 patients (40.0%) had ENT manifestations, while 27 patients (60.0%) did not show any ENT involvement. In the moderate head injury group, 28 patients (62.2%) had ENT manifestations and 17 patients (37.8%) were without ENT involvement. In cases of severe head injury, 18 patients (81.8%) presented with ENT manifestations, whereas only 4 patients (18.2%) had no ENT findings. A statistically significant association was observed between severity of head injury and presence of ENT manifestations ($p = 0.002$), indicating that the frequency of ENT involvement increases with increasing severity of head injury. [Table 3] In the present study, 100 head injury patients were evaluated for the association between sex and ENT manifestations. Among males, 40 patients (58.8%) had ENT manifestations, while 28 patients (41.2%) did not show any ENT involvement. Among females, 24 patients (50.0%) had ENT manifestations and 24 patients (50.0%) had no ENT findings. Although a higher proportion of ENT manifestations was observed in males compared to females, the difference was not statistically significant ($p = 0.142$), indicating that sex was not significantly associated with the occurrence of ENT manifestations in head injury patients. [Table 4] The study included 100 head injury patients presenting with ENT manifestations at a tertiary care centre. Regarding the mode of injury, 62 patients (62%) had road traffic accidents, 24 patients (24%) sustained injury due to fall from height, and 14 patients (14%) were due to assault. In terms of severity of head injury, 45 patients (45%) had mild head injury, 35 patients (35%) had moderate head injury, and 20 patients (20%) had severe head injury. Loss of consciousness was present in 58 patients (58%), while 42 patients (42%) did not have loss of consciousness. Associated facial injury was present in 36 patients (36%), whereas 64 patients (64%) had no associated facial injury. [Figure 1] In the present study of 100 head injury patients with ENT manifestations, epistaxis was the most common finding, observed in 30 patients (30.0%). Hearing

loss was noted in 22 patients (22.0%), while vertigo was present in 20 patients (20.0%). Otorrhea and nasal fracture were each observed in 18 patients (18.0%). Temporal bone fracture was identified in 12 patients (12.0%). CSF rhinorrhea and facial nerve palsy were each seen in 10 patients (10.0%), while vestibular dysfunction was the least common manifestation, noted in 8 patients (8.0%). [Figure 2]

Discussion

In the present study, the majority of head injury patients belonged to the 21–40 years age group, with a clear male predominance. Road traffic accidents were identified as the most common mode of injury. These findings are comparable to those reported by Desai et al. [9], who observed that young adult males constituted the majority of affected patients and that road traffic accidents were the leading cause of head injury. Their study also highlighted the importance of recognizing ENT manifestations early in the course of management. Hearing loss and otorrhea were among the important otological manifestations observed in the present study. Rajan et al. [10] reported similar findings, demonstrating that hearing impairment and otological symptoms are frequently encountered in patients with head trauma. They emphasized the need for thorough otological evaluation to identify traumatic injuries affecting the auditory system. Temporal bone fractures were identified in a notable proportion of patients in our study. Rai et al. [11] found that temporal bone fractures are commonly associated with hearing loss, facial nerve dysfunction, and vestibular symptoms. Their observations support the role of detailed clinical and radiological assessment in detecting temporal bone injuries and their complications. Vertigo and vestibular dysfunction were also observed in the present study. Kong et al. [12] described post-traumatic benign paroxysmal positional vertigo as a common vestibular complication following head injury and emphasized the importance of early diagnosis and appropriate vestibular rehabilitation for improving patient outcomes. The relationship between temporal bone fractures and ENT complications observed in our study is supported by Dahiya et al. [13], who reported that temporal bone fractures can result in a variety of otological and neurological manifestations, with more severe complications occurring in fractures involving the otic capsule. Facial nerve palsy was identified in a subset of patients in the present study. Similar findings were reported by Brodie et al. [14], who demonstrated that facial nerve injury is an important complication of temporal bone trauma and may significantly affect long-term functional outcomes if not managed appropriately. CSF rhinorrhea was another important manifestation observed in our

patients. Yilmazlar et al. [15] reported that cerebrospinal fluid leakage following skull base fractures is a serious complication that increases the risk of intracranial infection and requires prompt diagnosis and treatment. The occurrence of hearing loss, facial nerve palsy, vertigo, and CSF leakage in the present study is further supported by Djalilian et al. [16], who emphasized that temporal bone fractures represent a major source of ENT morbidity following head injury. Their study highlighted the importance of comprehensive evaluation and modern management strategies for minimizing long-term complications.

Conclusion

ENT manifestations are common findings in patients with head injury and are frequently associated with significant craniofacial trauma. In the present study, epistaxis was the most common presentation, followed by hearing loss and vertigo. The occurrence of ENT manifestations increased significantly with the severity of head injury, while no significant association was observed with sex. Road traffic accidents were the leading cause of injury, highlighting the need for preventive measures. Early recognition, prompt ENT evaluation, and multidisciplinary management are essential to reduce complications and improve patient outcomes in head injury cases presenting to a tertiary care centre.

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