Original Article Journal of Brain and Spine Foundation Nepal

Otorhinolaryngological manifestations in Traumatic brain injury in a tertiary care center of western Nepal.

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Received: October 10, 2021 **Accepted:** November 25, 2021 **Published**: December 30, 2021

Cite this paper:
Rai S, Yogi N, Karmacharya BG, Maharjan M, Koirala K. Otorhinolaryngological manifestations in Traumatic brain injury in a tertiary care center of western Nepal. Journal of Brain and Spine Foundation Nepal. 2021:2(2):18-22

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ABSTRACT:
Introduction: Otorhinolaryngological injuries in head injury are something which are very common but yet are overlooked, missed and at times forgotten. In this study, we tried to see the epidemiological characteristics, clinical presentations and management of these associated injuries in cases of head injuries in a tertiary care center in western Nepal. **Methods:** An analytical study was done in all cases of head injury admitted to neurosurgical ward and ICU in between January 2019 to December 2019. Various clinical and epidemiological details were collected from the patient's records obtained from Medical Records Department and charted in a preformed performa. All the continuous data were presented in terms of mean and standard deviation and categorical data in terms of percentage. Statistical analysis was done using SPSS 22.0 software. **Results:** Soft Tissue lacerations were the commonest findings in all head injuries; nose and face lacerations (29.5%), ear lacerations (23.5%) followed by facial bone fractures (19.2%). There were 41(52.6%) cases with mild head injury, 23 (29.5%) cases with moderate head Injury and 17 (17.9%) cases with severe head injury in patients those had associated ENT findings. There was no any statistically significant difference in outcome or hospital stay in between the head injuries with and without ENT manifestations (p=0.187) and (p=0.219) respectively. **Conclusion:** Skull base tumors are treated based on findings of diagnostic nasal endoscopy and imaging results. CT scans and MRIs are becoming more significant in the diagnosis of diseases. Endoscopic techniques to the skull base were beneficial in treating the malignancy. Chemotherapy can be used as a gold standard first-line treatment with radiation and surgery for significant types of head and neck tumors. immunotherapy-like checkpoint inhibitors targeting PD1 are the second-line treatments of advanced HNSCC. Prospective research and trials will be required in the future.
Keywords: Head injury, otorhinolaryngological injuries, cerebrospinal fluid leak

Introduction:

Head injury is one of the leading cause of mortality and morbidity worldwide. Road Traffic Accident (RTA), fall injury, physical assault etc. are the most common factors associated with head injury. It is a source of major disability and huge financial and psychological burden upon society. Failure of adequate and timely managements results into a spectrum ranging from mild contusion to neurological deficit and death.[1] Otorhinolaryngological injuries in head injury are something which are very common but yet are overlooked, missed and at times forgotten.

Soft tissue injuries and fractures of the craniofacial bones are the commonest findings in head injuries. These

fractures are usually associated with cerebrospinal fluid (CSF) leaks mostly rhinorrheas and ottorheas and can be very difficult to manage with many unpleasant consequences like meningitis, cerebral abscess, hearing loss, persistent vertigo, facial nerve paralysis due to entrapment etc.[2-4] Fractures involving the midfacial skeleton may occur with epistaxis and patients at risk of brain injury with or without fractures involving the calvarium. Hemorrhage in the ear canal or behind the tympanic membrane may indicate occult brain injuries, which may be difficult to predict initially. Anosmia is a common feature as a result of severance of the olfactory nerves at the cribriform plate of the ethmoid bone which can be accompanied by CSF rhinorrhea with the risk of developing meningitis.[5,6] Injuries to the neck and face may also lead to airway incompetence requiring urgent tracheostomies. Patient might have dysphagia leading to aspirations and inadequate nutrition. Apart from these, patients might have soft tissue injuries of the ear, nose and face causing cosmetic and aesthetic challenges once the patient is out of danger from traumatic brain injury.

Otorhinolaryngoloists are mostly forgotten partners in management of head injuries, who are usually called upon once the crisis is settled and patient is out of danger. However, for a better outcome of patient both clinically and aesthetically, otorhinolaryngologists should be involved right from the beginning. In this study, we tried to see the epidemiological characteristics, clinical presentations and management of these associated injuries with a view to creating awareness for early recognition and prompt treatment to achieve better management outcomes for patients.

Methods:

An analytical study was done in all cases of head injury admitted to neurosurgical ward and ICU of Manipal Teaching Hospital, a tertiary care teaching hospital in Pokhara in between January 2019 to December 2019. The objective of the study was to assess the incidences of various otorhinolaryngological manifestations in patients with head injury and its epidemiological and clinical characteristics and management patterns. All the patients admitted to the neurosurgical department during the study period were included in the study. Data were collected on various patient's characteristics (age, sex) Trauma characteristics [Glasgow Coma Scale(GCS), associated ENT injuries, mode of injury etc.), ENT manifestations (symptoms, associated injuries etc.] intervention and outcomes. Various clinical and epidemiological details were collected from the patient's records obtained from the departmental computer and Medical Records Department (MRD) of the hospital and charted in a preformed performa. Patients having incomplete data in their records, those with lost files and those who had left against medical advice without completing the proper treatment were excluded from the study.

All the continuous data were presented in terms of mean and standard deviation and categorical data in terms of percentage. Difference in various variables were tested using students' t test (continuous data) and Fischer Exact Test (categorical). Statistical analysis was done using SPSS 22.0 software.

Results:

During the study period, 458 cases of trauma were admitted in Neurosurgery department of Manipal Teaching Hospital, out of which 83 patients were cases of isolated spinal injury without head injury. Thus there were 375 cases of head injury admitted in the department during the study period. Out of these, 66 patients were excluded due to incomplete or lost records or those who left against medical advices. Thus, out of the remaining

309 patients with head injury, 78 patients had associated ENT manifestations.

Table 1 shows various ENT manifestation of patients admitted with head injury during the study period. Soft Tissue lacerations were the commonest findings in all head injuries; nose and face lacerations (29.5%), ear lacerations (23.5%) followed by facial bone fractures (19.2%).

Table 1. ENT manifestations in patient with head injury

S.N	ENT Manifestations	Frequency	Percentage
1	CSF Rhinorrhea	12	15.4
2	CSF Otorrhea	8	10.3
3	EAR Laceration	18	23.1
4	Nose & Face Laceration	23	29.5
5	Neck Laceration/Injury	12	15.4
6	TM Perforation	8	10.3
7	Hemotympanum	7	9
8	Hearing Loss	8	10.3
9	Tinnitus	10	12.8
10	Vertigo	9	11.5
11	Facial Palsy	5	6.4
12	Facial Fracture	15	19.2
13	Frontal Bone Fracture	10	12.8
14	Temporal Bone Fracture	13	16.7

Out of the 78 patients having ENT manifestations, 55 (70.5%) were male and 23 (29.5%) were females with M:F ratio of 2.39. The mean age of the patients was 38.94±15.821 years (Age range 16-78 Years). There were 41(52.6%) cases with mild head injury (GCS 13-15); 23 (29.5% cases with moderate head Injury (GCS 9-12) and 17 (17.9%) cases with severe head injury in patients those had associated ENT findings (Table 2).

Table 2. Grades of Head Injury

S.N	Head Injury Grade	Frequency	Percentage
1.	Mild	41	52.6
2.	Moderate	23	29.5
3.	Severe	14	17.9

Out of these only 22 (28.2%) of the patients were operated for primary brain injury condition. Recovery of the patients was categorized as Glasgow Outcome Scale (GOS) which was further dichotomized into Good Recovery (GR) group and Poor Recovery (PR) group. GR consisted of GOS 1 (Good recovery) and 2 (Moderate disability) whereas PR consisted of GOS 3 (Severe disability), 4 (Persistent vegetative stage) and 5 (Death). Amongst the 78 patient having some ENT manifestations along with head injury, Good Recover (GR) was seen in 70 (89.7%) cases where as Poor Recovery (PR) was seen in 8 (10.3%) of cases.

Table 3 shows various mode of injuries in these cases. Road Traffic accident (37.2%) and Fall from height (32.1%) were the commonest mode of injuries in these cases.

Table 3. Mode of Injury

S.N	Mode of Injury	Frequency	Percentage
1	Fall Injury	25	32.0
2	Road Traffic Injury	29	37.2
3	Assault	18	23.1
4	Others	6	7.7

Table 4 shows the comparison of outcome in between head injury patients with ENT manifestations and without ENT manifestations. There were 70/78 (89.74%) of patients with good recovery in patients having ENT manifestations versus 192/231 (83.12%) of patients with good recovery in patients without ENT manifestations. There was no any statistically significant difference in the outcome in between the two groups (p=0.219). Similarly, there was no any statistical significant difference in between the mean hospital stay of patients with ENT manifestations (30.63±10.52 days) versus those without ENT manifestations (28.37±13.82 days) (p=0.187).

Discussion:

In our series we noted that 78 (25.24%) of patients had some sort of ENT manifestations in cases of head injury ranging from soft tissue lacerations to fractures of craniofacial bones and CSF leaks. Nose and face

lacerations were the commonest findings (23,29.5%) in all head injuries followed by CSF rhinorrhea (20,25.6%), ear lacerations (18,23.1%) and CSF ottorhea (17,21.8%).

Lacerations of ear have been reported as the commonest findings in previous studies as well.[7-9] Potsic explained in his study that ear injuries are common findings in head injuries due to their unprotected position in the head and minor lacerations to severe avulsions are the commonest findings especially in vehicular accidents.[7]

CSF leaks are commonly seen after traumatic brain injury and usually manifest as CSF otorrhea and CSF rhinorrhea. Post traumatic CSF leaks are seen in almost 2-3% of all closed head injuries in adults and almost 80-90% of the causes of CSF leaks in adults are traumatic brain injuries, 12%-30% of skull base fractures, and 25% of facial fractures.[10-12] CSF leaks can be potentially detrimental owing to the fact that the risks of meningitis and infective complications and thus morbidity and mortality increases in comparison to head injuries without CSF leaks. The usual treatment of CSF leaks in head injuries include conservative prophylactic intravenous antibiotics with suspicion or documented CSF leaks to broad spectrum intravenous antibiotics for two weeks if meningitis is documented. Very few cases of CSF leaks which do not resolve itself after conservative treatment require surgery which includes identification of the site of leak with help of various radiological procedures followed by surgical exploration and primary repair of the dura and the cranial base.[13-15] In our series of head injuries with ENT manifestations; 25.6% had CSF rhinorrhea and 21.8% had CSF ottorhea. While all of the CSF ottorheas had spontaneous resolution, only one case of CSF rhinorrhea required surgical correction who underwent an uneventful course of anterior cranial fossa repair.

In our series there were eight (10.3%) of cases with tympanic membrane (TM) perforation which is similar to the series by Jarandikar AA et al (8.3%). All the cases of TM perforation were treated conservatively and had spontaneous healing.16 Pure tone audiometry (PTA) was done in OPD at follow up and most of them had conductive hearing loss. Patient with persistent perforation or with large perforations not undergoing spontaneous resolution, those with persistent vertigo, facial palsy or sensorineural hearing loss should be closely followed up and should undergo surgery. In our series none of the patient required surgery for tympanic membrane perforation.

In our series there were five (6.4%) patients with facial palsy, eight (10.3%) patients with hearing loss, 10 (12.8%) patients with tinnitus and Nine (11.5%) patients with persistent vertigo. All of these patient had spomtaneous resolution. Hearing loss were evaluated in ENT OPD with PTA and almost all of them had conductive hearing loss which had spontaneous resolution. Facial Palsy was reported in 6.6% -10% by other investigators.[16-17] While one patient in the series of Jarandikar AA et al. required facial nerve decompression while Patil S et al. reported spontaneous resolution.[16,17]

In our series, there was no any statistically significant difference in the outcome in Terms of GOS and mean hospital stay in between patients with ENT manifestations and those without ENT manifestations.

Table 4. Comparison of overall outcome in between the two groups

Head Injury Group	Good recovery	Poor recovery	P
With ENT manifestation	70	8	0.219
Without ENT manifestation	192	39	

Conclusion:

ENT injuries are commonly associated in cases of head injuries. Soft tissue injuries of nose, face and ear are the commonest findings followed by CSF rhinorrheas and otorrheas. In our series, ENT injuries did not have significant impact in overall outcome of head injuries and hospital stay of the patients.

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