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Ear manifestations in head and neck injury

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ABSTRACT

Background: This study was done to study different types of trauma to the ear that occur in head and neck injury and methods which help in early diagnosis of such trauma to the ear.
Methods: Data for the study were collected from patients who presented with ear, nose and throat manifestations in head and neck injury in the Department of Otorhinolaryngology at J. J. M. Medical College and Hospital, Davangere between November 2012 to October 2014. This is a prospective case study. 50 patients were included in the study. Once patient was presented to us detailed history and examination was done. Investigations were done wherever necessary.
Results: The incidence of head injuries is increasing in vehicular accidents (58%) due to increased use of vehicles, improper traffic control systems and increase in population. Males outnumbered the females. Males constituted 84%. Majority of the patients come under the age group of 21-40 constituting 60%. In the 50 cases, ear manifestations were seen in 22% patients.
Conclusions: Microscopic examination and microsurgical techniques in the field of ENT have revolutionized the treatment methods of sequelae following head injury.

Keywords: Head injury, ENT Manifestations, Neck injury

INTRODUCTION

Head injuries have existed since the time man appeared on this earth. They constitute a tragic problem equally in under-developed, developed and developing countries. The incidence is even increasing due to vehicles used by enormous population, busy roads, inadequate traffic control system, industrialization, etc. In civil life most of the cases are due to direct violence resulting from assault, industrial accidents and vehicular accidents. The injuries to the ear, nose, throat in head and neck injuries need special attention by the ENT surgeon, in addition to the usual treatment by the general surgery/ neuro-surgery.[1] Hence, to draw special attention to these injuries this study has been undertaken.

Motor vehicle accidents remain the single largest cause for head injury and neck injury in this country. Assaults and industrial accidents also play significant role.[2]

The management of cranio-maxillofacial injuries has evolved significant change in the past two decades with advent of newer endoscopic surgeries, CT scanning, MRI. The newer techniques allow high resolution to allow dependable and accurate assessment of injuries. Micro-plates and even absorbable plates have been advocated for repair of mid and upper facial as well as cranial fractures and osteotomies. Advances in implant technology particularly the wide use of titanium mesh, plates and screws have led to better management.[3]

The commonest ear, nose, throat findings following head and neck injury are: injury to auricle, injury to EAC – bony and cartilaginous and its stenosis, temporal bone fractures –longitudinal and transverse, traumatic perforations of tympanic membrane, ossicular dislocations, CSF –otorrhea, deafness –conductive/sensorineural, perilymph fistula, post traumatic cholesteatoma, CSF – rhinorrhea, fractures of nasal bones, fractures of facial

skeleton, blow out fractures, hyoid bone fractures, injury to laryngeal cartilages, cut throat injuries.

Even with much improved and expensive institutionalized treatment, a good number of patients die and few of them survive with severe disability and continue to be in vegetative state.[4] Persistent methods for better methods of treatment have led to various methods of treatment regimens. Microscopic and microsurgical techniques in the field of ENT have revolutionized the treatment methods of sequelae following head and neck injuries.

The present study aims at studying the various ear manifestations following head and neck injury.

METHODS

Data for the study were collected from patients who presented with ear, nose and throat manifestations in head and neck injury in the Department of Otorhino-laryngology at J. J. M. Medical College and Hospital, Davangere between November 2012 to October 2014

Selection criteria

Inclusion criteria were patients of both sexes in all age group with head injury and trauma to ear, nose and throat. Exclusion criteria patients with serious systemic diseases will be excluded.

Once the patient presents to us, a detailed history and examination findings are recorded in specifically constructed proforma. Detailed history of patient is taken. Local examination including detailed examination of ear, nose, throat, head and neck was done.

***Blood investigations*:** Haemoglobin, Total count, Differential count, Erythrocyte sedimentation rate, bleeding time, clotting time.

X-ray examinations: Skull bone -anteroposterior and lateral view, temporal bones- Towne's view, PNS-Waters's view AP and lateral view, nasal bones, pure tone audiometry.

CT scan (wherever necessary) plain and contrast studies of skull can detect leak in CSF otorrhoea. Culture and sensitivity of ear discharge to detect the offending organisms when traumatized ear gets infected.

RESULTS

50 cases were taken for this study. Only those cases of head and neck injuries, which had ear, nose and throat manifestations, were selected.

Males outnumbered the females. Males constituted 84%. Majority of the patients come under the age group of 21-40 constituting 60%. Males are known to use more vehicles and also known to be involved in violent activities compare to females so are more prone to accidents and injuries.

Table 1: Age and sex distribution.

Age (in years)	Male	Female	Total	Percentage
0-20	09	03	12	24.00
21-40	28	02	30	60.00
41-60	05	03	08	16.00
61-80	00	00	00	00.00
81-100	00	00	00	00.00
Total	42	08	50	100.00

Table 2: Nature of injury.

Nature of injury	Male	Female	Total	Percentage
Vehicle	26	03	29	58.00
Fall	11	02	13	26.00
Assault	05	03	08	16.00
Total	42	08	50	100.00

Vehicular accidents were the most common mode of injury. This contributed 58% of cases.

History of vomiting was complained by majority of patients (40%). The commonest otological symptom following head injury was bleeding from the ear which constituted (30%) and deafness (30%). Giddiness was complained by 14% of the patients.

Table 3: Incidence of ear symptoms following head injury.

Symptoms	Right	Left	Both	Total	Percentage
Bleeding from ear	06	08	01	15	30.00
Discharge from ear	02	00	00	02	04.00
Deafness	08	07	00	15	30.00
Tinnitus	01	03	00	04	08.00
Giddiness	00	00	00	07	14.00
Deviation of angle of mouth	01	01	00	02	04.00
Vomiting	00	00	00	20	40.00
Headache	00	00	00	05	10.00

Table 4: Ear manifestations following head and neck injury.

Ear manifestations	Right	Left	Both	Total	Percentage (WRT only ear manifestations following head injury 20 cases)	(WRT ENT manifestations following head and neck injury 50 cases)
Injury to pinna	05	07	00	12	60.00	24.00
Injury to EAC	05	06	00	11	55.00	22.00
TM perforation	03	04	00	07	35.00	14.00
C.S.F otorrohoea	02	00	00	02	10.00	04.00
Facial nerve paralysis	01	01	00	02	10.00	04.00
Haemotympanum	02	05	00	07	35.00	14.00
Temporal bone fracture	08	02	00	10	50.00	20.00

Table 5: Deafness following head injury.

Type of deafness	Right	Left	Both	Total	Percentage
Conductive deafness	04	05	00	09	18.00
Sensorineural deafness	02	01	00	03	06.00

Injury to pinna was the most common otological manifestation following head injury constituting about 60% of ear manifestations, and 24% of all manifestations of ENT following head and neck injury. Temporal bone fracture was noticed in 10 cases constituting 50% of ear manifestations and 20% of all manifestations of ENT following head and neck injury. Heamotymapnum was observed in 07 cases constituting 35% of ear manifestations and CSF otorrhea and facial nerve paralysis in 10% cases of ear manifestations.

Incidence of conductive hearing loss was noticed in 09 cases. Average hearing loss noticed was in the range of 15-25 dB. Only one case showed 45 dB A-B gap where ossicular dislocation was suspected. Senorineural hearing loss was noticed in 3 cases, out of which 2 patients had transverse temporal bone fracture.

DISCUSSION

In the study by Potstic, explained that external ear trauma occurs frequently in all age groups because the auricle has an unprotected position on the head and it is more in vehicular accidents.[5]

Templer et al, in their study reported that ear injuries occur in people of all the ages but are predominate in vehicular riders. Forces of moderate intensity cause lacerations or even amputation of pinna.[6]

As per Sharma et al, was observed that accidental trauma to auricle may result in partial or complete loss of auricle, and requires prompt care and treatment as it carries risk of perichondritis.[7]

In our present study, it was found that injury to pinna in 12 (24%) cases and bleeding from the ear in 15 (30%) cases. Injury to pinna was in the form of lacerations, partial or complete loss which was treated by suturing under strict aseptic precautions.

In the study of Ghorayeb et al, out of 2899 blunt head injury cases clinically reported that Battle's sign in 10.6%. Jones et al reported 3 (11.11%) patients with Battle's sign clinically out of 27 patients of head injury.[8] In our present study, it was found that 6 (12%) cases of Battle's sign, out of 50 cases studied. Our observations more or less matches with observation made by above authors.

In the study of Backous et al, observed the external auditory canal was injured in 50% cases of head injury with ear manifestations. The damage occurred directly or indirectly by prolapse of TMJ in to EAC.[9] Steele et al, reported that 14 % had blood in the external auditory canal due to head injury in survey of 111 patients with accidental or internal ear injuries.[10] In our present study, it was found that, out of 20 cases with ear manifestations in head injury observed external auditory canal injury in 11 (55%) cases or 22% of 50 cases of ENT manifestations following head and neck injury. Our observation more or less matches with observations made by above authors.

In the studies done by Cannan et al, this condition occurring in combination with temporal bone fracture in 22% of cases.[11] Jones et al, revealed 11 (40%) patients with haemotympanum out of 27 patients.[8] In our present study, it is observed that 7 cases (35%) of haemo-tympanum occurred in 20 cases with ear manifestations among the 50 cases studied for of ENT manifestations following head and neck injury. The findings of present study are more or less comparable with observations made by above authors.

Traumatic perforation of tympanic membrane was clinically studies by Kuroda, in 123 ears due to head injury. They observed in 43.72% cases of traumatic perforation of tympanic membrane.[12] In the present study, of 20 cases with ear manifestations among the 50 cases studied for of ENT manifestations following head and neck injury, there were 7 (35%) cases with tympanic membrane perforation, 4 of which were associated with temporal bone fractures.

In the study of 1,185 patients suffering from head injury conducted by Raff et al showed 79 (6.7%) patients had CSF otorrhoea and drainage stopped spontaneously in 61 patients and the patient's recovered. [13] House et al, reported CSF leak in approximately 6% of skull base structures in head injury.[14] In present study, of 20 cases with ear manifestations, 2 cases i.e., 10% cases of CSF otorrhoea due to head injury. These cases were treated conservatively. The findings of present study are more or less comparable with observations made by above authors.

In the study of 1,300 head injury patients by Cannon et al, observed 118 cases were found to have skull fractures of which 25% involved the temporal bone fractures. Most common cause was vehicular accident 44%.[11]

According to Backous et al study showed that 80% of the temporal bone fractures are longitudinal caused by trauma to lateral part of head and 10-20% of temporal bone fractures due to head injury over occipito-frontal region.[9] In the present study, observed 10(20%) cases of temporal bone fractures in head injury. In this 8 (80%) longitudinal fractures and 2 (20%) transverse fractures were noticed.

In the study of 123 cases of temporal bone fracture in head injury conducted by Ghorayeb et al, observed in 10.50% pateints had delayed facial nerve paralysis and these patients recovered spontaneously.[15] In the study of 500 cases of head injury conducted by Chopra et al, showed 48 cases were found to have facial nerve paralysis due to head injury in vehicular accident. Based on history 13 (27.1%) had immediate onset and 21(43.7%) had delayed onset. In our present study, out of 20 cases with ear manifestations following head injury among the 50 cases studied for of ENT manifestations following head and neck injury, there were 2 cases i.e., 10% patients had facial nerve injury. Which were treated with steroids and spontaneous recovery was observed. The percentage of facial nerve paralysis associated with ear manifestations in head injury is almost correlated with studies done by above author.

In the study of 123 temporal bone fractures out of 2,888 blunt head injuries conducted by Ghorayeb et al, observed 33.33% of the patients had conductive hearing loss and 17% had sensorineural hearing loss.[15] As per Tic et al, observed hearing loss in 48% of temporal bone fracture due to head injury.[16] In the present study, out of 20 cases with ear manifestations following head injury, 9 cases i.e., 45% cases of conductive hearing loss and in 3 cases i.e., 15% sensorineural hearing loss. Average loss was in the average range of 15-25 dB. Only one case showed 45 dB A-B gap, where ossicular dislocation was suspected which was corrected by ossicular reconstruction. 3 cases of sensorineural hearing loss were associated with transverse temporal bone fractures which were managed conservatively.

CONCLUSION

Injury to pinna was the most common otological manifestation following head injury constituting about 60% of ear manifestations, and 24% of all manifestations of ENT following head and neck injury. Temporal bone fracture was noticed in 10 cases constituting 50% of ear manifestations and 20% of all manifestations of ENT following head and neck injury. Heamotymapnum was observed in 07 cases constituting 35% of ear manifestations and CSF otorrhoea and facial nerve paralysis in 10% cases of ear manifestations. Incidence of conductive hearing loss was noticed in 09 cases. Average hearing loss noticed was in the range of 15-25 dB. Only one case showed 45 dB A-B gap where ossicular dislocation was suspected. Sensorineural hearing loss was noticed in 3 cases, out of which 2 patients had transverse temporal bone fracture.

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