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Original research article

A STUDY ON VARIOUS ETIOLOGY AND SEQUELAE WITH RESPECT TO OTOLOGICAL INJURY FOLLOWING HEAD TRAUMA

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Abstract

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 ever increasing due to vehicles used by enormous population, busy roads, inadequate traffic control system, industrialization, etc. Motor Vehicle accidents commonly result in head trauma of varying degrees of severity. A written informed consent was taken from all the patients included in this study. A detailed history, thorough clinical examination and relevant investigations was done for these patients. The data collected was entered into a specially designed case record proforma. Incidence of conductive hearing loss was noticed in 20(40%) cases. Average hearing loss noticed was in the range of 15-25 dB. Only two cases showed 45 dB A-B gap where ossicular dislocation was suspected. Sensorineural hearing loss was noticed in 10(20%) cases, out of which 2 patients had transverse temporal bone fracture. Out of 50 patients, 5 were found to have facial nerve palsy. Facial Nerve palsy was seen in 4 cases (100%) of oblique fracture and 1 case of transverse fracture (100%).However no cases of longitudinal fracture developed facial nerve palsy.

Keywords: Head injuries, Sensorineural hearing loss, Facial Nerve palsy

Introduction

Injuries and Violence are one of the most common causes of death and disability worldwide. Road traffic injuries are the 10th leading cause of death and the 9th leading cause of the burden of disease; self-inflicted injuries, falls, and interpersonal violence follow closely [1]. 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 ever increasing due to vehicles used by enormous population, busy roads, inadequate traffic control system, industrialization, etc. Motor Vehicle accidents commonly result in head trauma of varying degrees of severity. In addition, the increasing rates of violence have led to increased rates of head injury resulting from assault [2].

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In addition, a substantial number of these injuries to the otorhinolaryngological structures in head injuries may be missed and need special attention by the ENT surgeon, in addition to the usual treatment by the general surgery/ neurosurgery [3].
Hence, to draw special attention to these injuries this study has been undertaken. The spectrum of injuries following head injury are: injury to auricle, external auditory canal, temporal bone fractures, traumatic perforation of tympanic membrane, CSF otorrhoea, hearing loss [4].
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. Persistent research for better methods of treatment has led to various types of treatment regimens. Microscopic and microsurgical techniques in the field of ENT have revolutionized the treatment methods of sequelae following head injuries.

Methodology

Source of data

The Patients attending the department of otorhinolaryngology outpatient department and emergency department, and also patients referred from other Departments.

Method of collection of data

A written informed consent was taken from all the patients included in this study. A detailed history, thorough clinical examination and relevant investigations was done for these patients. The data collected was entered into a specially designed case record proforma.

Duration of study: The study was conducted for a period of 1 year.

Design of study: A prospective Study.

Sampling Technique

50 patients selected on Purposive non probability sampling technique with head injury with ear manifestations, attending to E.N.T. outpatient department, Emergency department, and patients referred from other departments over a period of 1 year.

Inclusion Criteria

- Patients of both sexes with head injury and trauma to ear.
- Patients > 5 years of age.
- Patients having a clear history and evidence of ear manifestations following head injury.

Exclusion Criteria

- Comatose patients.
- Patients with severe systemic disease.

Evaluation of patients

Detailed history of patient is taken

1. Local examination including detailed examination of ear, nose and throat and head

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and neck.

2. BLOOD: Haemoglobin, Total count, Differential count, Erythrocyte sedimentation rate, bleeding time, clotting time.
3. Pure Tone Audiometry.
4. C-T scan (wherever necessary) plain and contrast studies of skull can detect leak in CSF otorrhoea.
5. Culture and sensitivity of ear discharge to detect the offending organisms when traumatized ear gets infected.

Results

Table 1: Cause of Injury

Cause of Injury	Male	Female	Total	Percentage
MVA	36	3	39	78%
Fall	5	0	5	10%
Assault	5	1	6	12%
Total	46	4	50	100%

Motor Vehicle Accidents (MVA) were the most common form of injury and accounted for 78% of all the cases of head injury with otological manifestations followed by assaults (12%) and then falls (10%).

Table 2: Deafness following head injury

Type Of Deafness	Right	Left	Both	Total	Percentage
Conductive	12	8	0	20	40%
Sensorineural	6	4	0	10	20%

Incidence of conductive hearing loss was noticed in 20(40%) cases. Average hearing loss noticed was in the range of 15-25 dB. Only two cases showed 45 dB A-B gap where ossicular dislocation was suspected. Sensorineural hearing loss was noticed in 10(20%) cases, out of which 2 patients had transverse temporal bone fracture.

Table 3: Temporal Bone Fracture following Head Injury

	Longitudinal	Transverse	Oblique	Total
Right	6	1	2	9
Left	2	0	2	4
Total	8	1	4	13
Percentage (%)	61.53	7.69	30.76	

13 patients showed temporal bone fracture. Longitudinal Fracture was most common

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and seen in 8 patients (61.33%) followed by oblique fracture seen in 4 patients (30.76%).Transverse fracture was seen in only 1 patient (7.69%).

Table 4: Relation between temporal bone fracture and Facial Nerve Palsy

Type of Fracture	Total Cases of Temporal bone fracture	Total Cases of Facial Nerve Palsy	Percentage (%)
Longitudinal Fracture	8	0	0
Transverse Fracture	1	1	100
Oblique Fracture	4	4	100

Out of 50 patients, 5 were found to have facial nerve palsy. Facial Nerve palsy was seen in 4 cases (100%) of oblique fracture and 1 case of transverse fracture (100%).However no cases of longitudinal fracture developed facial nerve palsy.

Discussion

In the study of 1,300 head injury patients by Cannon CR, Jahrsdoerfer RA (1983) observed 118 cases were found to have skull fractures of which 25% involved the temporal bone fractures. Most common cause was vehicular accident 44% [5].

According to Douglas D. Backous, Llyod B. Minor and John K. Nidarko, (1996) 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 [6].

In a study by Tae Kyu Kang, Ryun Ha, Jae Hwan Oh, Woongsang Sunwoo,according to the traditional classification system, 9 (18.8%) had transverse fractures, 18 (37.5%) had longitudinal fractures, and 21 (43.8%) had oblique fractures among TBFs with single fracture component [7].

According to the traditional classification system, 9 (18.8%) had transverse fractures, 18 (37.5%) had longitudinal fractures, and 21 (43.8%) had oblique fractures among TBFs with single fracture component.

As per study by Dal Secchi *et al*, longitudinal fractures were seen in 18 patients (64%) and transverse fractures were seen in 2 patients (7%) out of 28 patients who were subjected to CT [8].

In a study by Gudigenhally Madaiah Puttamadaiah, Deepthi P, Viswanatha Borlingegowda among the various spectrum of trauma, temporal bone fractures were the most common finding on otologic evaluation seen in 19 of the 55 patients.13 cases had longitudinal fracture and 6 cases had transverse fracture [9].

In the present study, 13(26%) cases of temporal bone fractures due to head injury were observed. In this 8(61.5%) longitudinal fractures, 1(7.6%) transverse fractures and 4(30.7%) were noticed.

In the study of 123 cases of temporal bone fracture in head injury conducted by Ghorayeb BY, Rafie JJ (1989), observed in 10.50% patients had delayed facial nerve

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paralysis and these patients recovered spontaneously [10].

In the study of 500 cases of head injury conducted by Hemant Chopra, A.S. Khurana, M. Manjal, Vanita Chopra, Anju Mehndiratta, M.K. Sobti (2002) showed 48 cases were found to have facial nerve paralysis due to head injury in vehicular accident [11].

In our present study, out of 50 cases with ear manifestations following head injury among, there were 5 cases i.e., 10% patients had facial nerve injury which were treated with steroids and spontaneous recovery was observed. One patient underwent facial nerve decompression

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 BY, Rafie JJ (1989), observed 33.33% of the patients had conductive hearing loss and 17% had sensorineural hearing loss [10].

As per Chen J Tic, Yang C. Liuz (2001), observed hearing loss in 48% of temporal bone fracture due to head injury [12].

As per Siddaram Patil,Girish P.B.(2017) hearing loss was observed in 9 out of 50 cases with ear manifestations in head injury [13, 14].

In the present study, out of 50 cases with ear manifestations following head injury, 20 cases i.e., 40% cases of conductive hearing loss and in 10 cases i.e., 20% developed sensorineural hearing loss.

Average loss was in the average range of 15-25dB. Only 2 cases showed 45dB A-B gap, where ossicular dislocation was suspected. 1 case of sensorineural hearing loss were associated with 1 case of transverse temporal bone fractures which were managed conservatively.3(75%) out of the 4 cases of oblique temporal bone fracture developed sensorineural hearing loss.

Conclusion

- Temporal bone fracture was noticed in 13 cases constituting 26% of ear manifestations following head and neck injury
- Hemotympanum was observed in 08 cases constituting 16% of ear manifestations and Facial nerve paralysis was seen in 5 cases constituting 10% cases of ear manifestations.
- Incidence of conductive hearing loss was noticed in 20 cases. Average hearing loss noticed was in the range of 15-25 dB. Only 2 cases showed 45 dB A-B gap where ossicular dislocation was suspected. Sensorineural hearing loss was noticed in 10 cases

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