

TEMPORAL BONE FRACTURES IN PATIENTS WITH HEAD INJURY: A RETROSPECTIVE ONE YEAR STUDY

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ABSTRACT

INTRODUCTION: Head trauma is a common injury to which all of us are susceptible because of high speed travel. Skull fracture affects 23-66% of patients with head trauma and approximately 4-30% of head injuries involve fracture of cranial base, including 18-75% of temporal bone.^{1,2} **MATERIALS AND METHODS:** This is a retrospective one year review of 585 cases of head injury treated in Patel Hospital's Emergency Department and sent to the Radiology Department for CT Scan of Head from September 2014 to August 2015. The study was done to evaluate the incidence and types of temporal bone fractures associated with head injury and to analyze these fractures by age, gender distribution, cause of injury, clinical presentation, site of involvement and outcome. **RESULTS:** Out of 585 patients, 71 patients were diagnosed to have temporal bone fracture. The incidence in this study was 12.1%. Majority of the patients were male 87.32% and were between 30-40 years of age 50.7%. The major cause of injury was found to be Motor vehicle accidents (MVA) 84.5%. The right side was involved more than the left side 63.38% of the cases. Most of the patients clinically present with otorrhea 53.52%. and the next common presentations were otalgia and otorhinorrhea 14.08%. Longitudinal type of fracture was most frequent accounts for about 63.38% of the cases. The most commonly involved part was petromastoid portion of the temporal bone 81.69%. 21.12% patients died due to severe traumatic brain injury associated with temporal bone fractures. **CONCLUSION:** The temporal bone fracture is frequently associated with severe traumatic brain injury leading to serious long term morbidity and sequelae. These injuries are frequently overlooked while treating more life threatening injuries in emergency departments. Computerized tomography of high resolution in temporal bones is helpful in early detection of the fracture and its extensions.

Introduction

Head trauma is a common injury to which all of us are susceptible because of high speed travel. Skull fracture affects 23-66% of patients with head trauma and approximately 4-30% of head injuries involve fracture of cranial base, including 18-75% of temporal bone.^{1,2} Temporal bone fracture may result in potentially serious injuries as the facial nerve, middle ear, inner ear and intracranial contents are at risk. Immediate and long term sequelae can be devastating. How-

ever, temporal bone fracture also may be undetected as patient may sometimes be asymptomatic or do not report their symptoms to the attending doctor.

Materials and Methods

A one year retrospective review of cases of head injury was performed which were treated in Patel Hospital's Emergency Department and sent to the Radiology Department for CT Scan of Head from September 2014 to August 2015. The medical records

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and CT scan reports of all the patients were reviewed. The study was done to evaluate the incidence and types of temporal bone fractures associated with head injury and to analyse these fractures by age, gender distribution, cause of injury, clinical presentation, site of involvement and outcome. The collected data were then analyzed and compared with the literature series.

Results

A total of 585 patients were evaluated. Out of these, 71 patients were diagnosed to have temporal bone fracture. The incidence in this study was 12.1%. Majority of the patients were male 87.32% and were between 30-40 years of age 50.7%. The major cause of injury was found to be Motor vehicle accidents (MVA) 84.5%. The right side was involved more than the left side 63.38% of the cases. Most of the patients clinically present with otorrhea 53.52% and the next common presentations were otalgia and otorhinorrhea 14.08%. Longitudinal type of fracture was most frequent accounts for about 63.38% of the cases. The most commonly involved part was petromastoid portion of the temporal bone 81.69%. 21.12% patients died due to severe traumatic brain injury associated with temporal bone fractures.

Discussion

Temporal bone fractures occur from high energy mechanisms, particularly as a result of side impacts, typically but not limited to motor vehicle accidents. Out of 585 cases of head injury, 71(12.1%) were radiologically diagnosed to have temporal bone fracture. A study by University of Massachusetts from 1995 to 1997 revealed that out of 2977 patients with closed head injury, only 3% (90) sustained temporal bone fracture.^{7,3} The percentage in this study was higher compared to their study, most probably due to the higher incidence and severity of MVA we have in our country.

The literature, risk factors for and causes of temporal bone fractures are: younger age, male gender and

motor vehicle accidents.^{4,5,6,7} Similarly, in this series, traffic accidents were the primary mechanism of the injury, with a 84.5%. (Tab. 1) This study showed that 87.32% of the cases were male and 50.7% were between 31-40 years of age group. This result may

Cause of Head Injury	n	%
MVA	60	84.51%
Fall from height	5	7.04%
Blast injury	2	2.82%
Assault	1	1.41%
Occupational injury	2	2.82%
Sports injury	1	1.41%

Table 1: Causes of injury

be related to the fact that young males are greater participants in traffic and industrial business. Right side was involved in 63.38% of the cases. Findings seem to agree with Ishman et al.⁴ and Dahiya et al.³ in terms of gender distribution and site involvement of temporal bone fracture. Their studies, like this study, found that majority of their patients were male and the distribution of fractures was slightly more on the right side. (Tab. 2)

DEMOGRAPHICS		
GENDER	n	%
Male	62	87.32%
Female	9	12.67%
AGE		
0-10	1	1.40%
11-20	5	7.04%
21-30	20	28.16%
31-40	36	50.70%
41-50	5	7.04%
51-60	4	5.60%
SIDE INVOLVEMENT		
Right	45	63.38%
Left	26	36.61%

Table 2: Demographic profile

The commonest otorhinolaryngological clinical presentations reported were blood otorrhea (53.52%) followed by otorrhinorea and otalgia 14.08% respec-

tively. A research conducted Bygokhan Yalciner et al.,⁸ the most common otolaryngological findings were conductive hearing loss (CHL) in (64.9%), followed by blood otorrhea (62.1%), hemotympanum (58.5%), and tympanic membrane perforation (25.6%). (Tab. 3)

CLINICAL PRESENTATION	
Otalgia	14.08%
Otorrhea	53.52%
Otorrhinorhea	14.08%
CSF rhinorrhea	11.26%
Hearing loss	4.22%
Facial Palsy	2.81%

Table 3: Clinical presentation

Out of all 71 cases reported, 46 (75.4%) were involving petromastoid part of temporal bone. Here in this study petrous temporal bone fractures were divided into four subcategories; 31 longitudinal (67.4% of the case), 4 transverse (8.7%), 5 oblique (10.9%), and 6 mixed or comminuted (13%). (Tab. 4) The pattern of distribution of petrous temporal bone fracture found in this study is almost similar to other studies done, in which the longitudinal fracture predominates, though the percentage is different.^{3,4,9,10}

TYPE OF FRACTURES		
Longitudinal	45	63.38%
Transverse	19	26.76%
Oblique	2	2.81%
Comminuted	5	7.04%
LOCATION OF FRACTURES		
Squamous	10	14.08%
Tympanic	1	1.40%
Styloid	2	2.81%
Petromastoid	58	81.69%

Table 4: Classification of temporal bone fracture

Facial paralysis was seen in only 2.8% of the cases. In the literature, facial nerve paralysis rates were reported as 10%-25% for longitudinal fractures and 38%-50% for transverse fractures.² Longitudinal temporal bone fracture is the one most commonly associated with CSF leakage.^{11,12} This is in correla-

tion with the findings of this study, in which all cases of CSF leak are found in longitudinal petrous temporal bone fracture.

There is not much to be discussed regarding morbidity outcome of these patients. This is because most of these patients are still under follow-up at the point of this study. However, 21.12% of the patients died due to severe traumatic brain injuries associated with temporal brain fractures like subdural or epidural hematoma/ empyema, intraparenchymal hemorrhage, cerebral contusions, diffuse axonal injury and meningitis. To properly study the morbidity outcome from temporal bone fracture a long term survey needs to be done.

Conclusion

The temporal bone fracture is frequently associated with severe traumatic brain injury leading to serious long term morbidity and sequel. These injuries are frequently overlooked while treating more life threatening injuries in emergency departments. Computerized tomography of high resolution in temporal bones is helpful in early detection of the fracture and its extensions.

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