
TO DETERMINE THE FREQUENCY OF DURAL TEAR IN PATIENTS PRESENTING WITH DEPRESSED SKULL FRACTURE: AN EXPERIENCE OF 96 CASES IN A TERTIARY CARE HOSPITAL

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ABSTRACT

OBJECTIVE

The objective of this study was to determine the frequency of dural tear in patients with depressed skull fractures.

MATERIAL and Method

This cross-sectional study was conducted in department of Neurosurgery Pakistan institute of Medical Sciences Islamabad from January 2010 to December 2011. All patients of either gender with depressed skull fracture above one year of age were included in the study. CT brain with bone window done in all patients. Per-operative dura in the region of depressed skull fracture was closely observed for any dural tear. The data collected on pre designed proforma. and analyzed using SPSS version 20.0

RESULTS

A total of 96 patients were recruited in the study out of which 58(60.4%) were male and 38(39.5%) were female. Male to female ratio was 1.5:1. And mean age was 19.23 ± 2.54 years. The most common location of depressed skull fracture was parietal 37(38.5%), followed by frontal in 27(28.1%), 15(15.6%) in temporal region, 13(13.5%) in occipital region and only 4(4.1%) located in posterior fossa. Dural tear was present in 33(34.3%) while in 63(65.6%) it was absent. Other finding associated with depressed skull fracture per operatively were extradural hematoma in 16(16%), subdural hematoma in 11(11.4%), contusion in 16(16.6%) and pneumoencephalus was observed in 20(20.8%) cases.

CONCLUSION

The frequency of dural tear in DFS is quite high, so one should be vigilant to identify the defect and repair it properly to minimize post operative complications.

Key WORDS

Depressed skull fracture, Dural tear, Frequency, Head trauma, Contusion.

INTRODUCTION

Traumatic brain injury (TBI) is an acquired insult to the scalp, skull and intracranial content which may be accompanied by loss or alteration in sensorium, it is a leading cause of death and severe disability in young population world wide^{1,2}. In United States, more than 2 million sustained TBI annually, of which almost 15% have temporary or permanent neurological deficit. In addition it poses a great impact on economic losses and in one series estimated loss of 30 billion dollars in developed countries are reported³.

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A skull fracture can be classified in to linear, depressed and comminuted⁴. Depressed fracture is one where in the fracture fragment is displaced inward at a distance equal or greater than the thickness of skull bone.^{5,6,7}. Patient with depressed skull fracture (DFS) can present with sign and symptoms of raised intracranial pressure like headache, vomiting, papilledema. It can also present with decrease level of consciousness, seizure, and cerebrospinal fluid leak or in some cases oozing of brain matter through wound. Plain x-ray skull will clearly show the type, location and degree of depression. CT scan is the gold standard as it not only demonstrate the

depressed fracture but also show intracranial lesion^{8,9}. Depending upon the status of underlying skin DFS can be divided into closed or open. In closed depressed skull fracture (DFS), the skin is intact and is usually treated conservatively until there is significant cosmetic deformity, underlying hematoma or venous sinus injury¹⁰. On the other hand open DFS in which the skin is breached are surgical candidates because of increased risk of infection due to contamination¹¹.

Surgical treatment includes elevation of depressed fragment, evacuation of hematoma, wound debridement and repair of dura and dural venous sinuses. DFS should be treated properly and timely to prevent complications such as infection, seizures, progression of neurological deficit, and post traumatic Hydrocephalus.¹² DFS are often associated with dural tear which significantly increases the risk of infection, seizure and neurological deficit. The incidence of dural tear in depressed skull fracture varies and reported to be 25% and 65% in different studies¹³. To view the integrity of dura is paramount importance as foreign debris and brain matter may be present in the wound which need proper debridement and water tight closure of dura either with fascia lata graft or pericranium to prevent complications like cerebral abscess, meningitis and pseudomeningocele formation¹⁴. The main objective of our study is to determine the frequency of dural tear in patient with depressed skull fracture. Our study will provide a data which will be shared with other Neurosurgeons to make suggestions regarding the management plan of depressed skull fracture.

MATERIAL AND METHODS

This descriptive (cross sectional) study was done at Neurosurgery Department of Pakistan Institute of Medical Sciences Islamabad, from 1st January 2010 to 31st December 2011. Sample size was 96 and sampling technique was consecutive (non probability) sampling. All patients of either gender with depressed skull fracture admitted via outpatient department or Emergency department were included in the study, while children below one year of age and those presenting 2 weeks after trauma were excluded.

The study was conducted after approval from hospital ethical and research committee. Patient fulfilling the inclusion criteria were included in the study. Informed consent was taken from all the patients. After detailed history and clinical examination patients were sent to radiological investigation including X-ray skull (anterio-posterior, lateral view) and CT scan brain with bone window. Skull was said to be depressed when the fracture fragment is displaced inward at a distance equal or greater than the thickness of skull bone diagnoses on CT brain. Per operatively dura was closely observed for any tear and repair was done either with fascia lata graft or pericranium. The data were collected on predesigned proforma. Data was analyzed using SPSS version 20.0 and presented in form of tables.

RESULTS

Out of 96 patients 58(60.4%) were male and 38(39.5%) were female. Male to female ratio was 1.5:1. In our study the age of patient ranged from 1 to 50 years with mean age 19.23 ± 2.54 years. The incidence of dural tear was 21(21.8%) in males and 12(12.5%) in females as shown in table no. I

The patients were divided into five groups for the distribution of age. Out of 96 patients 44(45.8%) were in age range of 0-10 years, 25(26%) were in age range of 11 to 20 years, 16(16.6%) were in age group 21-30 years, 7(7.2%) in age group of 31-40 years and 2(2.08%) in age range from 41-50 years. Regarding the age distribution in association with dural tears were 9(9.3%) in age range of 1-10 years, 10(10.4%) in 11-20 years, 8(8.3%) in 21-30 years, 4(4.1%) in 31-40 years and 2(2.08%) in 41-50 years, as shown in table no. II

The most common location of depressed skull fracture is parietal 37(38.5%), followed by frontal 27(28.1%), and temporal 15(15.6%) region. Occipital depressed fracture were 13(13.5%) and only 4(4.1%) were located in posterior fossa. There is no significant differences found in dural tear when location of depressed fracture were taken into consideration as shown in table no. III

In our series we used pericranial graft in 18(18.7%) patient and fascial lata graft in 11(11.8%) patient, in 4(4.1%) we were unable to close the dura, however post operatively CSF leak was not observed in single case.

Out of 96 patients, 33(34.3%) had dural tear while in 63(65.6%) there was no dural tear. Other findings associated with depressed skull fracture per operatively were extradural hematoma in 16(16%), subdural hematoma in 11(11.4%), contusion in 16(16.6%) and pneumoencephalus was observed in 20(20.8%) patients as shown in table. No. IV

Table. No. I Gender distribution with dural tear.(n=96)

Gender	Dural Tear			Total
	Present	Absent	Percentage	
Male	21	37	21.8%	58
Female	12	26	12.5%	38
Total	33	63	100%	96

Table. No II Age group with dural tear.(n=96)

Age group	Dural Tear			Total
	Present	Absent	Percentages	
1-10years	9	35	9.3%	44
11-20years	10	15	10.4%	25
21-30 years	8	8	8.3%	16
31-40 years	4	3	4.1%	7
41-50 years	2	2	2%	4
Total	33	63	100%	96

Table. No. III Location of depressed skull fracture and dural tear.(n=96)

Location	Dural tear		
	Present	Absent	Total
Parietal	14	23	37
Frontal	11	16	27
Temporal	4	11	15
Occipital	3	10	13
Posterior fossa	1	3	4
Total	33	63	96

Table No. IV Per operative findings.(n=96)

Peroperative findings	Frequency	Percentages
Dural tear	33	34.3%
Extradural hematoma	15	15.6%
Subdural hematoma	11	11.4%
Contusion	16	16.6%
Pneumoencephalus	21	22.5%

DISCUSSION

Depressed skull fracture (DFS) occurs as result of direct blow to a small surface area of the skull with a blunt object. Generally it is thought that DFS is a very serious head injury having very bad prognosis. But the reality is that, it become serious only when it directly or indirectly involve the brain.¹⁵ Compound depressed fractures are surgical emergencies and should be dealt with properly to prevent complications like meningitis, cerebrospinal fluid leak and post traumatic seizure. If there is Dural rent, the brain matter which may be present in the wound should be sucked out, and after proper homeostasis dural tear should be repaired water tight either use of fascial lata graft or pericranium^{14,16}. In our study 96 patient were recruited of which 58(60.4%) were male and 38(39.5%) were female with male to female ratio 1.5:1. This male predominance coincides with other national and international studies^{17,18}. In one study shows depressed skull fracture more common in male population because of exposure to traffic and daily outdoor activities¹⁹

In our study the most common region was the parietal 37(38.5%), followed by frontal in 27(28%). Temporal region was effected in 15(15.6%) and occipital in 13(13.5%) . This is in accordance with study done by Braakman R²⁰ in Digkzikt hospital Netherland on 225 consecutive cases. The location of DFS depends upon the type of trauma and the region of skull which receives the blow.

We observed that dural tear was present in 33(34.3%) and it was absent in 63(65.6%) subjects. The frequency of dural tear in depressed skull fracture varies and reported to be 25% and 65% in different studies¹³. So dural tear is one of the common finding neurosurgeon can encounter during DFS surgery and one must be vigilant to identify the rent and repair with fascia lata graft or pericranium to prevent complications. In current study the frequency of dural tear shows no significant differences in either gender with 21(36.2%) male and 12(31.5%) females patient having dural tear, similarly the frequency of dural tear in different age groups were shown in our study as 9(9.3%) in age group of 1-10 years, 10(10.4%) in 11-20 years, 8(8.3%) in 21-30 years, 4(4.1%) in 31-40 years and 2(2.08%) in 41-50 years patients were having dural tears. Gul Muhammad et al. reported almost same results²¹

There are few limitations in our study. Firstly, the patients were not followed for the postoperative complications, after they were discharged from the hospital. Secondly, as it was a hospital based survey, so its results cannot be generalized to the whole population. Lastly, only Pakistan Institute of Medical Sciences was taken as the study place, inclusion of other hospitals from the same locality would have given better idea about the prevalence of condition in that area.

CONCLUSION

Depressed skull fracture is a very common neurosurgical emergency. The frequency of dural tears in DFS is quite high, so one should be vigilant to identify the defect and repair it properly to minimize post operative complications.

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