

A prospective randomized study of operative and conservative management for compound depressed fracture skull

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Abstract

Head injury is a leading cause of morbidity and mortality in developed as well as in developing countries. Due to its increasing incidence, it's a universal health and socioeconomic problem.

Key Word: Head injury, depressed fracture

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Received Date: 18/10/2014 Accepted Date: 27/10/2014

Access this article online

Quick Response Code:	Website: www.medpulse.in
	DOI: 29 October 2014

INTRODUCTION

Skull fractures are classified into linear, depressed and comminuted type.¹ Skull fracture can be simple (closed) or compound (open).¹ A depressed fracture is one where in the fractured fragment is driven inwards. On the other hand, in elevated fracture, this fractured portion is elevated above the level of the intact skull.³ Depressed skull fractures, a very serious type of trauma occurring in 11% of severe head injuries, are comminuted fractures in which broken bones are displaced inward.⁴ Depressed fracture skull bone called compound when skin above it cut or lacerated.^{5,6} Skull fractures are influenced by various factors, which include the thickness of the vault, site of impact, the force and angle of impact.⁶ Compound depressed fractures are caused by tangential injuries which break a portion of the scalp, skull and the underlying dura and brain.⁷ Most of the depressed skull

fracture are over fronto-parietal location as bone is thin and the specific location is prone for trauma.⁶ Complex depressed fractures are those in which the dura mater is torn.⁸ Approximately 25% of patients with depressed skull fracture do not report loss of consciousness, and another 25% loose consciousness for less than an hour. The presentation may vary depending on other associated intracranial injuries such as epidural hematoma, dural tears, and seizures.⁸ The plain CT scan Head injury is a modality of choice and has replaced the conventional skull radiography because of its higher accuracy and clear delineation of intra cranial manifestations.^{9,10,11} Our study was conducted from August 2011 to August 2013. Total 60 patients of compound depressed fracture skull bone admitted to our institute were included in this study. The admitted patients were divided into two groups by simple random selection method. One group of 30 patients were given surgical treatment and another group of 30 patients were given conservative treatment.

AIMS AND OBJECTIVES

- To study the outcome of surgical management and conservative management of compound depressed fracture skull.
- To compare the advantages and disadvantages of both methods for various parameters.
 1. Incidence of epilepsy
 2. Incidence of infection
 3. Incidence of delayed complication

4. Effect on neurological outcome

OBSERVATIONS AND RESULTS

Table 1: Study group

TOTAL NO. OF PATIENT	TYPE OF PROCEDURE	
	SURGICAL	CONSERVATIVE
60	30	30

Table 2: Sex Distribution

SEX	SURGICAL	CONSERVATIVE
MALE	26	27
FEMALE	04	03

Table 3: Age Distribution

AGE GROUP (YEARS)	SURGICAL	CONSERVATIVE
1-10	06	04
11-20	02	03
21-30	06	05
31-40	10	09
41-50	03	06
51-60	03	03

Table 4: Mode of Injury

CAUSE	SURGICAL	CONSERVATIVE
ASSAULT	04	05
ROAD TRAFFIC ACCIDENT	20	18
OTHER (eg., fall from height, fall of object on head, sport injury., etc.)	06	07

Table 5: Site of Fracture Involvement

SITE OF FRACTURE	SURGICAL	CONSERVATIVE
FRONTAL	15	13
TEMPORAL	01	04
PARIETAL	08	06
OCCIPITAL	00	01
> 1 BONE INVOLEMENT (eg.,fronto-parietal, temporo-parietal., etc.)	06	06

Table 6: CSF Leak and Brain Herniation in Wound

FINDINGS ON WOUND	CSF LEAK	BRAIN HERNIATION
EXPLORATION TREATMENT		
SURGICAL	06	01
CONSERVATIVE	07	02

Table 7: Depth of Depressed Fracture Fragment

DEPTH OF DEPRESSED FRACTURE FRAGMENT	SURGICAL	CONSERVATIVE
< 5mm	06	09
>5mm	24	21

Table 8: Glasgow Coma Score at Time of Presentation

GLASGOW COMA SCORE (BEFORE PROCEDURE)	SURGICAL	CONSERVATIVE
9-12	03	06
13-15	27	24

Table 9: Symptoms at Time of Presentation

PRESENTING SYMPTOMS	SURGICAL	CONSERVATIVE
HEADACHE	25	28
VOMITING	26	23
CONVULSION	07	04
UNCONSCIOUSNESS	10	11
EAR BLEEDING	01	00
NASAL BLEEDING	02	00
NEURODEFICIT (eg., hemi-plegia, mono-plegia, aphasia, loss of vision., etc.)	03	01

Table 10: Complications

COMPLICATIONS	SURGICAL	CONSERVATIVE
FEVER	12	08
SUTURELINE INFECTION	02	02
CONVULSION	02	00
MENINGITIS	00	00
CEREBRAL ABCESS	00	00
OSTEOMYELITIS	00	00
NEUROLOGICAL DEFICIT	03	01

Table 11: Average Time for Procedure

SURGICAL TREATMENT	CONSERVATIVE TREATMENT
60 MIN	27 MIN

Table 12: Glasgow Coma Score at Time of Discharge

GLASGOW COMA SCORE (AFTER PROCEDURE)	SURGICAL	CONSERVATIVE
9-12	02	01
13-15	28	29

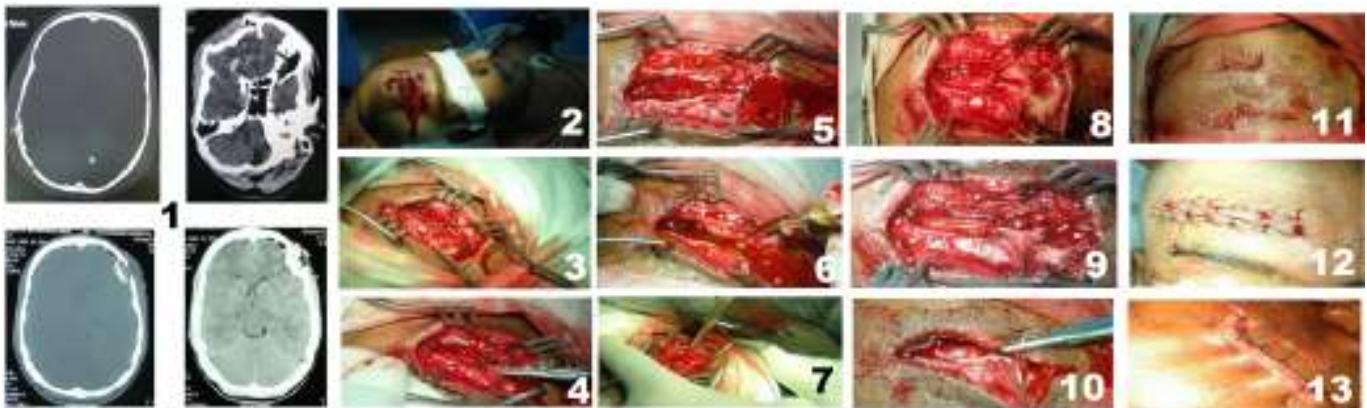


Figure 1: Compound depressed fracture skull bone involving left frontal bone with underlying contusion and pneumocephalus

Figure 2: Position of patient for surgical treatment under general anaesthesia

Figure 3: Exposure of wound with mastoid retractor

Figure 3: Exposure of wound with mastoid retractor

Figure 4: Removing the fracture fragments

Figure 5: After complete removal of fracture fragments

Figure 6: Wound thoroughly cleaned with hydrogen peroxide and betadine

Figure 7: Doing burr at point nearest to depressed fracture for its elevation

Figure 8: Burr hole completed near to depressed fracture fragment

Figure 9: Burr hole connected to fracture fragment defect

Figure 10: Closure of wound in double layer, with absorbable material

Figure 11: Completed first layer of absorbable suture

Figure 12: Completed of second layer with nonabsorbable suture.

Figure 13: Suture line on POD 3

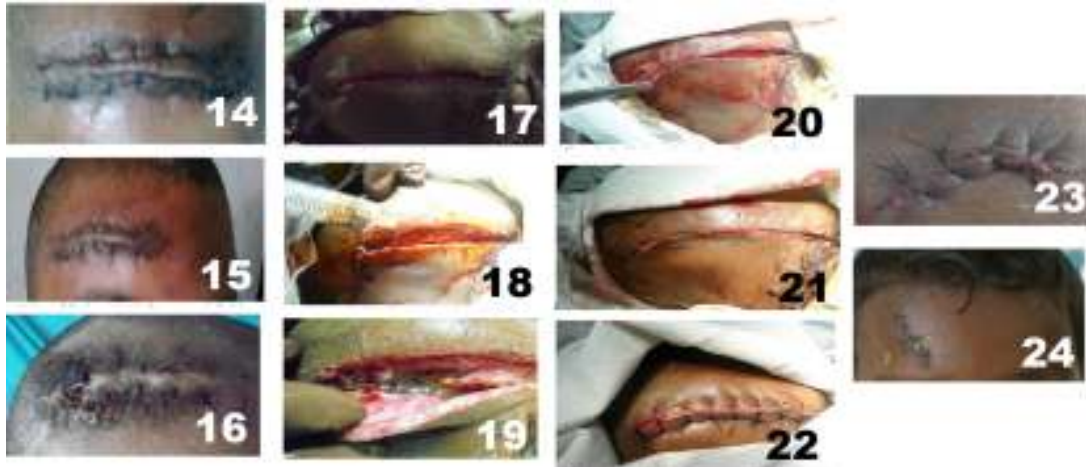


Figure 14: On post operative day 7

Figure 15: At time of discharge just before removal of stich.

Figure 16: Showing suture line infection in one of the case

Figure 17: Compound depressed fracture skull bone.

Figure 18: Wound cleaned with hydrogen peroxide and betadine

Figure 19: After through cleaning with betadine and hydrogen peroxide

Figure 20: Closer in double layer, Inner layer with absorbable suture

Figure 21: After completion of first layer with absorbable layer

Figure 22: After completion of outer layer with non absorbable suture

Figure 23: Suture line on POD3

Figure 24: Suture line on POD7

DISCUSSION

In our comparative study, we had compared 60 patients of compound depressed fracture, we divided them into two groups by simple random selection method and half patient were treated with surgical mode of treatment and half patients were treated with conservative line treatment with 7 day course of antibiotics postoperative period. In our study out of total patient, more than half of the patients (65%) were between ages of 21-50 years and the paediatric age group represents around 20 to 25%. Out of total 60 patient 53 patients were male and 7 were female. Male to Female ratio was 9:1 that are similar with the most of approved and accepted studies. In our study, out of total 60 patients 38 patients (63%) had history of road traffic accident which form most common cause of head injury, followed by the assault and other such as sport injury, fall from height, etc. These observations match with previous accepted studies. These attributes to increased urbanization and increased use of motor vehicle. In our study in both the groups, frontal bone was most common site of fracture involvements with contributes 46%, followed by parietal bone which contributed about 23% of total patients followed by more than one bone involvement such as fronto-parietal, fronto-temporal region. Temporal bone and occipital bone involved in least number of cases. In both the groups of study headache (80-90%) was most common presenting feature followed by vomiting (75-85%) forming the second most common presenting feature. Above observation also was similar to most of the studies. In surgical group patients, 40% patients had fever

postoperative period, 6% patients had minimal suture line discharge and surrounding erythema, later on it subsided with daily dressing and antibiotics. In conservative group patients, 26% patients had fever after conservative treatment, 6% patients had minor stitch abscess and was resolved with dressing and antibiotics. No patient in conservatively treated group had major infection such as cerebral abscess, meningitis, osteomyelitis. The incidence of infection in both the groups was similar. Both the procedure appeared to be equally safe and the complication rate is similar. In patients treated surgically, 02 (6%) patients had episodes of convulsion in postoperative period later patient kept on antiepileptic medications. In patient treated conservatively, no patient had episodes of convulsion before treatment as well as after treatment. The efficacy of one group over other regarding the incidence of epilepsy is statistically not significant. Both the groups had same outcome regarding incidence of epilepsy. In surgical group patients, 03 patients had neurological deficit and In patient treated conservatively, only one patient had neurological deficit. In both groups neuro-deficit improved in follow up period. In our study, the outcome of procedure regarding the complications such as infection, epilepsy, neuro-deficit in both the groups did not depends on type of procedure and difference is statistically not significant. Both procedures are equally safe and effective. Average time required for procedure in surgical mode treatment was 60 minutes under general anaesthesia and in conservative mode of treatment was 27 minutes. According to statistics, mean time required to complete

the procedure in surgically treated patients with a standard deviation is more than mean time required to complete the procedure in conservatively treated group and it is statistically significant.

CONCLUSION

Our randomized comparative study revealed following

Mean time for procedure was less in conservative mode than surgical mode. Hospital stay in conservative mode of treatment was less than in surgical mode of treatment. Complication in both group were comparable. Both the modes of treatment are equally safe. Conservative mode of treatment was economical and less time consuming. General anaesthesia is avoided in conservative mode of treatment. It leads to reduction in hospital burden and length of hospital stay. Though surgical mode of treatment is classical and accepted mode of management for compound depressed fracture of skull bone, conservative mode of management is equally safe. Outcome of incidence of epilepsy, infection, neuro-deficit and delayed complication did not depend on type of procedure. Both the procedure had same outcome and equally safe. Conservative mode of treatment has no higher rate of complications. It is less expensive. It has less hospital stay. It is equally effective and safe. It can be done at grass root level.

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Source of Support: None Declared
Conflict of Interest: None Declared