Outcome of Cerebral Contusions due to Traumatic Brain Injury

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ABSTRACT

Objective: *To compare the results of surgically operated vs conservatively treated patients of cerebral contusions due to traumatic brain injury.*

Study Design*: Retrospective Study*

Materials and Methods: *This comparative study was conducted from January 2012 to December 2014 at the department of Neurosurgery, PGMI Lahore General Hospital, Lahore. A total of 50 patients were included in this study of both gender (male and female) and in the age range of 15-65 years. In our study 20 patients were managed conservatively while other 30 patients were operated for cerebral contusions. The mode of injury in our study was road traffic accidents and history of falls.*

Results: *Out of 50 patients, there were 41 (82%) males and 09 (18%) female patients. Their age ranged from 15 - 65 years. In this study the overall mean age is 38.36 years. The maximum numbers of patients were in their third and fourth decades of life. In our study the duration of hospital stay in conservatively managed patients was longer as compared to surgically treated patients who were discharged earlier. Mortality rate in surgically managed patients having a GCS ranged between09 to 12 was very low contrary to the conservatively managed group, similarly the rate of delayed contusion formation and edema was also low in surgically managed patients as compared to those who were managed conservatively.*

Conclusion: *Surgically managed patients of cerebral contusions in traumatic brain injury has better outcome and decreased hospital stay as compared to conservatively managed patients.*

Key Words: *cerebral contusion, Traumatic brain injury. Glasgow Coma Scale (GCS)*

INTRODUCTION:

Traumatic brain injury (**TBI**), also known as **intracranial injury,** is defined as damage to the brain resulting from external mechanical force, such as rapid acceleration or decelera- tion, impact, blast waves, or penetration by a projectile.[1]**Traumatic brain injury (TBI)** is the most disabling of traumatic injuries often leading to lifelong physical, psychological, behavioral , cognitive and emotional impairments.[2,3] Nearly half of hospitalized survivors of **TBI** experience long term disabilities Contusion occurs due to a bruise or injury to a region of the brain tissue. Contusions occur primarily in the cortical tissue, especially under the site of impact or in areas of brain located and constituting one of the largest expenditures in the Health Care System.[4,5] **TBI** encompass numerous types of insults to the brain, with one of the most severe being a hemorrhagic cerebral contusion. TBI associated with cerebral contusion is a frequent cause of death & disability in trauma patients.[6]

Cerebral contusion is derived from a Latin word ***contusion cerebri meaning*** a bruise of the brain tissue.[7]Cerebral contusion, also known as brain

near sharp ridges on the inside of skull .It is commonly occur in coup or counter - coup injuries. In coup injuries, the brain is injured directly under the area of impact, while in counter-coup injuries it is injured on the opposite side of impact. Sign & symptoms of cerebral contusions depend upon the location, size and severity of the injury.

CT scanning is an excellent modality for defining cerebral contusions and is the most preferred acute imaging modality, because it can be performed quickly and also in the presence of life support equipments.[8,9,10] Contusions often are not appreciated on the first CT scan obtained immediately after trauma, but they become obvious on follow- up scans.

The outcome of TBI depends on the cause and location of the injury. The outcome, severity and extent of neurological damage can range from a good recovery to death of the patient.

MATERIAL AND METHODS:

This study was conducted at the department of Neurosurgery Postgraduate Medical Institute Lahore General Hospital, Lahore from Jan 2012 to Dec 2014, with a total duration of two years. The patient's age ranges b/w 15-65 years and both sex were included in this study. A total 50 patients of cerebral contusions due to traumatic brain injury following road traffic accidents or history of falls confirmed on CT scan were included in our study. In our study 20 patients were managed conservatively while other 30 patients were operated for cerebral contusions.

RESULTS:

Sex Incidence

Total patients included in the study were 50. Among them, males were 41 (82%) and females were 09 (18%) with M: F ratio of 4: 1.

Age Incidence:

The youngest patient was of 15 years and the oldest was 64 years of age. The mean age was 38 years and the maximum number of patients were in third and fourth decades of life (fig 1).

Patients with GCS of (3-5), (6-8) and (9-12) were managed both conservatively and surgically (table 1).

Surgery performed within first 24 hours has good results as compared to delayed surgery with much less hospital stay and mortality rate than those managed conservatively. Rate of contusion expansion and edema is also high in conservatively managed patients

Figure 1: Age Distribution

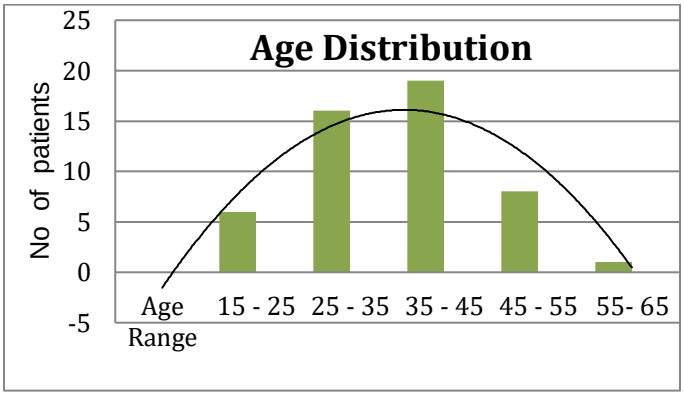


Table 1: Pre-operative status

GCS	Conservative	Surgery
3 – 5	06 (30%)	04 (13%)
6 – 8	0	14 (47%)
9 – 12	14 (70%)	12 (40%)
Total	20 Patients	30 Patients

Discussion:

Traumatic brain injury is the leading cause of mortality and morbidity in developing as well as in most of the developed countries.[11] Road traffic accidents are a major cause of cerebral contusions worldwide but especially in developing and emerging countries.[12] Cerebral parenchymal injury is evident in a considerable number of head injury victims. The most significant structural abnormality of the brain is contusion occurring in the brain parenchyma, which is a multifarious and dynamic area, due to primary lesion and is related to ischemic and inflammatory process that requires a comprehensive knowledge and proper management plan. Cerebral contusions account for 25-30 % of severe head injuries and 8.5% of all traumatic brain injuries.

In our study we present a review of important aspects of cerebral contusion, comparison of conservatively managed and surgically treated patients of cerebral contusions in head injury patients over a wide range of Glasgow Coma Scale between4 to 12. In our study of 50 patients, 41 were males and only 9 were females in whom 20 patients were managed conservatively while remaining 30 patients were operated from January 2012 to December 2014. The mode of injuries in our study were road traffic accidents and history of fall (figure 2).

In our study we managed patients with cerebral contusions in different lobes of the brain as shown in table 2.

Inclusion and exclusion criteria of patients with contusions in our study is shown in table 3.

Figure 2

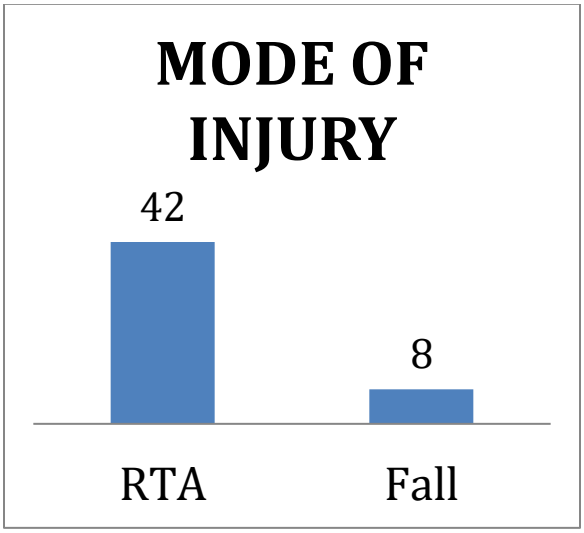


Table 2: Cerebral lobe Involvement

Conservative	Surgery
Temporal – 6 patients (30%)	**Temporal** – 14 patients (47%)
Frontal – 10 patients (50%)	**Frontal** – 12 patients (50%)
Parietal -- 04 patients (20%)	**Parietal** - 04 patients (13%)
Total -- 20 patients	**Total** -- 30 patients

Table 3: Study Criteria

Inclusion	Exclusion
Contusions in Frontal, Parietal and Temporal regions	Associated Extradural Hematoma (EDH)
Volume of blood 20ml or more	Associated Intra-ventricular bleed
GCS between (04 – 12)	Associated Skull fractures
	Age above 65 years and below 15 years

In 2006, ***Kawamata, et al*** conducted a study in Japan on 182 patients with cerebral contusions and proved that surgical excision provides satisfactory control of progressive elevation of ICP and clinical deterioration in many cases.[13]

Becker, et al also advocated early evacuation of traumatic contusions for the purpose of avoiding secondary complications.[14]

In our study we did early evacuation of cerebral contusions usually within first 24 hours by doing either Craniotomy and Evacuation, Craniotomy with Lobectomy and also Craniectomy in few cases for Temporal contusions. These patients had better outcome, decreased hospital stay and less mortality as compared to those who were managed conservatively by doing initial resuscitation, head up and oxygen inhalation, mannitol infusion and anti-epileptic drug therapies. (Table 4, table 5 and fig 3).

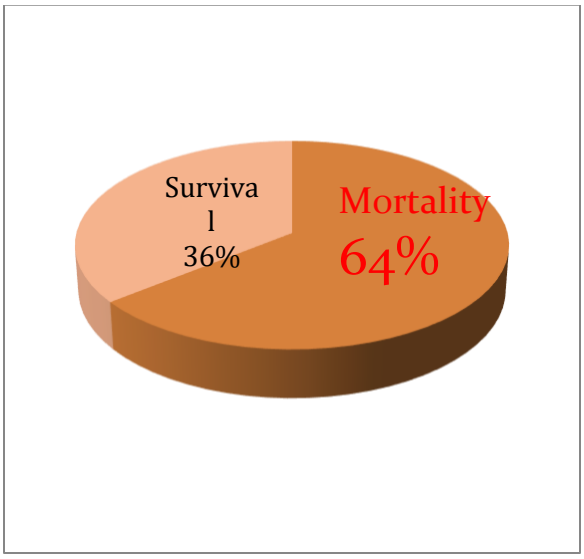
Table 4: Outcome

Conservative	Surgery
GCS 3-5 All 6 patients died **Mortality 100%**	**GCS 3-5** All 4 patients died **Mortality 100%**
	GCS 6-8 06 died 04 same status 04 improved **Mortality 43%**
GCS 9-12 9 died 3 same status 2 improved **Mortality 64%**	**GCS 9-12** 2 died 1 same status 1 worsen 8 improved **Mortality 17%**

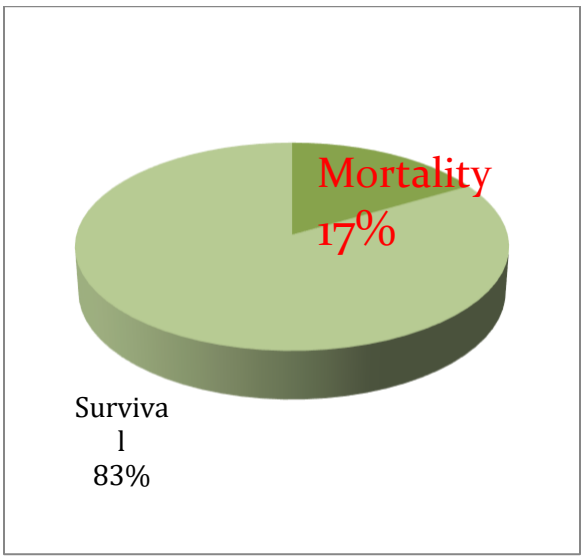
Table 5: Duration of Hospital Stay

Conservative	Surgery
Average 22 days	Average 16 days

Figure 3: Mortality in GCS (9 – 12)



Conservative



Surgery

Conclusions:

It is concluded that early evacuation of cerebral contusion due to traumatic brain injury in patients with mild to moderate GCS improves neurological status of the patient, decreases mortality and hospital stay and abolishes the chance of contusion expansion.

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