



A Prospective Study of Risk Factors for Early Death in Severe Head Injury Patients

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ABSTRACT

Early deaths in head injury patients are still topic of debate. In our study we aim to identify the risk factors responsible for early deaths in severe head injuries patients A Prospective study was conducted in department of General surgery Hamidia hospital Bhopal. Radiological investigation of all head injury patients was done and patients were assessed according to Glasgow coma scale. Incidence of death due to traumatic brain injury mostly occurs in old age patients although majority of patients with severe head injury belongs to younger age group .Patients with low Glasgow coma scale along midline shift >5mm have poor prognosis while those presented with midline shift > 15mm associated to 100% mortality. Our study is based on radiological and clinical data based on Glasgow Coma Scale and is helpful to rule out poor prognostic factors and cause of early death in severe head injury patients.

KEYWORDS : Head injury, Glasgow Coma Scale, midline shift

INTRODUCTION-

Head injury is a leading cause of death in general population especially in young patients. And inspite of all available measures outcome of patient with head injury is very poor. Head injuries include injuries to brain or skull (Selecki et al 1981)¹ and documented head injury with loss of consciousness, post traumatic amnesia or skull fracture (Jagger et al 1984)². Traumatic brain injury are leading cause of death and disability and prognosis is notorious as captured in the Hippocratic aphorism "No head injury too severe to despair, nor too trivial to ignore"³. So, a prospective study is conducted to identify the risk factors responsible for early deaths (within 7 days) in head injury patients on patients admitted in Gandhi medical college.

METHODS-

This study is conducted from October 2012 to December 2013 in department of General surgery Hamidia hospital Bhopal. X –ray and computed tomography scan were carried out as early as possible after head injury. All patients are assessed for the type of head injury (mild, moderate, severe) according to Glasgow coma scale. The association between early death and independent prognostic factors was analyzed.

OBSERVATION-

Total 960 patients of traumatic brain injury patients with G.C.S <12 were admitted in Hamidia hospital in study duration .Total 150 patients of significant traumatic brain injury died during hospital stay out of which 120 patients were found eligible for study that died within 7 days of admission.

TABLE NO. 1- AGE WISE DISTRIBUTION OF DEATHS (age ranged from >15 years) n=120

Age group(in years)	No. Of deaths (No. Of head injury patients in age groups)	Percentage
15-19	11(84)	13.1
20-29	17(225)	7.5
30-39	25(263)	9.5
40-49	27(202)	13.4
50-59	18(100)	18.0
60 and above	22(86)	25.6

TABLE NO. 2- SYMPTOMS OF PATIENTS WITH TRAUMATIC BRAIN INJURY, n=120

Symptoms	No. Of deaths (no. Of cases)	Percentage
unconsciousness	114	95.0

vomiting	61	50.8
ENT bleed	63	52.5
Seizures	18(45)	15.0

TABLE NO. 3- SIGNS IN PATIENTS WITH TRAUMATIC BRAIN INJURY, n=120

Sign	No. Of cases	Percentage
Abnormal pulse a)Tachycardia(>120) b)Bradycardia(<60)	32 23	26.22 19.20
Abnormal respiration	51	42.5
Abnormal pupillary reaction to light	91	75.8
Decerebrate rigidity	35	29.2
Hyperpyrexia(neuro-genic fever)	4	4.2

TABLE NO. 4- RADIOLOGICAL FINDINGS IN TRAUMATIC BRAIN INJURY PATIENTS, n=120

Radiological findings	No. Of cases	Percentage
Subdural haematoma	30	25.0
Extradural haematoma	9	7.5
Sub arachnoid haemorrhage	18	15.0
contusions	54	45.0
Intra ventricular haemorrhage	11	9.2
Intra cerebral haemorrhage	3	2.5
Linear skull fracture	45	37.5
Depressed skull fracture	9	7.5
Diffuse axonal injury	9	7.5

TABLE NO.5- DISTRIBUTION OF DEATH WITH G.C.S Score,n=120

No. Of deaths with G.C.S score	No. Of deaths	Percentage
<5	84	70.0
6-8	26	21.6
>8	10	8.3

TABLE NO.6-DEATHS WITH MIDLINE SHIFT, n=111(9 patients of D.A.I)

Midline shift in mm	No. of deaths (no. Of patients with midline shift)	Percentage
<5mm	7(308)	2.27
6-15mm	77(153)	50.3
>15mm	27(27)	100

DISCUSSION-

Total number of head injury patients admitted in surgical ward Hamidia hospital during study period were 960 out of which 120 patients who certified dead within 7 days due to head injury or its complication were included in study. The mortality rate was 12.5%. Marshall et al(1991)⁴ reported 28% mortality and Lyle et al (1986) reported 51% mortality after severe head injury in which subject group was having patients with G.C.S <8 , whereas in our study we took patients with G.C.S <12.

Mortality rate was maximum with age group >60 years (25.6%) and 50-59 years (18.0%).Annegers et al (1980)⁵; Max et al 1991 reported 20% mortality in age group >60 years.

In our study out of 120 patients died 105 were males (mortality is 10.3%) and 15 patients were females (mortality is 10.3%).Miller J D et al (1981) recorded 13.4% mortality in males and 11.6% in females⁶. Shivhare Bajaj (2005) reported 88% males and 12% females mortality in head injury patients⁷.

Majority of patients presented with unconsciousness (95%) following E.N.T bleed (52.5%), vomiting (50.8%).Soni Sumeet 2003 observed unconsciousness in 61.33% and vomiting in 58.6% of Traumatic brain injury patients⁸.Total 45 patients develops seizures out of 960 patients and 18 were died (15%).Jennett (1975) reported 20% mortality in post traumatic epileptic patients¹⁰. Majority of patients were admitted with abnormal pulse tachycardia 26.6% and Bradycardia 19.2% in this study.Jain and Devadige (1969) observed Bradycardia in 70% head injury patients¹¹ while Soni Sumeet observed tachycardia in 14% head injury patients⁹.

In this study abnormal pupillary reaction present in 75.8% patients which was due to pre-existing brain herniation and intracranial mass lesions. Marshal et al (1991) showed 61% mortality in abnormal pupillary reaction patients⁴. Abnormal respiration (tachypnea) is seen in 42.5% patients, this indicates brain stem injury.Shivhare jalaj (2005)⁷ observed abnormal respiration in 60.8% patients. Decerebrate rigidity 29.2% also indicates brain stem injury occur in 35 patients out of 120 patients of severe head injury.Shivhare jalaj (2005) recorded 8% patients of Decerebrate rigidity⁷.

Patients with shock have 46.2% mortality in our study. Chestnut et al (1993) showed that presence of hypotension (systolic B.P. <99) with severe head injury was 56% mortality rates⁹.

In our study out of 120 patients, 5 (4.2%) develop neurogenic fever and all 5 patients were died. so mortality was 100% which is similar to study by M.K Awlders , D.W Smith (1993) in which 3 out of 81 patients (4%) and study by Shivhare Jalaj (2005) in which 6 out of 125 patients (4.8%) died by neurogenic fever⁷ .

In our study we observed the fact that contusion occur in 54 (45%) patients is commonest intracerebral lesion. These result correlate with study by Dablin et al (1977) Zimmerman et al (1978) as they observed contusion in 36.5% head injury patients^{13,14}.Skull fracture is next commonly occur radiological finding as it was present in 54 (45%) out of 120 patients .Soni Sumeet (2003) observed skull fracture in 40.3% and Shivhare Jalaj (2005) observed in 31.2% patients⁸.

Subdural haematoma were seen in 25% patients in our study which correlate with study by Zimmerman et al (1978) 16.5% patients¹².

Subarachnoid haemorrhage was observed in 15.0% patients of head injury which correlate with study by Talwar et al (1983) and Ko et al (1977) in which incident of subarachnoid haemorrhage found was 14% and 16.6% respectively^{14,15}.

Intraventricular haemorrhage reported in our study was 9.2% which correlate with finding of Dublin et al (1977) and Cusmaro et al (1985) who observed 12% Intraventricular haemorrhage in head injury patients¹⁶.

We observed that 84 (70)% patients with Glasgow Coma Scale <5 died which correlate with study conducted by Gonnerally et al (1982) which show 74% mortality in head injury patients with Glasgow Coma Scale <5¹⁷.

In our study, 308 patients of head injuries were admitted with midline shift of <5mm out of which 7 patients (2.27%) died within 7 days. Out of 153 patients with midline shift 6-15mm 77 (50.3%) died and 27 patients with midline shift >15mm have 100% mortality. Soni Sumeet (2003) reported 77.7% mortality in head injury patients with midline shift of >5mm.472 out of 960 patients have no midline shift and only 9 patients (7.5%) died in this group. Study by Soni Sumeet (2003) reported 19.3% mortality in head injury patients with no midline shift⁹.

CONCLUSION-

In our study group, we have concluded that:-

- Incidence of death due to traumatic brain injury mostly occurs in 5th and 6th decade.
- Mortality difference between male and female was not significant.
- Maximum no. Of deaths within 1st 24 hours (49.2%) occurs due to head injuries and associated abdominal or thoracic injuries blood loss.
- Abnormal pupillary reaction is seen in 76.75% of patients. Abnormal pulse (tachycardia in 26.25% and Bradycardia in 18.75%) was seen in 45% patients and high mortality is observed in this group.
- Most of the patients presented with unconscious state (95%) followed by E.N.T bleed (52.5%) and vomiting (50.8%).
- Neurogenic fever have very poor prognosis and have 100% mortality in our study.
- Contusions (45%) and skull fracture (45%) are major radiological findings followed by subdural haematoma (25%).
- Low Glasgow Coma Score have very poor prognosis. In our study patients with G.C.S <5 have 70% mortality.
- Patients with midline shift >5mm have poor prognosis. In our study 100% mortality is seen in head injury patients with midline shift more than 15mm.
- 15% mortality is seen in post traumatic seizure patients even after taking antiepileptic drugs.

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