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Acute subdural haematoma and its various aspects; A Clinical study.

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ABSTRACT

Background: Acute subdural hematoma is one of the most common types of intra cranial hematoma caused by trauma accounting for more than 20% severe head injuries and resulting in highest mortality. Various studies have been made to understand the consequences and surgical outcomes of SDH patients. Therefore, the present study was designed to evaluate the clinical spectrum and assess the outcome of surgery in SDH patients. **Methods**: Present study included 50 patients of both sexes from 1 to 70 years age group with head injury, diagnosed to have traumatic subdural haemorrhage. Clinical examination included pupillary anisocoria, hemodynamic status, extent of hematoma either focal or diffuse, midline shift, GCS, status of basal cisterns, blood pressure. All the patients included in the study underwent surgical procedure for the removal of haematoma. **Results**: There was 100% mortality rate in patients with bilaterally dilated pupils. Whereas, there was 24.13% and 5.5% mortality rate respectively in unilateral dilated and normal pupil patients. Most of the patient had GCS <8 (40%), followed by GCS 9-12 (34%) and GCS 13-15 (26%) at the time of admission in the hospital. Further, GCS <8, GCS 9-12and GCS 13-15 were found in 32%, 40% and 28% correspondingly in patients after resuscitation. **Conclusion**: Findings of present study showed that there was an inverse relation between interval between injury and surgery with prognosis, Greater the interval poor will be outcome of surgery. Basal cistern obliteration is a reliable marker of increased intra cranial pressure which is responsible for poor outcome. Further, hypotension is also one of the important factors affecting the outcome of surgery in SDH patients.

Keywords: Subdural haematoma, GCS, Mortality, Surgery outcome.

INTRODUCTION

Acute subdural hematoma is one of the most common types of intra cranial hematoma caused by trauma accounting for more than 20% severe head injuries and resulting in highest mortality. Mortality rates in subdural hematoma (SDH) varies drastically form as low as 30% to as high as 90%.[1-4] Various studies have been made to understand the consequences and surgical outcomes of SDH patients.[5-7] Reports are there that 21 subjects suffer with severe head injury out of 100000 people; whereas, 24% severe head injuries causes SDH.[8,9]

Three mechanisms have been suggested for the development of SDH. First is injury to surface cortical vessels, followed by bleeding from underlying damaged parenchyma. In addition, splitting of veins from cortex to dural venous sinuses.[4] SDH is arbitrarily divided into three groups according to the time period of injury. Acute SDH 3 days after injury, sub acute SDH 4 to 21 days after injury while chronic SDH is considered when time interval is at least 3 weeks from injury.[5]

Frequency of brain injury causing damage to brain is the prime factor increasing the severity of SDH. Variation in the brain damage from simple sub pial haemorrhage to extensive laceration of brain has been associated with outcome of SDH. However, brain stem distortion and cerebral oedema can further deteriorate the prognosis of SDH. Inferior frontal, anterior temporal and parietal regions are the most common location of hematoma.[2]

Disruption in the level of conscious has been found to be associated with SDH. Moreover, slowly loss of consciousness is considered as the classical sign of SDH. In addition, restlessness is also an important sign of aforesaid. Further, localization is found in 70% patients with few evidences. On the other hand, there is no sign of localization in rest

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patients due to quick progress of brainstem signs or concomitant lesions.

Pupillary deformities along with site of hemiparesis point toward the side of subdural hematoma. Cranial CT is essential as well as widely available technology for the early and prompt diagnosis of SDH as timely diagnosis and surgery is the gold standard treatment for SDH.[4,10]

Various factors influence the prognosis of SDH. Reports are there of better prognosis with gradual appearing symptoms of SDH.[4,10,11] Both consciousness level and onset of decerebrate rigidity are directly related to the mortality rate in SDH patients.[2,10,12,13]

Therefore, the present study was designed to evaluate the clinical spectrum and assess the outcome of surgery in SDH patients.

MATERIAL AND METHODS

This was a prospective observational type of Study which was conducted in tertiary care hospital from January 2013 to December 2018. Present study included 50 patients of both sexes from 1 to 70 years age group with head injury, diagnosed to have traumatic subdural haemorrhage.

All 50 patients included in the study were selected out of 250 head injury patients admitted in the hospital during this period. Patients having acute SDH with hematoma of >1cm thickness, >5mm thickness with mid line shift of >5mm, Glasgow coma scale (GCS) <8 were included in the study. All detailed history and physical examination was done before patients were included in the study. Clinical examination included pupillary anisocoria, hemodynamic status, extent of hematoma either focal or diffuse, midline shift, GCS, status of basal cisterns, blood pressure. All the patients included in the study underwent surgical procedure for the removal of haematoma.

Standard procedure of fronto-temporo-parietal craniotomy with question mark incision and flap was followed in all cases. During this procedure dura meter was wide open and haematoma was evacuated. Anti oedema measures with mannitol and hyperventilation resulted in decrease of brain swelling. Pericranium was used for duraplasty whereas replacement of bone flap was done whenever required.

Statistical analysis

All the data were expressed as percentage. Entire calculations were done with the help of SPSS v 23software manufactured by USA. The p value <0.05 was considered as statistically significant.

RESULTS

Results of our study showed that out of 250 patients of head injury 50 patients had subdural hematoma; which constituted 20% of total head injury cases. It is evident from fig 2 that maximum patients of SDH belong to 21 – 30 age group (21) followed by 31 -40 age group (12). Further, 1 – 10, 11 -20, 41-50, 51-60 and 61 –70 had 3, 7, 3, 2 and 2 patients respectively.

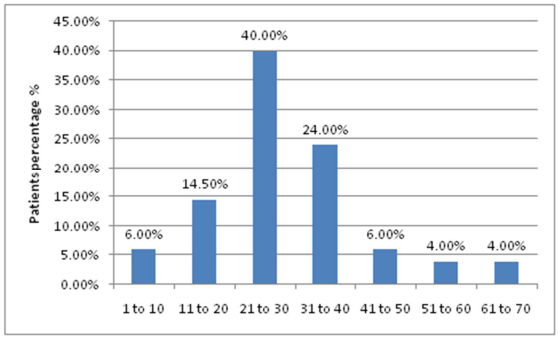

Figure 2: Distribution of patients according to different age groups

[Table 1] shows that incidence of SDH was more common in male population (72%) compare to female (28%). Road traffic accident (74%) was the most common cause of injury in SDH patients followed by fall from height (18%) and assaults (8%).

Table 1: Basic characteristic of patients

Variants	No. of patients	Percentage of patients
Gender		
Male	36	72%
Female	14	28%
Mode of injury		
Fall from height	9	18%
RTA	37	74%
Assaults	4	8%

Most of the patient had GCS <8 (40%), followed by GCS 9-12 (34%) and GCS 13-15 (26%) at the time of admission in the hospital. Further, GCS <8, GCS 9-12and GCS 13-15 were found in 32%, 40% and 28% correspondingly in patients after resuscitation.

Table 2: Glasgow coma scale pre and post resuscitation.

GCS level	Pre Resuscitation		Post Resuscitation	
	No. of patients	Percentage of patients	No. of patients	Percentage of patients
<8	20	40%	16	32%
9-12	17	34%	20	40%
13-15	13	26%	14	28%

There was 100% mortality rate in patients with bilaterally dilated pupils. Whereas, there was 24.13% and 5.5% mortality rate respectively in unilateral dilated and normal pupil patients. Patients without neurological deficit showed mortality rate of 11.1% and patients with neurological deficit had mortality rate of 26.08%. [Table 3]

Table 3: Pupillary abnormalities and focal neurological deficit

Variants	No. of patients	No. of mortality	Percentage of mortality
Pupils			
Normal	18	1	5.5%
Unilateral dilated	29	7	24.13%
Bilateral dilated	3	3	100%
No neurological deficit	27	3	11.1%
Neurological deficit Contralateral hemiparesis	23	6	26.08%

[Figure 3] shows that mortality rate was significantly high (35%) in patients with systolic blood pressure less than 90 mm of hg with p value <0.05. On the other hand, there was an insignificant relation between systolic blood pressure >90 mm of hg and mortality rate (16.16%) with p value >0.05.

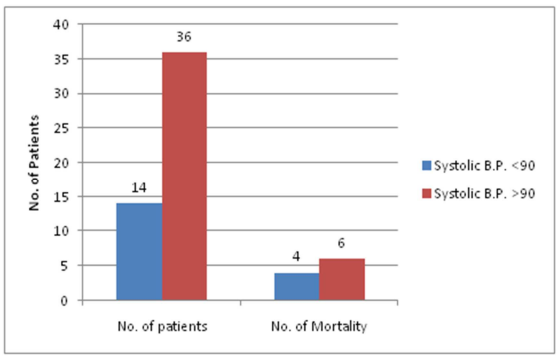

Figure 3: Systolic blood pressure and mortality.

[Table 4] shows that thickness of haematoma was significantly associated with mortality of patients. Mortality rate was recorded 14.2%, 17.85% and 40% with haematoma size <5mm, 5-10mm and >10mm respectively. Fontal haematoma and temporal haematoma had mortality of 10.1% and 18.18% correspondingly. In addition fronto tempo parietal haematoma and posterior fossa haematoma showed 30.7% and 33.3% mortality rate respectively. There was higher mortality rate in diffuse haematoma compare to focal haematoma.

DISCUSSION

Highest incidence of morbidity and mortality has been found to be associated with SDH due to traumatic injuries.[1-4] Parenchymal injuries and subsequent intracranial hypertension are the leading causes for such a high mortality rate in SDH.[2-4] Studies have shown that almost 50% of SDH patents have associates lesions. Most of the SDH have been associated with head injury in two wheeler users without helmet. Poor prognosis has been observed in pupillary abnormalities as compared to patients without pupillary abnormalities.

Table 4: Various variant and mortality relation

Variants	No. of patients	No. of mortality	Percentage of mortality	p value
Thickness of haematoma				
<5mm	7	1	14.2%	<0.01
5-10mm	28	5	17.85%	<0.01
>10mm	15	6	40%	<0.01
Location				
Frontal	10	1	10.1%	<0.05
Temporal	11	2	18.18%	<0.01
Fronto temporo parietal	26	8	30.7%	<0.01
Post fossa	3	1	33.3%	<0.01
Extent of hematoma				
Focal	26	6	23.07%	<0.01
Diffuse	24	6	25%	<0.01

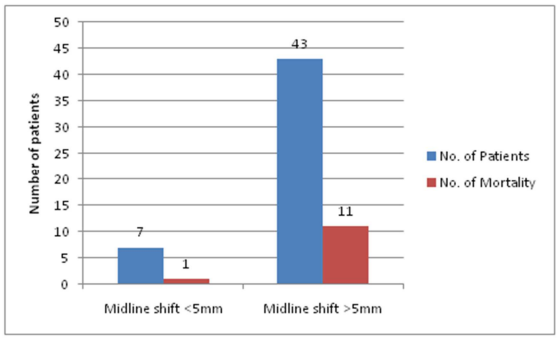

Figure 4: Midline shift

In the present study we have recorded that there was very high mortality rate in patients with pupillary abnormities in comparison of patients without pupillary abnormities. These findings are in agreement with findings of previous study of Kristianson et al 13 recorded 100% mortality in SDH patients with dilated pupils; while 19% and 14% mortality in patients having unequal and normal pupils correspondingly. Similarly, Tandon PN observed high prevalence of mortality among SDH patients with pupil abnormalities.[14]

Further, hypoxia, interval between injury and surgery, thickness of hamotoma, post traumatic seizures and hypotension etc are the associated factors which leads to poor prognosis in SDH patients.[15]

Present study recorded significantly high rate of mortality in patients with systolic blood pressure less than 90 mm of hg compare to systolic blood pressure more than 90 mm of Hg. These findings are in consistent with the findings of earlier study of Seelig J et al,[15] as they recorded 40% mortality rate in hypotension patients.

Results of the current study showed that time duration between injury and operation is inversely

related to prognosis of the disease. These results are confirmed by various previous studies as they recorded mortality rate of 30% if operated within 4 hours whereas it becomes high up to 90% if surgery is delayed.[15,16] In contrast to this Wilberger et al,[17] recorded statistically insignificant difference between time period in surgery and injury with outcome of operation.

On the other hand Gennereli et al,[18] suggested that basal cistern obliteration, hypotension and time difference between injury and surgery are among the most important factors causing significant effects on outcome of surgery. Finding of their study confirmed the results of our study as we observed that these three factors have significant effect on outcome of surgery in present study.

Current study has shown that there was significantly high mortality in patients having midline shift >5mm compared to patients with midline shift <5mm. These findings are very similar to the findings of Heissler et al,[19] as they recorded high mortality rate among patients having mid line shift >5mm. Further, we observed thickness of the clot was directly related to the mortality rate of SDH patients. Similarly, Heissler et al,[19] observed high mortality rate and poor outcome in patients with hematoma thickness of >10mm.

Present study showed that there was 100% mortality rate in patients with dilated pupil. These findings are confirmed by the earlier study of Vigouroux RP et al,[20] as they found 100% mortality with fixed dilated pupils.

We have observed high rate of mortality in patients having GCS <8. These findings are consistent with the findings of Yanaka K et al,[20] as they recorded 40% mortality rate in patients with GCS <8, size of haematoma and pupillary deformities.

Our study has recorded total 24% mortality in study population. These findings are similar to the findings of earlier study of Hasselberger K,[21] Gennereli T,[18] and Marshall at al,[16] as they found mortality rate 51.35%, 19.12% and 31.44% respectively in their study population.

Various researchers suggested that prevention of accident might be helpful in decreasing and preventing SDH. Moreover, surgery can be useful in removing the blood clot caused by SDH but surgery has not been found effective in repairing the lesions.[2,3]

CONCLUSION

Findings of present study showed that there was a inverse relation between interval between injury and surgery with prognosis, Greater the interval poor will be outcome of surgery. Basal cistern obliteration is a reliable marker of increased intra cranial pressure which is responsible for poor outcome. Further, hypotension is also one of the important factors affecting the outcome of surgery in SDH patients.

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