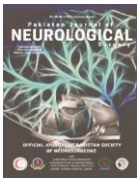

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Original Article

Acute Traumatic Subdural Hematoma: Series of Thirty Cases

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ABSTRACT

Objectives: Acute Traumatic Subdural Hematoma (ASDH) is one of the most dangerous and challenging neurosurgical problems faced by neurosurgeons. Road traffic accidents (RTAs) and falls are the most common causes of ASDH. This study focused to evaluate the incidence, mode, and severity of the injury, treatment options, and determine outcomes in patients with ASDH.

Material & Methods: Thirty patients with ASDH were studied over a period of three years. Detailed history, general and neurological examination including GCS were noted, CT scans were done and patients managed according to said protocol.

Results: Twenty-three (76.66%) were male and Seven (23.33%) were female. The common mode of injury were road traffic accidents (66.66%) and falls (26.66%). Out of 30 patients, 53.33% had GCS 3-5. Overall, the mortality rate was 60%. 23.33% of patients survived with severe disability and 10% of patients showed moderate disability and good recovery. The mortality rate was higher in patients above 50 years of age.

Conclusion: Acute traumatic subdural hematoma is still very fatal and has a high mortality. Early CT scanning emergency, surgery and good postoperative ICU care can play a role in improving the outcome in patients with ASDH.

Keywords: Acute Traumatic Subdural Hematoma (ASDH), Road Traffic Accident (RTA), Glasgow Coma Scale (GCS).

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INTRODUCTION

Acute traumatic subdural hematoma is a threatening issue among head injuries. It is the most challenging surgical pathology for neurosurgeons, in which a blood clot forms between the brain surface and the dura mater. Among the patients with ASDH, a subgroup of patients' needs to be defined who can get the benefit of its surgical evacuation. It is diagnosed through a CT Scan as intracranial hyperdense and the concavo-convex assemblage of blood

between dura and brain parenchyma, which usually involves almost the whole of the cerebral hemisphere.[1] The incidence of ASDH has been reported between 12 – 29% in patients with severe head injury.[2-5] The patients with combined mild, moderate and severe head injuries observed to have an incidence rate of 11% in ASDH.[6,7]

The majority of patients reported with ASDH were male with an average ages between 10 and 40 years.[8-11] Road traffic accidents (RTAs), falls and assault are among the major causes of ASDH. In the younger age group, RTAs are the major cause. In one case-series study, up to 56% falls were responsible for almost 12% of ASDH. Among elderly patients, falls were the major cause of ASDH compared to RTAs (22%).[12] Among the patients presenting in coma state RTAs were responsible for up to 75% of the ASDH, which indicated that RTAs lead to more serious injury due to high-speed accidents and associated diffuse axonal injury (DAI).[3,5,13] The vast majority of patients (up to 80%)[7,8,11,14] with ASDH had a severe head injury with GCS ≤ 8 and only a small percentage of the patients had GCS ≥ 9. It is due to the fact that the majority of the patients with ASDH and GCS ≤ 8 had associated intracranial pathology. Brain contusions, intracerebral hematoma, subarachnoid hemorrhage, and extradural hematoma are frequently associated with intracranial pathologies.[7,14]

ASDH is one of the lethal pathologies in head injury patients and it is still a big challenge for neurosurgeons. The mortality from ASDH varies 35 – 90% in different reported studies.[17-20] Mortality from ASDH is affected by different factors, i.e., primary resuscitation, early referral to specialized neurosurgical units, earliest possible CT scan, diagnosis, effective surgical procedure, and postoperative ICU care.[18] The timing of surgery has been a debate as it is a critical factor, which determines the surgical outcome. But a number of recent studies have shown no big difference in mortality rates among patients with ASDH whether the surgery was performed within four hours of injury or after four hours of injury.[21] Recently, it has been suggested that the age and type of surgical procedure are the major factors affecting the outcome of patients with ASDH especially those with GCS 4 – 6 i.e., in severe head injury.[16] The current study aimed to evaluate the incidence, mode, and severity of the injury, treatment options and to determine the outcome in patients with ASDH.

MATERIAL AND METHODS

Study Design & Setting

This study was conducted on thirty patients with ASDH (Acute Traumatic Subdural Hematoma) who were enrolled in Department of Neurosurgery DHQ Teaching Hospital/Sahiwal Medical College, Sahiwal for three years i.e., from January 2017 to December 2019. Most of our patients were referred from surrounding DHQ (District Headquarters) and THQ (Tehsil Headquarters) Hospitals, where Neurosurgical facilities were not available and the majority of them had severe head injuries.

Inclusion Criteria

All the patients were resuscitated following standard protocols i.e., ATLS. The vitally stable general physical examination was ensured and neurological examination was done including GCS (Glasgow coma scale). The patients were then shifted for CT Scan brain. Those patients who had acute traumatic subdural haematoma were included in this study.

Exclusion Criteria

Patients with polytrauma having serious extracranial injuries were not included in this study.

Clinical and Surgical Management

The mode of injury, timing of the injury, level of unconsciousness (GCS), operative procedure, and final outcome were noted. Patients with ASDH with more than 10 mm thick and more than 5 mm midline shift were operated in an emergency. Associated brain injuries were analyzed and recorded. Mannitol 1 gram per kg was given and patients shifted to the operation theatre for craniotomy/craniectomy and evacuation of ASDH. Duraplasty was done in only a few cases where there was brain swelling and brain contusion. Neurological outcome was determined by recording the Glasgow outcome scale.

RESULTS

Age Distribution

Twenty-five (83.33%) were below 50 years of age and only 5 (16.66%) were above 50 years.

Gender Distribution

76.66% were male patients and 23.33% were female patients, with male to female ratio almost 3:1.

Modes of Injuries

The most common mode of injury was the road traffic accident (RTA). 20 patients (66.66%) reported injuries from RTA falls reported in 8 patients (26.66%) and two patients (6.66%) had a history of assault (**Table 1**). **Figure 1** shows the acute subdural hematoma with underlying brain contusions and midline shift.

Neurological Assessment

Table 2 shows the association of GCS with the outcome in all patients. The neurological assessment was based on GCS. Out of thirty patients, 16 (53.33%) had GCS 3 – 5. Out of these sixteen patients, 12 (75%) died and 4 (25%) survived with poor functional outcomes i.e., severe disability and vegetative state.

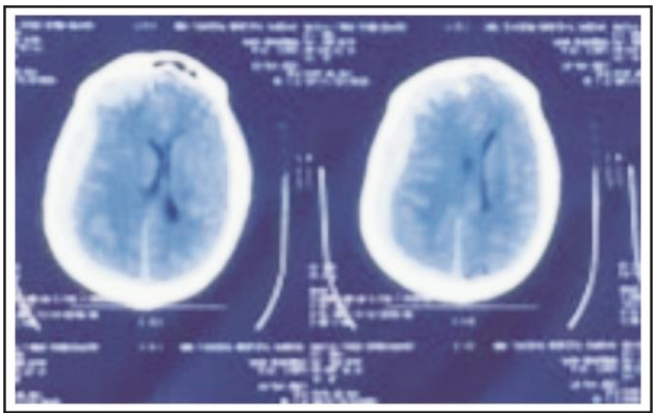

Figure 1: Acute subdural hematoma with underling brain contusions and midline shift.

Table 1: Distribution of 30 Patients for Age, Sex & Modes of Injury.

	Number of Patients	Percentage
Age Group		
< 50 years	25	83.33%
> 50 years	5	16.66%
Sex		
Male	23	76.66%
Female	7	23.33%
Mode of Injury		
Falls	8	66.66%
Road traffic accident	20	26.66%
Sport injury& fire area injury	2	6.66%

Ten (33.33%) patients had GCS 6 – 8, among them, 5 (50%) patients died, 2 (20%) survived with severe disability, whereas, 3 (30%) had a good functional recovery.

Only four patients had GCS 9 – 12, one of them (25%) died, one (25%) survived with severe disability and two (50%) showed a good recovery.

Overall, out of total thirty patients, 18 died showing a mortality rate of 60%. Seven out of thirty (23.33%) patients survived with severe disability and three (10%) patients showed moderate disability and good recovery. A good

functional outcome means a GOS grade of good recovery and/or moderate disability.

Table 2: Relationship between GCS and the Outcome.

Glasgow Coma Scale (GCS) Scores	Number of Patients	Good Functional Recovery		Poor Functional Recovery	
		Good Recovery	Moderate Disability	Severe Disability	Death
3 – 5	16	-	-	4	12
6 – 8	10	1	2	2	5
9 – 12	4	2	1	1	1

Age and GCS

Out of five patients with age more than 50 years (elderly patients), four with GCS below 8 died with a mortality rate of 80%. Among 25 patients, with ages below 50 years, 23 had GCS below 8, and fourteen died with 56% mortality rate. This showed that the mortality rate was higher in patients above 50 years of age.

DISCUSSION

The incidence of ASDH has been reported in 12-29% in patients with severe head injury.[2-5] In spite of rapid and early CT scanning, diagnosis, and neurosurgical interventions, the mortality rate reported in 50 – 90%.[17-23] Hatashita et al[16] has reported a mortality rate of 55% and functional recovery as 30% in patients with ASDH. The acute subdural hematoma was evacuated by craniotomy and/or decompressive craniectomy depending on GCS, the estimated volume of subdural collection and midline shift, and associated intracranial pathologies. The aim of surgical intervention was to give enough space to the brain to relax and restore its functions.[25] Most studies have demonstrated that the majority of the patients with ASDH were adult males. A study by Ryan et al[26] showed shown that 63% of patients with ASDH were male. Yanagawa et al[27] has reported 67% of male patients with ASDH with a mean age of 43 years. In a study by Alago et al,[24] 79.8% of patients were male with a mean age of 47 years. In our study, 76.66% of the patients were male with a mean age of 45 years and these figures are inconsistent with the above-mentioned studies. It has been well believed that road traffic accidents, falls, occupational accidents, and higher rates of assaults are more common in adult males. Males are more exposed to the outside environment, especially in countries like Pakistan, here people are more involved in risky works and driving as compared to females. Yanagawa el al[27] has stated that ASDH has resulted as most common from RTAs. In another study, RTAs were followed by falls and were the two most common causes of ASDH.[28] Kaptanaglu et al[29] had mentioned similar statistics for ASDH. In our study, 66.66% of patients had injuries from road traffic accidents and 26.66% of patients suffered from falls being the cause of ASDH. The mortality rate in patients with ASDH varies from 40 – 60%.[30-31]

Many factors including age, GCS at the time of presentation, the timing of surgery, and associated intracranial pathologies play important role in ultimate outcome. Gennarelli et al[32] has reported patients with GCS 3-4 had 74% mortality and GCS 6 – 8 had 36 % mortality. Leitgeb et al[30] reported a mortality rate as 47% and with associated intracranial pathologies, the mortality rate was increased as the GCS lowered. Shen et al[33] have reported that the lower the GCS, the higher the mortality. In our study, the overall mortality was 60%. In patients with GCS 3 – 5, the mortality was 75% and with GCS 6-8 it was 50%. The ultimate outcome of patients with ASDH was better in younger age patients as compared to elderly patients.[34-36] Howard et al[18] had reported the mortality rates as 74% and 18% in patients above 65 years and 18 – 40 years of age. Hatashita et al[16] reported that the patients above 65 years had a mortality of 74% as compared to

33% in patients age 10 – 40 years. In our study, the patients above 50 years had a mortality of 80% as compared to patients below 50 years (56%). The reason for increased mortality in elderly patients might be the increased rate of associated medical illnesses, decreased physiological reserve as a whole, and decreased elasticity of the aging brain.

CONCLUSION

In spite of all the developments in the field of medicine and especially in neurosurgery, the ASDH is still very fatal and has high mortality rates. Increasing age, pre-operative GCS, and associated intracranial pathology on CT scans are supposed to be important factors predicting the mortality of such patients. Timely resuscitation and referral to specialized Neurosurgical units, early CT scans, emergency surgical intervention, and postoperative ICU care play role in improving such patients with ASDH.

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Additional Information

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Human Subjects: Consent was obtained by all patients/participants in this study.
Conflicts of Interest:
In compliance with the ICMJE uniform disclosure form, all authors declare the following:
Financial Relationships: All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.
Other Relationships: All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

AUTHORS CONTRIBUTIONS

Sr.#	Author's Full Name	Intellectual Contribution to Paper in Terms of:
1.	Muhammad Asif	Study design and methodology.
2.	Muhammad Asif	Paper writing, referencing, data calculations and
3.	Waqar Aziz Rehman	Data collection and calculations.
4.	Sumaira Serwar	Analysis of data and interpretation of results etc.
5.	Muhammad Asif	Literature review and manuscript writing.
6.	Sumaira Serwar	Analysis of data and quality insurer.