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Acute Subdural Hematomas; management, complications and outcome -a tertiary center experience

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Abstract
Background*: acute subdural hematoma is the most common traumatic intracranial hematoma which carries highest mortality. It's a type of hemorrhage that occurs beneath the dura and is usually associated with other brain injuries. These a number of variables include like age, mechanism of injury, neurological condition on admission, postoperative intracranial pressure (ICP), and time of injury to surgical evacuation contribute to mortality and morbidity in acute SDH. In the present study the management, complications and outcome of acute SDH will be studied.* ***Methods:*** *The study was prospective in nature conducted on all patients of acute subdural hematoma admitted in the Department of neurosurgery, Sher-I-Kashmir Institute of Medical Sciences (SKIMS) Srinagar for a period of two years between June 2015-August 2017. 150 patients diagnosed with acute subdural hematoma were recruited into the study.* ***Results****: In this study acute suH2002064153bdural hematoma was most common in the age group of 21-30 year which was 22% followed by age group of 31-40 years which was about 21.3% with male predominance in all age groups. Most common mode of head injury was road traffic accidents which was found in 67 patients (44.7%) followed by fall from height which was found in 59 patients (39.3%). Most common symptom in acute SDH was Loss of consciousness in 50(33.3 %) patients followed by Vomiting in 43 (28.66%). Glasgow coma scale (GCS) <8 at presentation was found in 73(48.66%) patients followed by GCS of 9-12 in 39(26%) patients. Unilateral dilated pupil which was found in majority of patients. Most patients had thicker SDH>10 mm (50.66%) with significant midline shift and associated contusion (35.33%). Most common location of acute subdural hematoma was in fronto- temporo-parietal region which was found in 44.7% of patients followed by temporal region which was found in 30.7% of patients. Only a minority of patients (20%) were managed conservatively. Most common postoperative complication during hospital stay in our study was chest infection in 30% of patients followed by sepsis in 19.33% of patients. With age there is increase in mortality. Mortality is highest in age group of 60-65 which is 86.20% and lowest in 1-20 age group which is 26.08%. Mortality of Acute subdural hematoma with associated SAH is 55.55% followed by patients associated with Contusion which is 49.05%. Mortality of Acute subdural hematoma with associated SAH is 55.55% followed by patients associated with Contusion which is 49.05%. Mortality rate increased with delay in surgery with delay of >12 hours the mortality is 58.82%. Most of the patients presented with GCS< 8 at the time of presentation to hospital and had a mortality of 78.08%, which indicates very bad prognosis.*
Conclusion*: Traumatic acute SDH is a fatal condition despite all developments in neurosurgical interventions. GCS score, hematoma size, midline shift and associated brain injury are important parameters influencing mortality and morbidity. Early intubation, hyperventilation, prevention and treatment of shock, and surgical decompression and management of increased intracranial pressure are basic requisites for meaningful recovery in patients with severe head injury and acute subdural hematoma.*
Keywords: *acute SDH, Head trauma, GCS Score*

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I. Introduction

Acute Subdural hematoma (ASDH) is a form of traumatic brain injury in which blood gathers between dura and the arachnoid membrane. It occurs in approximately 15% of all traumatic brain injuries and in 30% of the severe ones[1, 2]. Acute subdural haematoma may be of venous or arterial origin. Most frequently, these hematomas result from tearing of bridging vein between the cerebral cortex and a draining venous sinus. Acute subdural hematomas are usually characterized on the basis of their size and location and the amount of time elapsed since the inciting event. In general, Subdural haematoma is classified as acute (up to 72 hours after injury), sub-acute (between 3-14 days after injury), and chronic (usually>14 days after injury) [3]. Acute traumatic subdural hematoma (SDH) is one of the most devastating forms of traumatic brain injury (TBI), with mortality rates estimated between 40–60%[4]. In most situations, especially in patients with profound neurological deficits, subdural haematoma is considered a neurosurgical emergency requiring immediate evacuation of the hematoma[5]. In a study of pure acute subdural haematomas, it was found that in 72% of patients, head injury was produced by a fall or assault, and in only 24% was the cause a motor vehicle collision[6]. Acute subdural hematoma may also occur (sometimes after relatively minor trauma) in patients given anticoagulants and in those with coagulopathies [7,8]. An acute subdural haematoma patient may present with decreased level of consciousness, headache, seizures nausea, personality change, speech difficulties, impaired vision or double vision, weakness, numbness or tingling in arms or legs, memory loss and other changes in mental status. This injury is the leading cause of death in people younger than 45 years old in the US, Europe[9], and most other countries[10.] It has been estimated that each year 1 million admissions to European hospitals are caused by TBI[11]. Incidence, mortality, and morbidity of TBI are even higher in developing countries[10]. Several factors have been well documented to significantly correlate with the morbidity and mortality from ASDH. These variables include: age, mechanism of injury, neurological condition on admission, postoperative intracranial pressure (ICP), and time of injury to surgical evacuation of the ASDH[12, 13, 14, 15, 16, 17, 18,] The treatment of acute subdural haematoma is usually evacuation via craniotomy or decompressive craniotomy (DC). Small haematomas with little mass effect may be managed conservatively in neurosurgery centres[19]. Traumatic acute subdural hematoma (SDH) continues to have high morbidity and mortality rates despite the advent of rapid transportation, computed tomography (CT) scanning, intracranial pressure monitoring and intensive care management[20, 21]. Outcome for these patients may be influenced mainly by the underlying brain injury than the ASDH itself [22]. Despite studies on the impact of early craniectomy (EC) in traumatic acute SDH[23, 24] the value of primary decompressive craniectomy (DC) remains uncertain.

II. Aims & Objectives

To determine the demographic profile of traumatic acute SDH.
To study clinical & radiological assessment at presentation.
To study various modes of management, complications and outcome up to 3 months after trauma.

III. Material & Methods

The study, ‘‘Acute Subdural Hematomas; management, complications and outcome -a study at SKIMS’’ was conducted in the Department of Neurosurgery, SKIMS prospectively for two years (June 2015-August 2017). Prospectively each patient admitted in emergency was clinically evaluated by history and clinical examination. The blood and biochemical test, skeletal survey, ultrasound abdomen and NCCT head was done. The management of the patients was planned as per the patient’s hemodynamic stability, neurological state (on Glasgow Coma scale), medical co-morbidities and radiological

findings. Any associated life-threatening injury to chest or abdomen was ruled out on primary assessment and if present was dealt accordingly. The patients were managed conservatively or surgically after thorough evaluation. The surgical management criteria for acute SDH was 1) SDH with thickness > 10mm; midline shift > 5mm should be evacuated regardless of GCS .2) Patients with acute SDH and GCS< 9 were observed under ICP (intracranial pressure) monitoring. 3) SDH with thickness < 10mm or <5mm midline shift was evacuated when GCS dropped 2 or more points from injury to admission, pupillary function was abnormal, or rise of ICP> 20 mm Hg. The surgery comprised of decompressive craniectomy with evacuation of acute SDH with duroplasty. Post - operatively patients were managed in ICU till stability in haemodynamics and neurological recovery was achieved. The patients with GCS ≥ 13 or with thin rim SDH with no significant midline shift were managed conservatively by iv fluids, decongestants, anti-convulsants and H2blockers and monitored meticulously clinically and radiologically. Any fall in GCS by 2 or increase in SDH radiologically was managed by surgical intervention. The outcome of patients in either group (surgical and conservative) was compared and functional outcome at 3 months after admission was documented. Patients less than 1 year or more than 65years, with polytrauma, severe medical co-morbidities, spontaneous acute SDH and GCS 3 with no brain stem reflexes were excluded. The data was recorded according to proforma and observations compiled and results drawn using statistical techniques (spss/excel).

IV. Observation And Results

Table 1: **Age and Gender Distribution of Patients With acute Subdural Hematoma**

AGE DISTRIBUTION			GENDER DISTRIBUTION			
			Male		Female	
Agegroup	**Frequency(n)**	**%**	**Frequency(n)**	**%**	**Frequency**	**%**
1-20	23	15.33	18	12.0	5	3.33
21-30	33	22.0	27	18.0	6	4.0
31-40	32	21.3	25	16.7	7	4.6
41-50	18	12.0	13	8.67	5	3.33
51-60	15	10.0	11	7.33	4	2.67
61-65	29	19.3	23	15.33	6	4.0
Total	**150**	**100**	**117**	**78.0**	**33**	**22.0**

In this study acute subdural hematoma was most common in the agegroup of 21-30 year which was 22% followed by age group of 31-40 years which was about 21.3%. In this study acute subdural hematoma was predominant in males as compared to females. Out of 150 cases, males were 117(78%) whereas 33 cases were females (22%).

Table 2: Co morbid conditions present in Acute Subdural Hematoma Patients

Comorbid conditions	Frequency	Percentage (%)
Hypertension	31	20.66
Diabetes Milletus	9	6
Hypothyroidism	10	6.66
CAD	3	2
Dementia	3	2
Nil	94	62.66

In our study, concomitant systemic disease identified in most of the patients was hypertensionfollowedbyhypothyroidism.

Table 3: Mode of Trauma Causing Acute Subdural Hematoma

Mode of Trauma	Frequency	Percentage (%)
Road Traffic Accident (RTA)	67	44.7
Fall from Height (FFH)	59	39.3
Assault	14	9.3
Firearm injury	10	6.7

Most common mode of head injury was road traffic accidents which was found in 67 patients (44.7%) followed by fall from height which was foundin59 patients(39.3%).

Table 4: Clinical Presentation of Acute Subdural Hematoma

Symptoms	Frequency	Percentage (%)
Loss of consciousness	50	33.3
Vomiting	43	28.66
Comatose	32	21.33
Weakness	28	18.66
ENT bleed	21	14
Altered Sensorium	16	10.66
Headache	13	8.66
Seizure	11	7.33
Urinary Incontinence	4	2.66

In our study out of 150 patients, most common symptom was Loss of consciousness in 50(33.3 %) patients followed by Vomiting in 43 (28.66%).

Table 5: Glasgow coma scale at Presentation

Glasgow coma scale (GCS)	No. of patients(n)	Percentage (%)
<8	73	48.66
9-12	38	25.33
13-15	39	26

Glasgow coma scale (GCS) <8 at presentation was found in 73(48.66%) patients followed by GCS of 9-12 in 39(26%) patients.

Table 6: Pupillary Size and Reaction at the time of presentation in AcuteSubdural Hematoma

Pupillary size and Reaction	Frequency	Percentage (%)
Normal Pupil	58	38.7
Unilateral Dilated Pupil	73	48.7
Bilateral Dilated & fixed pupil	19	12.7
Total	**150**	**100**

Most common pupillary abnormality found in our study was unilateral dilated pupil which was found in 73 (48.7%) patients.

Table 7: Radiological findings of NCCT Head in Acute SDH patients:

Thickness of SDH>10 mm was found in 72(50.66%) of patients followed by thickness of 5-10mm in 50(33.33%) patients. Midline shift of 5-10mm was common finding in 72(48%) patients.

NCCT Head Findings	variables	Frequency	percentage
Thickness of SDH	SDH <5mm	24	16.0
	SDH 5-10mm	50	33.33
	SDH >10mm	76	50.66
Midline shift (MLS)	<5mm	24	16.0
	5-10mm	72	48.0
	>10mm	24	16.0

Table 8: Associated intracranial injuries in Acute SDH patients:

Associated intracranial injuries	**Contusion**	53	35.33
	SAH	45	30.00
	EDH	11	7.33
	Simple SDH	25	16.66

Most common associated intracranial injury seen in Acute SDH patients was contusion in 53(35.33%) patients followed by SAH in 45(30%) patients.

Table 9: Location of Acute Subdural Hematoma

Location of Hematoma	Frequency	Percentage
Fronto-temporal-Parietal	67	44.7

Temporal	46	30.7
Frontal	27	18
Occipital	10	6.7

Most common location of acute subdural hematoma was in fronto- temporo-parietal region which was found in 44.7% of patients followed by temporal region which was found in 30.7% of patients(figure 1,2,3 and 4)

Table 10: Interval between Injury to Surgery (Golden Hour)

Hours	Frequency(n)	Percentage (%)
<4hours	36	30
5-12hours	66	55
>12hours	18	15

Most of the patients about 55% were operated between 5-12 hours from the time of injury**.**

Table 11: Management of Acute Subdural Hematoma

Management	Frequency	Percentage
Medical	30	20.0
Surgery	120	80.0
TOTAL	150	100

Most of the patients of acute subdural hematoma underwent surgery which was done in 80% of patients(figure 5 and 6)where as 20% of patients where managed conservatively.

Table 11: Postoperative complications During Hospital Stay

Complications	Frequency	Percentage
Chest infection	45	30
Sepsis	29	19.33
Hypotension	18	12
Bed sores	15	10
Urinary sepsis	12	8
Coagulopathy	11	7.3
Wound infections	**7**	4.66

Most common postoperative complication during hospital stay in our study was chest infection in 30% of patients followed by sepsis in19.33%ofpatients.

Table 12: Glasgow Outcome Score at 2 weeks and 3 Months

	2WEEKS		3 MONTHS		
Glasgow Outcome Score	Frequency	%	Frequency	%	P-VALUE
Good recovery	41	27.3	52	34.7	0.17
Moderate disability	13	8.7	14	9.31	0.84
Severe Disability	15	10	5	3.31	0.02
Persistent Vegetative state	9	6	4	2.7	0.15
Death	72	48	75	50	0.908

Out of 150 patients in our study 75(50%) patients died and 52 (34.7%) patients had good recovery.

Table 13: Correlation between Age and Mortality

AGE GROUP	FREQUENCY	MORTALITY	PERCENT	P-Value
1-20	23	6	26.08	<0.5
21-30	33	10	30.30	<0.5
31-40	32	14	43.75	<0.5
41-50	18	9	50	<0.5
51-60	15	11	73.33	<0.5
60-65	29	25	86.20	<0.5

With age there is increase in mortality. Mortality is highest in age group of 60-65 which is 86.20% and lowest in 1-20 age group which is 26.08%.

Table 14: Correlation between Thickness of Acute Subdural Hematomaand Mortality

Thickness of SDH	No. of Patients	Mortality	Percent	P-Value
SDH<5mm	24	1	4.16	<0.05
SDH 5-10mm	50	15	30	<0.05
SDH >10mm	76	29	38.15	<0.05

Mortality of acute subdural patients with SDH Thickness >10mm was 38.15% and mortality was only 4.16% when SDH thickness was <5mm.

Table 15: Correlation between Midline Shift and Mortality

MLS	No. Of Patients	Mortality	percent	P-Value
<5mm	24	5	20.83	<0.05
5-10mm	72	47	65.27	<0.05
>10mm	24	19	79.16	<0.05

Mortality of the patients was 20.83% when midline shift was <5mm and mortality was increased to 79.16% when midline shift was >10mm.

Table 16: Correlation between Pupillary Reaction and Mortality

Pupillary Reaction	NO. OF PATIENTS	MORTALITY	Percent	P-VALUE
Normal Pupil	58	8	13.79	<0.05
Unilateral Dilated	73	49	67.12	<0.05
B/L Fixed Dilated	19	18	94.73	<0.05

Patients with normal size and reacting pupils the mortality is 13.79%, for those with unilateral dilated pupil the mortality risen to 67.12% and it is 94.73% for bilateral dilated fixed pupils.

Table 17: Correlation between Associated Intracranial Injuries and Mortality

Intracranial Injury	No. Of	Mortality	Percent	P-Value
Simple SDH	25	5	20	<0.05
Contusion	53	26	49.05	<0.05
EDH	11	5	45.45	<0.05
SAH	45	25	55.55	<0.05

Mortality of Acute subdural hematoma with associated SAH is 55.55% followed by patients associated with Contusion which is 49.05%.

Table 18: Correlation between Time interval From Injury to Surgery and Mortality

Time Interval	No. Of Patients	Mortality	Percent
<4Hours	36	17	47.22
5-12 Hours	67	42	62.68
>12 Hours	17	10	58.82

When the interval between the injury to surgery is <4 hours mortality is 47.22%, when interval between the injury to surgery is between 5-12 hours the mortality is 62.68% and when the interval is >12 hours the mortalityis58.82%.

Table 19: Correlation between hemodynamic and Mortality of Acute Subdural Hematoma patients

BP	No. of Patients	Mortality	%	P-Value
SystolicBP<90mmHg	26	21	80.76	<0.05
SystolicBP>90mmhg	124	54	43.54	>0.05

Patients with hypotension (systolic BP<90mmHg), the mortality was80.76%andforthose withBP>90mmhgthemortalitywas43.54%.

Table 20: Correlation between Glasgow coma scale at Presentation and Mortality

GCS	No. of patients	mortality	%	P-Value
<8	73	57	78.08	<0.05
9-12	38	15	39.47	<0.05
13-15	39	3	7.69	<0.05

Most of the patients presented with GCS< 8 at the time of presentation to hospital and had a mortality of 78.08%, which indicates very bad prognosis.

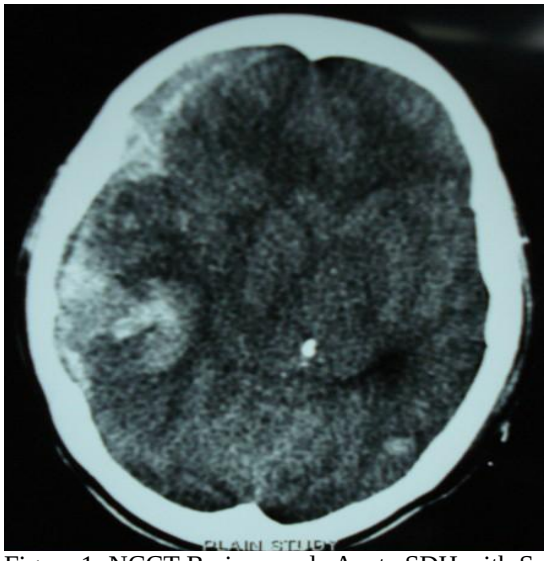

Figure 1. NCCT Brain reveals Acute SDH with Severe Brain Edema

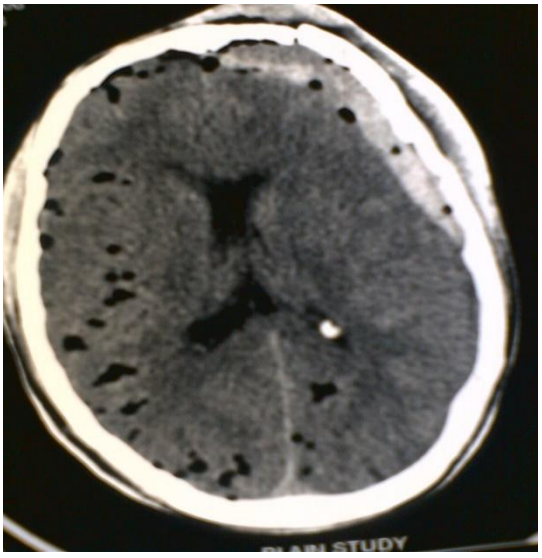

Figure 2. Plain CT Scan shows Acute SDH with Pneumocephalus, Cranial fracture and cephalohematoma

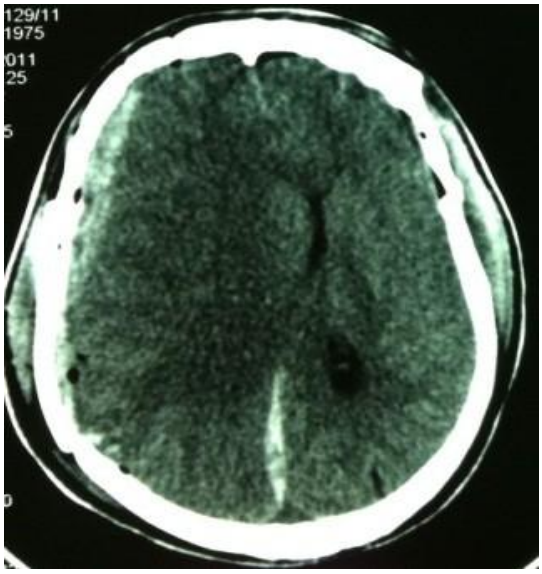

Figure 3. NCCT head showing acute SDH with severe brain edema

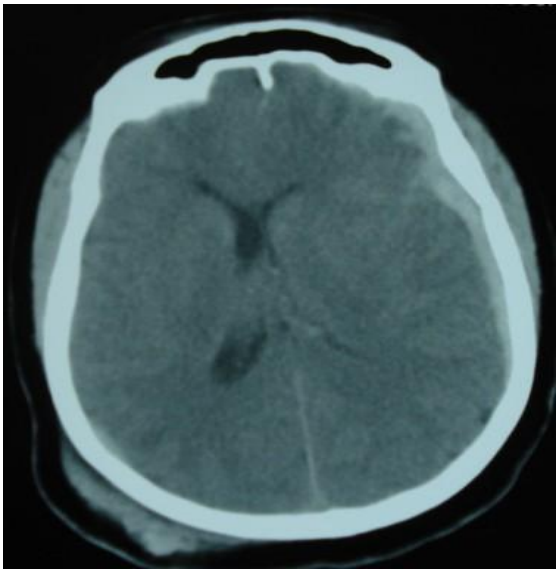

Figure 2 CT Brain depicts Left Frontal Acute SDH diagonally Opposite to Right Parietal

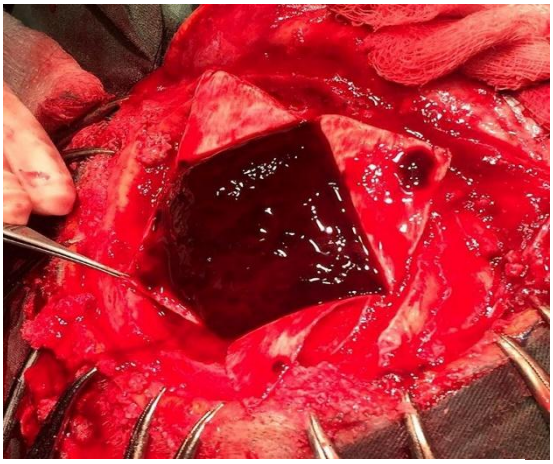

Figure 5 Intra-Operative image of Acute SDH

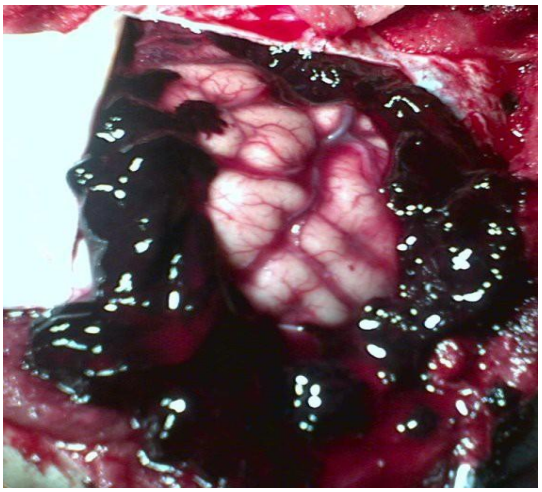

Figure 6 Intra-Operative Evacuation of Acute SDH

V. Discussion

Acute SDH develops in approximately one third of brain injuries due to severe head trauma[13, 25]. Morbidity and mortality after an acute sub dural hematoma are the highest of all traumatic mass lesions[15, 17] This poor 0..outcome results largely from associated parenchymal injuries and subsequent intracranial hypertension[15,17]. Approximately 50% of the patients have associated lesion[15, 17]. In our series we found 83% of acute SDH patients are having associated lesions. Our study shows that age, neurological status, hypotension and severity of trauma are the main factors determining outcomes after severe TBI due to acute SDH. Age is one of the most important factors influencing survival as well as recovery after severe TBI, as demonstrated in the large study done by Hukkelhoven et al[26]. They estimated that the odds for poor outcome increased by 40%–50% per 10 years of age. Studies from United States and Europe[27] demonstrated that traumatic ASDH has an important role on the mortality under the age of 45. Yanagawa et al[28] reported that 67% of the patients of traumatic ASDHs were male and the mean age was 43. Shen et al[31] reported that the majority of the affected patients were male and the patient population had a

mean age of 36

years. In our study, 78% of our patients were male and their mean age was 38 years. Thus, our population's mean age and male percentage were similar to series reported in the literature. We believe that an increased percentage of driving, occupational accidents, higher rate of assault incidents among adults and firearm injuries due to human right violation are the factors that shaped the mean age of our population. Men are exposed more to trauma since they spend more time out of their house and are more commonly involved in risky jobs such as working in high places and driving vehicles compared to women.

Ryan et al[29] reported that the most common cause of traumatic

ASDH was falls from heights, followed by motor vehicle accidents. Leitgeb et al[32] similarly reported that falls and traffic accidents were the most common causes of traumatic ASDH. Yanagawa et al[28] observed that ASDH most commonly resulted from traffic accidents. It was also reported that falls were the most common cause of ASDH, followed by traffic accidents[34]. In our study, we found road traffic accidents followed by fall from height were the most common etiology of ASDH.

Various co morbid conditions where present in patients of acute subdural hematoma. The common co morbid conditions present in our study was hypertension (20.22%), hypothyroid (6.66%), diabetes mellitus (6%), coronary artery disease (2%) and dementia (2%). The common medical conditions present in the study of Christana G. Ryan et al[29] were hypertension (37%), cardiac disease (20%), diabetes mellitus (15%), alcohol abuse (12%) and drug abuse (6%).The co morbid condition patients were less in our study as compared to Christana G. Ryan et al[29] study. The main reason for this variation may be due to less data in our study and due to geographical variation. Another reason may be age of the patients, as the mean age of acute SDH patients in our study was 38 years as compared to mean age of 58 years in the study of Christana G. Ryan[29]. The classical presentation of acute subdural hematoma patients is alteration in conscious level or gradual worsening in the level of consciousness. Some evidence of localization is present in about 70% of cases. In the rest the localizing signs do not occur either because of associated lesions or rapid development of brainstem signs. The common clinical presentation in our study was loss of consciousness (33.3%), vomiting (28.66%), comatose (21.33%), weakness (18.66%), ENT bleed (14%), altered sensorium (10.66%), headache (8.66%) and urinary incontinence (2.66%). Preoperative neurologic status is the most important factor in determining outcome. The most detailed analysis of the effects of GCS scores on outcomes after severe TBI was done in the IMPACT (International Mission for Prognosis and Analysis of Clinical Trials in TBI) study[20]. It was shown that the GCS score at hospital admission w a s strongly related to the GOS score at 6 months after trauma (OR 1.7–7.5). Hatashita et[39] also found a strong correlation between GCS scores and mortality: nearly all patients with acute SDH and GCS scores of 3 died (93% mortality); patients with GCS scores of 4–6 had a mortality of 45%–67%, and all patients with GCS scores of 7 or higher survived. These results are confirmed by the study by Koç et al[11]. Gennarelli et al[23] published mortality rates of 74% for patients with acute SDH and GCS scores of 3–5, and 36% for those with GCS scores of 6–8. This significant association between GCS scores and outcomes was also found in our study. In our study we found that patients with GCS score of 3-8 have mortality of 78%, patients with GCS score of 9-12 have mortality of 39% and patients with GCS of13-15 have mortality of 7.69%. Koç et al[11] reported that patients with acute SDH who presented with bilateral or unilateral unreactive pupils had mortality rates of 97% and 81%, respectively. In the study by Marmarou et al[20] one or both unreactive pupils were significantly associated with poor outcome (OR 2.71–7.31). With regard to hospital outcome, this association was also observed in our study. In our study, we found 13.79% mortality in patients with normal size reacting pupil, 67.12% with unilateral dilated pupil and 94.73% with bilateral dilated fixed pupil. It is well known that parenchymal lesions

and edema developing inside the brain are the most important factors determining the clinical course of ASDH[25]. Shen et al[31] reported that cranium fractures and brain edema were the main additional pathologies in their study population. Leitgeb et al[32] reported that SAH and contusion ranked top among additional pathologies also emphasized by Son et al[34]. In our study, the contusion and SAH were also the commonest associated intracranial injury. In this study, the most common location of acute Subdural hematoma was in fronto-tempero-parietal region which was found in 44.7% of patients followed by temporal region which was found in 30.7% of patients. P. Prahaladu et al[41] also found fronto-tempero-parietal region as most common location of acute subdural hematoma which was found in 53.33% of patients followed by temporal region which was found in 20% 0f patients. Thus location of acute subdural hematoma found in our study is same as found in the literature. Hypotension is an important factor which predicts poor outcome in traumatic acute SDH patients. P. Prahaladu et al[41] found hypotension in 35% of the patients with mortality 60%. In our study hypotension was found in 26 (17.33%) patients with mortality in 21(80.76%) of patients. Thus hypotension is another important factor which is having significantinfluence on the outcome after surgery for acute subdural hematoma.

Heissler et al found thickness of hematoma, midline shift are having significant impact on outcome. They found hematoma thickness

of >10mm, with midline shift >5mm are having 30% increased mortality than those without[74]. P. Prahaladu et al[41] found thickness of hematoma, midline shift are having significant impact on outcome .They showedsimilar trend with mortality reaching 30%. In our study we also found midline shift and thickness of hematoma have significant impact on outcome of acute traumatic SDH. We found patients with midline shift >10mm and thickness >10mm have mortality of 79.16% and 38.15% respectively.With regard to surgical management, Seelig et al[42] reported a mortality of 30% for comatose patients treated less than 4 hours after injury versus 90% mortality for those treated after 4 hours. Other authors, however, came to different conclusions. Wilberger et al[43] found that mortality in patients with admission GCS scores less than 8 whounderwent surgery within 4 hours of injury was 59% versus 69% for those who underwent surgery after 4 hours. They were not able to confirm a significant influence of timing of surgery on outcome. These findings are supported by the studies done by Stone et al[36], Hatashita et al[39] and Koç et al[11] .In our study the mortality of the patients who underwent surgery within 4 hours was 47.22% versus 61.90% who underwent surgery within 4 to 12 hours and mortality was 58.82% who underwent surgery after 12 hours of injury.

Although the indications for operation have not been clearly established in traumatic ASDH, craniotomy and decompressive craniectomy were performed for therapeutic purposes to induce brain relaxation[44, 32]. Croce MA at al[21] in their study managed 58(70%) patients nonsurgically and 25(30%) managed with craniotomy. In our study, out of 150 patients of acute SDH, 120(80%) patients were operated as soon as possible after admission and 30(20%) patients were manage conservatively. Hematoma evacuation was accomplished with craniotomy or decompressive craniectomy, depending on factors such as clinical condition, hematoma size, and parenchymal edema of the patient. In patients with a lower GCS score and severe edema as an additional pathology, decompressive craniectomy was the preferred treatment modality. The aim of craniectomy was to provide sufficient spaceforbrainrelaxationandtopreventherniation.

Most common postoperative complications found in patients of acute subdural hematoma during hospital stay in our study was chestinfection which was found in 30% of patients followed by sepsis in19.33%. The other common complications found were hypotension (12%), bed sore (10%), urinary sepsis (8%), and coaglopathy (7.3%) and wound infection (4.6%). Christana G. Ryan et al[37] in their study the most common complication was pulmonary complication in 11% and urinary infection in 7%. Pneumonia is a common complication of severe brain injury and can occur in up to 60% of patients[37] as these

patients are prone to aspirate stomach contents. The chest infection was common in our study as patients were kept in ICU. In our ICU, the staff is not probably talking proper antiseptic precautions before touching the patient and the patient are not properly isolated due to less space. The staffs in ICU are also less as result patients do not receive proper care.

Koç et al[11] reported 60% mortality and 38% favourable outcome for patients with acute SDH who needed surgery; that study included patients with moderate TBI. Hospital mortality for patients who had acute SDH evacuation was 50% in our study. It seems that nearly all survivors in the study by Koç et al[11] had favourable outcomes, and more than one-third of the survivors had unfavorable outcomes in our study. Hatashita et al found an overall mortality of 55% and favourable outcome of 30% in surgically treated patients with acute SDH; their study also included patients with moderate TBI. These results are somewhat closer to our own results than those of Koç et al[11]. In another study, Servadei et al[30] reported a 35.4% favourable outcome in 65 patients with severe TBI due to acute SDH, and they managed 20% of the patients conservatively. In our study of 150 patients of acute traumatic SDH, we had a mortality of 50% and functional outcome of 34.7%. On the other hand, the functional recovery rate ranges between 19% and 45% in traumatic ASDH[44, 32]. Nearly 50% 0f patients of acute subdural hematoma were improved within one week of management. S. Azhari et al[45] in their study of acute subdural hematoma found mortality rate of 73%, good to moderate recoveries were seen in 23% and severe disability or a vegetative state in 4%. P. Prahaladu et al[41] in their study of acute subdural hematoma at 6 months found mortality of 24.67%, vegetative state 1.33%, severe disability 6.67%, moderate disability 34% and good recovery 33.33%. In our study at 6 weeks of follow up we found mortality of 50%, vegetative state 2.7%, severe disability 3.31%, moderate disability 9.31%, good recovery 34.7% as shown in table no.12. These data compare favourably with the results of other reports[40].

VI. Conclusion

Traumatic acute SDH is a fatal condition despite all developments in neurosurgical interventions. GCS score, hematoma size, midline shift and associated brain injury are important parameters influencing mortality and morbidity. Other factors affecting mortality are age and time delay from admission to intervention. Early intubation, hyperventilation, prevention and treatment of shock, and surgical decompression and management of increased intracranial pressure are basic requisites for meaningful recovery in patients with severe head injury and acute subdural hematoma.

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