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Chronic Subdural Hematoma: A Comprehensive and Analytical Study in a Tertiary Care Teaching Hospital of Vindhya Region of India

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Abstract
Objective: *To correlate the etiological factors, to confirm the diagnosis, role of surgical intervention and effect on outcome of these patients.*
Material and Method: *A Prospective study of 42 cases of chronic subdural hematoma was conducted in surgical wards of Shyam Shah Medical College and associated Sanjay Gandhi Memorial Hospital Rewa during 2013-2017. After admission, detailed clinical and neurological assessment done with routine and specialized investigation. Diagnosis confirmed by CT/MRI and surgical intervention done. Assessment of outcome done by Markwalder Grading System (MGS) at admission and in postoperative period.*
Results: *Forty-two patients of chronic subdural hematoma were treated in our department during the study period. 76.18% patients were above the age of 60, 85.71% patients had history of trauma 4-8 weeks back, most Common Presenting symptom was Headache(85.71%), and drowsiness (76.19%), Overall, there was a significant improvement in the neurological status of patients from admission to follow-up in patients grouped in MGS score 2. The mortality rate in our study was 7.7%.*
Conclusion: *Present study gives an epidemiological overview of this surgical condition, role of detailed neurological assessment and appropriate surgical intervention. In our study we found that 30 out of 32 patients that belonged to moderate neurological impairment group(MGS-2) showed significant improvement in neurological status postoperatively and had a post op MGS of 0-1. Based on this observation we can conclude that there is strong evidence in favor of timely and appropriate surgical intervention in treatment of CSDH, so as to reduce morbidity and mortality associated with the disease.*
Keywords: *Hematoma, Chronic, Subdural, Neurosurgery, Analytical study.*

Introduction

Chronic Subdural Hematoma (CSDH) is one of the most frequent types of intracranial hemorrhage, with favorable prognosis when treated properly. However, as it tends to occur in older patients, its evolution may suffer interference from postoperative complications.[1] Chronic subdural hematoma is a common neurological problem in the elder age group because of normal brain shrinkage that occurs with ageing. The bridging veins weakens and likely to get rupture even after minor head injury. Most of the time family member may not remember any history of injury to the head. Usually these patient's presents with mild to moderate headache, change in the behaviour, memory impairment, gait disturbances and weakness on one side of body usually. So many times patients are attending the psychiatry opd due to abnormal behavior. In pre CT era the final diagnosis was difficult and the investigation of choice was cerebral angiography. So final diagnosis was delayed and patient neurologically get deteriorated before the final diagnosis. After the availability of the CT scan and MRI the early and accurate diagnosis of the disease have become easy hence the management and outcome of the cases has improved tremendously and mortality rate got down significantly. Patients who were already taking antiplatelets /anticoagulant drugs like aspirin and clopidogrel for pre existing medical problem are more susceptible to develop chronic subdural hematoma due to bleeding tendency even in minor trauma or some time without trauma. Surgical treatment of CSDH is widely accepted as the most effective method.[2]

Material and Method

A Prospective study of 42 cases of chronic subdural hematoma was conducted in surgical wards of Shyam Shah Medical College and associated Sanjay Gandhi Memorial Hospital Rewa during 2013-2017. Most of the patients were admitted from outpatient department, emergency department and patient's referred from other departments. After admission in ward or icu detailed clinical and neurological assessment done with routine and specialized investigation. Diagnosis confirmed by CT/MRI followed by Surgical intervention. Surgical interventions done were burr holes or Craniotomy decided on the clinical and neurological status of the patient. Neurological assessment done at the time of admission, at 7th postoperative day or at the time discharge whichever is earlier on the basis of Markwalder Grading System (MGS) (Table-1).[3] Aim of the study was to correlate the etiological factors, to confirm the diagnosis, role of surgical intervention and effect on outcome of these patients.

Table -1 Markwalder grading system of neurological status

MGS Score	Neurological Status
0	Neurologically intact
1	Alert and oriented; mild symptoms such as headache; absent or mild neurological deficit, such as reflex asymmetry
2	Drowsy or disoriented with variable neurological deficit, such as hemiparesis
3	Stuporous but responding appropriately to noxious stimuli; severe focal signs such as hemiplegia
4	Comatose with absent motor response to painful stimuli; decerebrate or decorticate posturing

MGS: Markwalder Grading System

Results

Our study consisted of 42 patients, 30 male and 12 female (ratio 2.5: 1). Maximum number of patients (57.14%) were in 61-70 years age group. (Table-2,3)

Table-2 Distribution of patients according to Age group

Age group	No. of patients	%
30-40	1	2.38
41-50	4	9.52
51-60	5	11.90
61-70	24	57.14
71-80	8	19.04
Total	42	100

Table-3 Gender wise distribution of Patients

Age group	Male	%	Female	%
30-40	1	3.33	0	0
41-50	3	10	1	8.33
51-60	4	13.33	1	8.33
61-70	16	53.33	8	66.66
71-80	6	20	2	16.66
Total	30	100	12	100

CSDH was caused by trauma in 36 (85.71%) patients, the time from trauma to diagnosis was on an average 4-8 weeks. Antiplatelet drugs intake was found in 30 (71.4%). Regarding associated diseases, 20 (47.61%) patients were hypertensive, 16(38%) had diabetes, 12% had seizure disorder. 14% of patients were alcoholics (Table-4).

Table-4 Distribution of patients according to Associated conditions

Associated Condition	No. of Patients	Percentage (%)
History of trauma	36	85.71
Antiplatelet drugs intake	30	71.4
Hypertension	20	47.61
Diabetes	16	38
Seizure Disorder	5	12
Alcoholism	6	14

Ongoing medications were antiplatelet drugs in 71.4%, inhibitors of angiotensin-converting enzyme (ACE) in 23.8%, Nonsteroidal anti-inflammatory drugs (NSAIDs) in 33.3%, and 19% oral hypoglycemic agents, 9.5% diuretics, 7% Anticonvulsants. (Table-5).

Table-5 Medication in use

Medication	No. of Patients	Percentage (%)
Antiplatelet agents	30	71.4
Angiotensin-converting enzyme (ACE) inhibitors	10	23.8
Diuretics	4	9.5
Hypoglycemic agents	8	19
Anticonvulsants	3	7.14
Nonsteroidal anti-inflammatory drugs (NSAIDs)	14	33.33

Most Common Presenting symptom was Headache (85.71%), followed by drowsiness (76.19%), Hemiparesis (71.42%), Altered Mental Status (57.14%).(Table-6)

Table-6 Presenting symptoms

Symptoms	No. of Patients	Percentage(%)
Headache	36	85.71
Altered Mental Status	24	57.14
loss of consciousness	7	16.66
Drowsiness	32	76.19
Fluctuation of symptoms	15	35.71
Vomiting	12	28.57
Hemi paresis	30	71.42
Neck stiffness	4	9.52
Dysphasia	12	28.57
Limb symptoms	10	23.80
Coma	2	4.76

Diagnostic imaging was done by Computerized Tomography CT and MRI. The hematoma was unilateral in 85.71%, and in 7% it was bilateral. Hematoma was hypodense in 47.6%, mixed in 42.8% and hyperdense in 9.5%.

Overall, there was a significant improvement in the neurological status of patients from admission to follow-up in patients grouped in MGS score 2.

Patient outcome was assessed compared to their initial neurological status as determined by MGS score. On admission 10.2% cases had an MGS score of 0-1 and on follow-up it was seen in 87.1% cases, demonstrating improvement in neurological function in significant number of patients on follow-up. There was significant neurological improvement in patients that initially presented with an MGS score of 2 (82% patients at admission while only 5.1% patients on follow up) and those patients that presented with an MGS score of 3-4; all of them died in follow up period. (Table-7) The mortality rate in our study was 7.7%.All the patients that died were either stuporous or comatose i.e, had severe impairement of neurological functions preoperatively.

Table -7

MGS Score	At Admission		Follow up	
	No. of cases	Percentage(%)	No. of cases	Percentage(%)
0-1	4	10.2	34	87.1
2	32	82	2	5.1
3-4	3	7.7	-	-

n- 39(Out of 42 patients, 3 patient didn't consent for surgery.)

Discussion

Chronic subdural hematoma (CSDH) is predominantly a disease of the elderly, yet surgical outcome remains an understudied field of research in this population. In this study we studied the etiologic factors, role of early diagnosis and surgical intervention in outcomes of 42 patients, that were treated for chronic subdural hematomas. We found that 32 (76.18%) patients were above the age of 60. Among males 53.33% patients were above the age of 60 whereas among females 66.66% were above the age of 60.It has a peak incidence in the sixth and seventh decade of life. Fogelholm and Waltimo estimated an incidence of 1.72/100 000 per year, the incidence increasing steeply with advancing age up to 7.35/ 100 000 per year in the age group 70–79.[4] This incidence is expected to rise further due to the continuing growth of the older population.

36 patients (85.71%) had history of trauma 4-8 weeks back. Trauma is an important factor in the development of CSDH. However, a history of head injury (direct trauma) is absent in about 30%–50% of the cases. Indirect trauma seems to be more important. About half the patients have a history of fall but without hitting their head on the ground.[5.6] CSDHs often occur after a trivial injury without any damage to the underlying brain and usually there is a period of weeks to months before it becomes clinically evident. The thin walls of bridging veins, circumferential arrangement of collagen fibers, and a lack of outer reinforcement by arachnoid trabecules contribute to the more fragile nature of bridging vein in the subdural portion as compared to the subarachnoid portion.

History of antiplatelet drug intake was present in 30 (71.42%) patients. All these patients were taking either Aspirin or Clopidogrel or both. 20 (47.61%) patients had history hypertension, 16 had diabetes, 5 had history of seizure disorder, 6 patients had history of chronic alcoholism. Antithrombotics are the second most common risk factor. CSDH could develop in the presence of potential hemorrhagic diathesis due to the deficiency of clotting factors. Factor XIII (FXIII) deficiency may play a pathophysiological role in spontaneous CSDH. FXIII activity should be investigated because it may predict rebleeding events after treatment. FXIII substitution may prevent recurrence in individuals with considerably low FXIII activity.[7]CSDH could develop in patients receiving antiplatelet and anticoagulation therapy.[8]

Most common presentation was Headache (85.71%) followed by drowsiness(76.19%) and hemiparesis (71.42%). The presentation of CSDH could vary from no symptoms to headache, seizures, decreased memory, and confusion. Patients could have difficulty in speech, swallowing, and walking. There may be weakness or numbness of arms, legs, and face.

CSDH is usually diagnosed by CT scan. A CSDH is a dynamic lesion and its appearance on computed tomography is dependent on its age. Soon after a haemorrhage (acute phase), the haematoma looks hyperdense when compared with the normal brain, due to the presence of fresh blood. During the next few weeks (subacute phase) resolution occurs due to fibrinolysis so the haematoma appears isodense. After about four weeks (chronic phase) it appears hypodense due to the resorption of fluid.[9] However repeated microhaemorrhages into a CSDH can increase the density, giving rise to a heterogeneous or a hyperdense picture. In 20 cases on CT hematoma was hypodense, mixed in 18 cases and isodense in 4 cases. As most of the cases in present study

presented to hospital after 4-8 weeks following the trauma that's why in maximum cases hematoma was seen as hypodense. Site of hematoma was unilateral in 36(93.33%) patients and bilateral in 6 patients.

Overall, there was a significant improvement in the neurological status of patients from admission to follow-up in patients grouped in MGS score 2.

Patient outcome was assessed compared to their initial neurological status as determined by MGS score. On admission 10.2% cases had an MGS score of 0-1 and on follow-up it was seen in 87.1% cases, demonstrating improvement in neurological function in significant number of patients on follow-up. There was significant neurological improvement in patients that initially presented with an MGS score of 2 (82% patients at admission while only 5.1% patients on follow up) and those patients that presented with an MGS score of 3-4; all of them died in follow up period. (Table-7) The mortality rate in our study was 7.7%.All the patients that died were either stuporous or comatose i.e, had severe impairement of neurological functions preoperatively.

Conclusion

Our results show that there is a definite role of surgical evacuation in chronic subdural hematoma patients for improving their neurological status significantly. The perioperative course of SDH is often unpredictable and complications often arise from other medical comorbidities. This study gives an epidemiological overview of this surgical condition, role of detailed neurological assessment and appropriate surgical intervention. In our study we found that 30 out of 32 patients that belonged to moderate neurological impairement group (MGS-2) showed significant improvement in neurological status postoperatively and had a post op MGS of 0-1. Based on this observation we can conclude that there is strong evidence in favour of timely and appropriate surgical intervention in treatment of CSDH, so as to reduce morbidity and mortality associated with the disease. In present study 4 patients were grouped in mild neurological impairment group (MGS-1), those patients can be observed with vigilance and can be operated later if there is any neurological deterioration. The poor results in severe neurological impairement group i.e, (MGS= 3-4) could be explained by the severe degree of permanent parenchymal damage that was beyond repair. Furthermore, larger trials may be required to confirm or refute this observation.

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