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Original Research Article

Management of chronic subdural hematoma: our experience of last seven years

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ABSTRACT

Background: Chronic SDH is collection of altered blood under dura mater which is variably more than 4-6 weeks old. It usually occurs in presence of atrophic brain which usually occurs in chronic alcoholics and in old age. Pathogenetic factors are mild trauma with or without some form of coagulopathy. There are various management options like twist drill and drainage, burr hole with evacuation with or without placement of drain and mini craniotomy. There are specific indications for each procedure with individual variations. We operated 74 patients of chronic SDH in last 7 years and are presenting analysis of our series.
Methods: The study is retrospective. We studied records of 74 consecutive patients operated in single unit at our institute from February 2014 to December 2020. Patients with very poor GCS (less than 5) and children are not included in this study.
Results: There was no benefit of drainage tube seen in our series of patients in decreasing incidence of residual collection.
Conclusions: Timely intervention in case of chronic SDH is very gratifying in view of improvement of GCS and motor deficit without much effect of the type of procedure performed. Burr hole evacuation is the procedure of choice. Placement of drainage tube in subdural space is not effective in decreasing the incidence of residual collection. But it is very helpful in management of residual/recurrent collections.

Keywords: Chronic subdural hematoma, Twist drill craniostomy, Burr holes, Brain atrophy, Subdural drain

INTRODUCTION

Chronic subdural hematoma (CSDH) is collection of altered blood under dura mater which is variably more than 4-6 weeks old. The annual incidence of chronic subdural hematoma has been reported to be 1-5.3 cases per 100,000 population. It occurs in presence of atrophic brain which usually occurs in chronic alcoholics, in old age, in prisoners and in children suffering from CP or HIE or improperly managed congenital hydrocephalus. Other major risk factor is presence of some coagulation deficit or taking some anticoagulants.

Pathogenesis

Mild trauma in these patients causes disruption of bridging veins over cerebral convexity. However active bleeding stops itself without any significant mass effect over brain and without any significant symptoms. Now, there are multiple theories suggested for expansion of this hematoma and eventually becoming symptomatic. Oldest theory states that after passage of 3 to 4 weeks, collected blood dissolves and because of more osmotic active strength, it increases in size by absorption from CSF or blood vessels.[1] Another theory suggests multiple mild traumas in series results in gradual increase in size of

hematoma with accumulation of blood of different intervals because of recurrent bleeding episodes. Third theory states that there is formation of vascularized membrane over hematoma which actively secretes fluid in to hematoma.[2] Rebleeding from thin-walled sinusoidal blood vessels in the outer neo membrane has been proposed.[3] Ito et al estimated that the new haemorrhages accounted for about 6.7% of the hematoma content.[4] Coagulation profile is already deranged in many of these chronic alcoholic patients.[5] In nutshell, the CSDH enlarges from recurrent bleeding in the subdural space, caused by local angiogenesis, inflammation, defective coagulation, and ongoing fibrinolysis. Other groups of patients with deranged coagulation profile and affected by CSDH are those who are on anticoagulants and renal failure patients.[6] Up to certain size of hematoma and because of slow increase in size of hematoma, patient remains asymptomatic and with further mild increase in size of hematoma causes decrease in the blood flow in the underlying brain cortex which results in deterioration of sensorium with appearance of motor deficits. The drainage of the hematoma results in the improvement of cerebral blood flow and clinical recovery.[7]

Clinical presentations

Common presenting symptoms are altered sensorium with or without urinary incontinence and with or without motor deficits (more common in elderly patients), headache and vommitings (which is increasing in severity, more common in comparatively younger patients), other less common presenting features are hemi anaesthesia, diplopia, memory loss and ataxia. Patients are usually more than 70 years of age with history of chronic alcohol intake.

Investigations

Plain CT head is sufficient in diagnosis of CSDH. Features to be seen are effacement of cortical sulcal spaces, asymmetry of lateral ventricles and presence of midline shift in presence of iso to hypodense collection over the cerebral hemisphere. Although, in some patients with bilateral and/or isodense collection, contrast CT or MRI is more informative for diagnosis as well to delineate any presence of septa inside hematoma/ multi-loculations or any enhancing extra-axial mass lesions.[8]

Management

Presence of significant mass effect in presence of severe headache or motor deficit is definitive indication of surgical intervention on emergency basis.[9] Antiepileptics are started in high risk patients.[9] The patients having deranged coagulation profile should be operated only after normalization of coagulation profile. In mean time, decongestants are to be started. Burr hole with drainage of collection is gold standard procedure for its management.[10] Patients are operated under GA or under sedation.[11] Other method of evacuation and drainage is by twist drill craniostomy which is equally effective but because of blind nature carries more risk of brain parenchymal injuries and recurrences.[12] Post operatively, patients are advised to keep head flat or slight downwards. Some surgeons prefer to put feeding tube in subdural space/subgaleal space for continuous drainage. In presence of thick septas visible on radiological investigations and in cases of multiple recurrences, minicraniotomy is done over carefully selecting the region.[11,13] Patients with nonsignificant mass effects and mild symptoms are usually managed conservatively.[13]

Prognosis

The mortality within 30 days of surgery is 3.2-6.5%. Eighty percent of patients resume their prehematoma level of function. In a relatively recent series, 89.4% of patients with chronic SDH who were treated with a closed drainage system had a good recovery and 2.2% worsened. The morbidity and mortality rates associated with surgical treatment of chronic subdural hematoma have been estimated at 11% and 5%, respectively. Between 86% and 90% of patients with chronic subdural hematoma are adequately treated after one surgical procedure.

Complications

Recurrences, residual SDH, pneumo-cranium, subdural empyema, wound infections, seizures.

METHODS

We retrospectively analysed records of patients operated for CSDH from February 2014 to December 2020 in a single unit at our institute. There were 74 such consecutive patients operated in this interval which matched our selection criteria. Patients with very poor GCS (less than 5) are not included in this study and also children are excluded from study. Patients having thick SDH associated with significant mass effect and resultant and explainable clinical symptoms with or without significant mid line shift were selected for surgical decompression. Since study is retrospective, and we studied only records, ethical approval was not required. All patients were evaluated for coagulation profile in addition to all routine investigations. All patients were managed by standard procedure of burr hole and evacuation. All patients who are candidates for surgery were operated as early as possible after stabilizing medical condition of patient. Antiepileptics were started preoperatively after diagnosis is made. Decongestants were started only if delay in surgery was unavoidable because of deranged coagulation profile or some other medical illness and stopped few hours before surgery. 50 patients were managed by two burr holes and rest (24) of patients were managed by single burr hole (usually frontal) at site of maximum thickness of collection with passage of 6 FG feeding tube intra duraly to thoroughly irrigate subdural space with normal saline upto point until returning fluid becomes completely clear**.** Intradural FT

was left in situ in 18 patients and was removed on third post op day. All data collected, was in form of single categorical variable and statistically analysed by one sample proportion test.

RESULTS

Majority of patients (89%) included in our study were males, who were in elderly age group (77% of patients were more than 60 years of age), 62% were having normal coagulation profile and 51% were having history of mild trauma. Headache (35%) was the most common presenting symptom and hemiparesis/hemi anaesthesia was most common presenting sign (Table 1). Placement of subdural drain during surgery was found very useful in management of residual/recurrent collection but we could not find any benefit of drain in preventing recurrences. As almost equal percentage of patients i.e., 22% in drainage group and 23% in nondrainage group showed residual collection (Figure 1).

Table 1: Characteristics of patients involved in study (n=74).

Characteristics		N (%)
Gender	Males	66 (89)
	Females	8 (11)
Age distribution	More than 60	57 (77)
	40 to 60	12 (16)
	Less than 40	5 (7)
History of trauma	Present	51 (69)
	Absent	23 (31)
Coagulation deficit/on anticoagulants	Present	12 (16)
	Absent	62 (84)
Presenting clinical features	Headache only	26 (35)
	Headache with neurological deficits with intact GCS	24 (32.4)
	Poor GCS	24 (32.4)

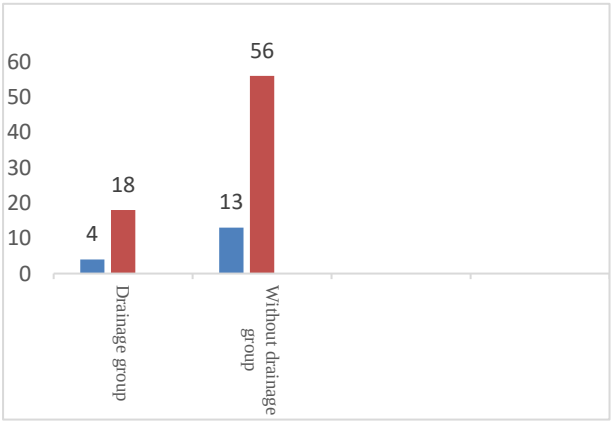

Figure 1: Bar chart showing number of patients presenting with residual collection (blue shaded) in drainage vs. non-drainage group.

DISCUSSION

Chronic SDH is collection of liquefied blood over cortical surface that is usually dark brown in colour with small flakes of blood clots. As it progresses in size very slowly, it becomes very thick before patient presents and diagnosis is made. Majority of affected patients were males. In our study out of 74 patients, only eight patients (11%) were females. The incidence on basis of sex distribution highlights the fact that only the male population is more frequently affected – 64% vs. 33% according to some studies, 71.8% vs. 28.2% according to other studies, etc. It is because, major risk factor responsible for chronic SDH formation that is habit of chronic alcoholism predominantly occurs in males. In a series reported by Foelholm and Waltimo, alcoholics constituted over half of the patient population. It is disease of old age although no age is immune to it.[14,15] One retrospective study reported that 56% of cases were in patients in their fifth and sixth decades; another study noted that more than half of all cases were seen in patients older than 60 years. The highest incidence, 7.35 cases per 100,000 populations, occurs in adults aged 70-79 years. In our study, 57 (77%) patients were more than 60 years of age and 12 (16%) patients were in 40 to 60 age group. Rest 5 (7%) patients were less than 40 years of age. With increasing age, there occurs age related atrophy of brain which is more predominant in alcoholic patients which results in more lax subdural space and stretching of bridging veins. Even mild trauma causes acceleration and deceleration injury in these patients resulting in tears of bridging veins and collection of subdural hematomas. There was history of mild trauma in 51/74 (69%) patients. In rest, there was no history of trauma given. Indirect trauma seems to be more important. About half the patients have a history of fall but without hitting their head on the ground.[16] In many situations the trauma is so trivial that it is forgotten. 50 (67.5%) patients presented with complaints of severe headache with complaints of weakness and numbness on one side of body in 24 (32.4%) of these 50 patients. In rest (26 patients) there was no sensorimotor deficit. 24 (32.4%) patients presented with poor GCS along with hemiparesis. Headache is less common in the elderly when compared with a younger patient[17]. It is partly due to the large available intracranial space for the haematoma to accommodate before creating pressure on the adjacent brain. Another reason is the earlier onset of confusion, which attracts medical attention before the development of headache in the elderly. All patients were diagnosed on basis of plain CT head only. 12/74 (16%) patients were having deranged coagulation profile and were operated after correcting profile by transfusing FFP. Vitamin k also added to treatment in these patients. Literature tells as many as 24% of patients with CSDH are on warfarin or an antiplatelet drug.[18] One patient was a case of Chronic renal failure and was on dialysis and one another patient was postpartum female.40 (54%) patients were operated under GA. 22 (29.7%) patients were operated under LA and rest of 12 (16.2%) patients were operated

under sedation with dexmed. It is advisable by experience that only fully cooperative patients or patients with very poor GCS should be operated under LA, otherwise patient should be operated under GA if patient can tolerate GA or under sedation with dexmed. In 18/74 (24.3%) patients, subdural drain, 6 FG feeding tube, (FT) was left intraoperatively. Although literature suggests high recurrence rate with one burr hole technique, we did not find any difference between two techniques because we did extensive irrigation with normal saline by passing FT.[19] The burr-hole drainage with irrigation is associated with good outcomes and lower recurrence rate, as compared to drainage alone**.** Irrigation with large amount of fluid during surgery may reduce the recurrence rate in CSDH.[20] On the other hand, the outcome with or without irrigation has been found to be the same in CSDH managed by the drainage system.

Post operatively, patient head is kept flat or slightly downwards and not elevated for at least 24 hours after surgery and anticonvulsants with antibiotics kept continue.[21] It is our observation as well as accepted fact that keeping head low keeps brain full because of venous engorgement and increased CSF collection in ventricles leading to increased brain volume and decreased subdural space causing less incidence of pneumocranium and hematoma recollection until brain expands to its previous size that was present before hematoma collection. However, some authors do not prefer head low position because of risk of some medical complications and keep head elevated to 30**.**

Sub Dural drain was removed after three days and it was noted that it did not work properly. CT head used to be done before removal of drain which showed significant residual collection/ recurrence in 4/18 (22%) patients. However, during removal, significant drainage came out. In another 10/56 (18%) patients operated by this method and in whom drain was not placed, there was significant residual collection with or without pneumo-cranium seen on postoperative CT films which was managed bedside by gentle passage of 6 FG feeding tube and irrigating with normal saline. In another 3 patients, there was significant pneumo-cranium present which was also managed by passing feeding tube intra-duraly. So, there was no difference seen (22% vs. 23%) in both groups of patients because of extensive irrigation done in both group of patients. However, literature show less recurrence rate in patients in whom subgaleal or subdural drain was placed after procedure. According to some studies, continuous drainage therapy for CSDH is superior to the one-time drainage method, with shorter post-op hospitalization and low recurrence.[22,23] While, on the other hand, there was no significant difference seen in the postoperative recurrence and the complication rates in drainage and without drainage groups in other studies.[24,25] Advocates of no drain group argue that placing a drain could lead to complications such as brain injury, haemorrhage from neo membranes, and infection without reducing recurrence. Subdural empyemahas been reported after subdural drain.[25] Postoperative infection in the subgaleal space has also been reported after drainage.[26] Still, we also recommend placement of subdural drain in patients in whom brain did not swell and come close near to surface after evacuation of hematoma because it is very helpful in post-operative management of residual collection and we did not see any complication due to subdural drain. In four patients not responding to this treatment, mini-craniotomy was done to remove hematoma and it was noted there was a thick inner membrane present over cortical surface, although not adherent to brain surface, which was removed. In one patient, large intracerebral hematoma formation occurred post operatively and finally succumbed to his illness. Total four patients died during course of treatment, rest three because of chest complications. One patient developed seizure episode. One patient developed subdural empyema, again presented with severe headache after 30 days of surgery. CT head showed mix density collection in subdural space which was managed by re-exploration of previous burr holes and drainage of purulent collection and copious irrigation with normal saline and postoperatively course of antibiotics.

Limitations

Limitations of current study are that we did not operate any patient by twist drill technique. So, we can not comment on recurrences following twist drill drainage. Other, we done extensive irrigation with normal saline in all the patients operated by us, so also could not comment on limited irrigation. Thirdly, we used subdural drain in very small number of patients and that too only for three days that may be the reason for it's no benefit in preventing recurrences.

CONCLUSION

Chronic subdural hematoma is very common neurosurgical problem presenting in elderly, chronic alcoholic males. Timely diagnosis and management is very crucial as postoperative results are very satisfying to surgeon. Placement of Feeding tube in subdural space does not result in decrease in incidence of post-operative collection. However, it is very helpful in its management. Any significant residual collection should be managed by passing FT in subdural space or manipulating already placed FT in subdural space placed during surgery.

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