SURGICAL OUTCOME OF CHRONIC SUBDURAL HAEMATOMA: AN ANALYSIS OF 300 CASES

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Abstract :

Chronic Subdural Heamatoma (CSDH) is defined as collection of blood in the brain's surface, subdural space between dura and arachnoid. It is one of the most common clinical entities in daily neurosurgical practice among the elders, several weeks after the head injury. CSDH doesn't always produce symptoms but when it does, it generally requires surgical treatment. The diagnosis and treatment are well established, but the cause of recurrence, complications and related factors are not completely understood. This study evaluated the clinical features, radiological findings and surgical results in a large series of patients treated at the Neurosurgery department of Dhaka Medical College Hospital. 300 consecutive patients (250 men and 50 women) age ranging from 30-85 years, GCS 5-15, volume of blood >25cc, symptomatic with CSDH were treated by one or two burr hole craniostomies. Haematoma cavity was irrigated with normal saline and closed system subdural drainage was continued for 1-2 days from January 2012 to December 2015. The clinical outcome was measure on 1st, 3rd, 5th and 7th POD using GCS scoring and GOS after 4 and 8 weeks of operations. Most patients 94%(282) had good recovery (GOS 5,4,3), 4%(12) showed no changes (GOS 2) and 2%(6) worsened (GOS 1). Recurrence of haematoma was recognized in 5%(15) patients 1-8 weeks after the first operation. 4%(12) patients suffered post operative complications of which 1.33%(4)patients were acute subdural haematoma caused by incomplete haemostasis of the scalp wound, 1.33%(4)patients were tension pneumocephalus and remaining due to hypertension, use of anticoagulants, poor general health and medical problems. Careful haemostasis and complete replacement of subdural haematoma with normal saline to prevent influx of air into the subdural space will further improve the surgical outcome for patients with CSDH.

Key words: *CSF(Cerebrospinal fluid), CSDH(Chronic subdural hematoma), Burr hole craniostimies, GCS (Glasgow coma score), GOS(Glasgow outcome score).*

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Introduction:

CSDH is one of the most common clinical entities encountered in daily neurosurgical practice. It usually tends to occur in the elderly, several weeks after head injury[1]. CSDH doesn't always produce symptoms but when it does, it generally requires surgical treatment. The causes, clinical features and therapeutic management are well established. Many surgeons pay less emphasis and inadequate attention in the management of CSDH, invites post operative complications and recurrence. The incidence of CSDH varies from 1.72 per 100,000 inhabitants per year in Finland and 13.1 per 100,000 inhabitants per year in Japan[2]. The peak incidence in the 7th and 8th decade of life. It was estimated that the incidence, at a rate of 1.72/100000 per year in earlier decades which became increased upto 7.35/ 100000 per year with increasing age of 70-79 years[3]. CSDH tends to occur in elderly people because brain atrophy causes enlargement of subarachnoid spaces and stretching of the

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bridging veins and these preexisting conditions facilitate tearing of bridging veins also the arachnoid membrane and leakage of bloody CSF into the subdural space after mild head injury[4]. Dramatic improvement was achieved while pathophysiology was clearly understood, neuroimaging was available and refinement of operative technique was adopted. Once operative mortality was upto 13% now it become reduce to 0.5% in a typical neurosurgical centre[5]. The indication of operations was : symptomatic patient with neurological deficit with GCS 5 – 15, midline shift >5mm, haematoma thickness >15mm and volume of haematoma>25cc. The principal technique was burr hole evacuation (one or two burr holes craniostomy with or without membranectomy) with local infiltration of anesthesia with deep sedation. Thorough irrigation was continued till stainless normal saline returned and a closed drain bag placed in situ. This method of evacuation of haematoma minimizes the anaesthetic hazards and reduces the surgical risks and can be done in associated co- morbid conditions[6,7]. In conventional plain CT scan of the brain reveals crescentic hypo to isodense area on the convexity located usually in the fronto-parietal region unilaterally or bilaterally with or without midline shift[8]. Burr hole evacuation of CSDH with or without membranectomy achieved a good surgical prognosis >97% with very few recurrence rates (3%)[9].

Materials and methods

300 consecutive patients with CSDH were treated by haematoma evacuation and drainage through cranial burr holes in the Department of Neurosurgery, Dhaka Medical Collage Hospital, Dhaka from January 2012 to December 2015. There were 250 men and 50 women aged from 35 to 85 years.

Results:

The results of the study are shown in the following tables and figures.

Table-I

Clinicalcharacteristics of 300 patients with CSDH

Sex:	Male	250
	Female	50
Age:	Ranging 30-85 years	
Haematoma Location:		
Left		156 (52%)
Right		90 (30%)
Bilateral		54 (18%)
Haematoma Thickness:		
Left Side		15-25 mm
Right Side		15-24 mm
Bilateral		20-39 mm
Volume of Haematoma:		
Left side		25-75 cc
Right side		25-70 cc
Bilateral		40-130 cc
Haematoma Density:		on CT scan
Hypodensity		45%
Isodensity		40%
Hiperdensity		15%

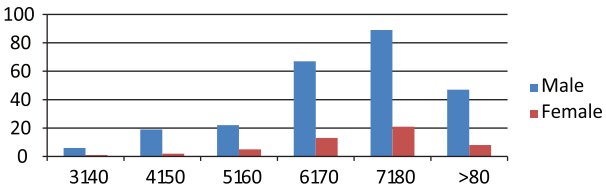


Fig.-1: *Age Distribution*

The incidence gradually increased in each decade and peaked in the eight decade (105 cases, 35%). Computed tomography (CT) scan were performed in all patients to confirm the diagnosis and follow up. CSDH were located on the left side in 156 cases (52%), the right side in 90 cases (30%) and bilaterally in 54 cases (18%). CT demonstrated CSDH as hypodense (45%), isodense (40%), and hyperdense (15%) in relation to Cerebral Parenchyma haematoma thickness varies from 15-25 mm unilaterally and 20-39 bilaterally. Volume of haematoma varies from 25-75 cc unilaterally and 40-130 cc bilaterally.

Table-II

Coexisting disease in 300 patients with CSDH.

Coexisting disease.	No. of patients
Hypertension	50
Diabetes mellitus	21
Cerebral infarction.	12
Intracerebral haemorrhage	4
Alcoholism / hepatitis / CLD.	15
Cancer	6
Anti coagulant patients	4

Under local infiltration of anesthetic drugs, with deep sedation, adequate intravenous analgesics and oxygenmask were given. One or two burr holes craniostomieswere performed and haematomas were evacuated and cavity was irrigated with normal saline through burr holes where possible membranectomy was done. Closed subdural drainage system was continued for 1 – 2 days after the operation. Routine CT scan was performed the day after surgery, after one week and any time if needed. Preoperative haematoma thickness and postoperative haematoma thickness after one week were measured by CT scan to calculate the re-expansion of the brain. Patients with no complications were discharged on the 7th POD and follow up given after 4 to 8 weeks. Neurological assessment was done by GCS & GOS.

Table-III

Causes of CSDH.

Cause	No of patients
Head injury	180 (60%)
H/o previous neurosurgical intervention	12 (4%)
Alcoholism	12 (4%)
Anti coagulant	6 (2%)
Unknown	90 (30%)

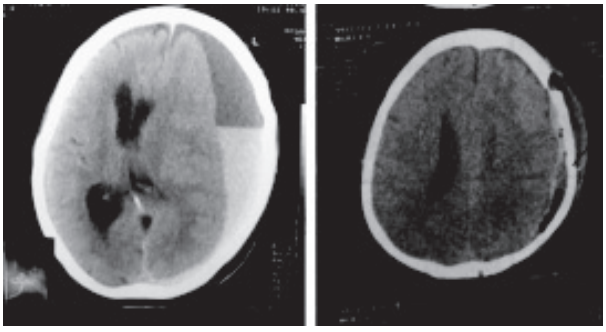
A definite history of head injury was obtained in 180 patients (60 %). Most head injuries were mild, following trivial trauma/RTA/physical assault etc. A past history of neurosurgical operation in 12 patients (4%). History of alcoholism was recognized in 12 patients (4%). 90 patients did not have any definitive cause of CSDH.

Table-IV

Presenting symptoms ofCSDH.

Symptoms.	No. of patients
Gait disturbance.	195 (65 %)
Hemiparesis.	180 (60 %)
Headache.	120 (40 %)
Dementia.	75 (25 %)
Incontinence.	51 (17 %)
Consciousness disturbance.	48 (16%)
Vomiting.	9(3 %)
Convulsion.	9 (3 %)
Motor aphasia.	6 (2 %)

The most frequent symptom was gait disturbance 195 (65 %) followed by hemiparesis 180 (60 %) and headache 120 (40 %). Headache was frequent in the younger age group. Dementia 75 cases (25 %) and urinary incontinence 51 cases (17 %) were also frequently recognized. Dementia was significantly frequent in bilateral CSDH than unilateral.



Pre-operative Post-operative

Fig.-2: *Pre and post operative CT scan.*

Table-V

Immediatepost-operative outcome:

Pre-operative GCS	No of patients	Post-operative GCS	No of patients
5-8	35	5-8	7
9-12	120	9-12	8
13-14	140	13-14	13
15	5	15	272

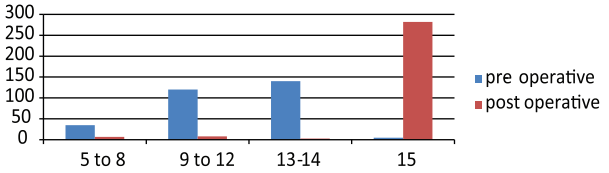


Fig.-2: *Immediate post-operative outcome:*

One month after burr holecraniostomy, 282 of 300 patients (94%) showed good recovery, 12(4%) patients showed no change, 6 patients (2%) died. Causes of death were multiple organ failure, cerebral infarction, DIC, brain herniation and coagulopathy. Outcome of gait disturbance, hemiparesis,headache was better than if patient presented with convulsions.

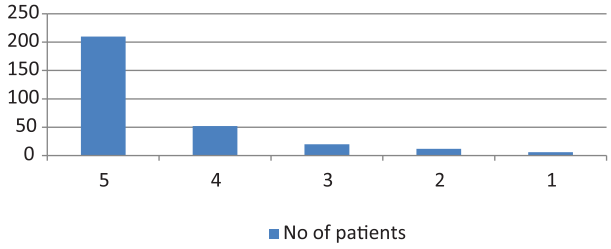


Fig.-3: *Delayedpost-operative outcome*

Delayedpost-operative outcome was assessed by GOS. GOS 5,4,3,2,1 means good recovery, independent, dependent, vegetative state, death respectively.

Recurrence of CSDH after first burr holecraniostomy was recognized in 15 patients (5%). The interval from the first operations to the re-operation ranged from 1 to 8 weeks. The presence of thin subdural haematoma in the contralateral side and poor re-expansionof brain after burr hole craniostomy are the causative factors of haemotoma recurrence.

Table-VI

Post Operative Complications:

Complications	No of patients
Acute Subdural Haematoma	4
Tension pneumocephalus	4
Cerebral Infarction & haemorrhagic stroke	4

Discussion:

The etiology of CSDH is not completely understood. Traumatic subdural effusion is widely accepted as a preliminary stage in the development of CSDH [10]. Despite the general agreement about the indication of operation, the extent of surgery is still controversial through burr hole craniostomy and closed drainage should be the method of choice for initial management[11]. In this study, the age range was between 30-85 years and mean age was 69 years which correlates with Ernestus et al study[11] . In this study male and female ratio was 250:50 (5:1) which correlates with the study of Sanbasivanwhere male female ratio was 6:1[7].

In the present study, the most common symptom was gait disturbance(65%), followed by hemiparesis(60%), headache was also common in younger patients. Dementia (40 %) was recognized in bilateral cases are treatable. Urinary incontinence (17%) was also well recognized. Functional results have been satisfactory in 72% to 95% of recent cases[12]. Our study showed good recovery in 94% and mortality was 2%. which correlate with previous study, where mortality were 2%-4.3%[11].

Recurrence of CSDH after first burr hole craniotomy is not rare and the repeated incidence is 7% to 18%[13]. Our series had a recurrence rate of 5% which is lower than other study.

The rate of cure of CSDH after burr hole craniostomy is high (89 %), but neurological deterioration occasionally complicates the post operative course of this treatable disease 5.4%[14]. In this study cure rate is 94 % and post operative complication is 4 % which is lower than previous studies. Acute subdural haematoma (2.6 %, 13 cases)[14] caused by

bleeding from the scalp wound and fresh blood flowed directly into the evacuated subdural space. In this study 4(1.33%) patients developed acute subdural haematoma lower than previous studies probably due to packing the burr hole with gel foam to prevent fresh blood flow into the subdural space, careful haemostasis of the scalp wound during closure, use of subdural drainage tube and correction of coagulation abnormalities before surgery.

In the present study, tension pneumocephalus was the second most common complication in 4 patients (1.33 %) which was correlated with other studies[14]. Tension pneumocephalus is a fatal complication causing brain herniation. Incomplete replacement of subdural haematoma with normal saline to prevent air accumulation in the evacuated subdural space to avoid complication.

Post operative hypertension and intracerebral haemorrhage may also occur as a post operative complication after burr hole craniostomy[15]. In this study one patient developed Intracerebralhaemorrhage immediately after rapid decompression of CSDH.

The most common co-existing disease was arterial hypertension (18.6%)[14]. In this study 50 patients (16.66%) also have hypertension, correlate with previous study.

Most patients with CSDH (89%) recovers after burr hole craniostomy with closed system drainage. 15% suffer recurrence of haematoma and developed complications, death 2%. In this study good recovery was 94%, complication was 4%, and death 2% which co-relates with international study.

Conclusion :

CSDH is the one of the most common clinical entities in daily neurosurgical practice. Interestingly haematoma evacuation was undertaken, keeping awake with local anesthesia through burr holes. Haematoma was irrigated with normal saline and closed system subdural drainage was continued for 1 or 2 days. Most patients with CSDH recovers after surgery> 94%. The result of surgical treatment can be far better by reducing the post operative complications and recurrence of Haematoma.

Our recommendation are:

1. CSDH evacuation Done under local anesthesia to avoid hazzard of general anesthesia.
2. Double burr hole procedure is better than single burr hole for complete evacuation of haematoma.
3. Hematoma evacuation with membranectomy gives better result.
4. Haematoma cavity was irrigated and filled with normal saline to avoid tension pneumocephalus.
5. Closed system drainage was continued for at least 1 - 2 days.
6. Acute subdural haematoma should be avoided by packing the burr hole with gel foam and careful haemostasis of the scalp wound.

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