# EFFECTIVENESS OF TWO BURR HOLE ASPIRATION FOR TREATMENT OF CHRONIC SUBURAL HEMATOMA

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## ABSTRACT

**Objective:** To determine the effectiveness of two burr hole aspiration for treatment of chronic subural hematoma.

**Material and Methods:** This descriptive study was conducted at Department of Neurosurgery, Naseer Teaching Hospital Peshawar from 1st March 2014 to 28th February 2015. 140 patients were enrolled in this study. Chronic subdural hematoma was diagnosed on CT brain all patient were operated via two bur hole aspiration. Effectiveness of the procedure is determined by at least 3 grades improvement in Glassgow coma scale on 24th hour postoperatively.

**Results:** In this study mean age was 65 years with standard deviation ± 2.31. Seventy four percent patients were male while 26% patients were female. At presentation 22% patients had Glasgow coma score range from 3-7, 67% patients had Glasgow coma score range from 8-12 and 11% patients had Glasgow coma score range from 13-15. Mean Glasgow coma score at presentation was 8 with standard deviation ± 1.78. While after 24 hours follow up 2% patients had Glasgow coma score range from 3-7, 18% patients had Glasgow coma score range from 8-12 and 80% patients had Glasgow coma score range from 13-15. Mean Glasgow coma score was 14 with standard deviation ± 0.51. Effectiveness of procedure was analyzed, in 80% patients the procedure was effective while in 20% patients the procedure was not effective.and mortality was 3.5%

**Conclusion:** Chronic subdural hematoma is common in male and elderly population. Most of the patients present with hemiparesis, headache, behavior changes and urinary incontinence. Two burr-hole evacuation has got excellent outcome with minimal complications.

**Key Word:** Chronic subdural hematoma, Two burr-hole evacuation, Outcome.

## INTRODUCTION

Chronic subdural hematoma (CSDH) often occur in elderly after a trivial injury without any damage to underlying brain and usually there is period of weeks to month before it become clinically evident. History of fall, minimal head trauma often unnotice by the patient, road traffic accident and antithrombotic therapy are the most frequent risk factors for CSDH.[1]

Clinical presentation of CSDH is often insidious. Symptoms include decreased level of consciousness, headache, ataxic gait, cognitive dysfunction or memory loss, motor deficit e.g hemi paresis, headache and aphasia. CT scan brain is the investigation of choice because it depicts acute hemorrhage and skull fractures well, fast obtained, and more readily available than MRI, for smaller hemorrhages MRI is the study of choice[2,14].

Treatment options include two burr-holes drainage, single large burr hole drainage, twist drill craniostomy and craniotomy.[2]

Burr hole drainage is a simple and widely practiced technique and has the best cure to complication ratio. Most surgeons prefer to place two or three burr holes on the side of lesion. The requirements of surgical exposure are adequate drainage, breakdown of septa and washing out of subdural space.[3]

Burr hole craniotomy is the most commonly performed procedure for decompressing the hematoma with in the past 20 years. The procedure is quicker and technically less demanding. It has significantly lower associated morbidity then the other principle techniques. Burr hole revealed no difference in mortality as compared to other procedures. The mortality of CSDHs treated by burr hole craniotomy ranges from 0-8% but it is reported to be 2.5% lower than other procedures[4].

The complications associated with burr hole aspiration are low, but most common are recollection, subdural emphysema, intracerebral hemorrhage, seizure, and pneumocephalus.[4] Burr hole drainage was superior to twist drill craniotomy and craniotomy in treating CSDHs.[7] Outcome in different studies was 64% to 98%[5,6] and mortality rate was 0-8%[7].

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The present study was conducted to determine the effectiveness of two burr hole aspiration in treatment of chronic subdural hematoma and this study will provide us with fresh local efficacy statistics and will guide us in making further recommendation and suggestion for the two bur hole aspiration.

## MATERIAL AND METHODS

This study was conducted at Department of Neurosurgery Naseer Teaching Hospital Peshawar. Study design was descriptive case series and the duration of the study was one year (1st March 2014 to 28 feb 2015) in which a total of 140 patients were studied by keeping success rate of two burr hole aspiration in patients with CSDH to be 64%, 95% confidence interval and 8% margin of error under WHO sample size calculation. More over consecutive non probability sampling Technique was used for sample collection. All patients of chronic subdural hematoma, all ages with either sex, baseline Glasgow coma scale of 12 or less than 12 were included while patients with chronic subdural hematoma treated conservatively, recurrent cases of CSDHs on history, patients with co morbid conditions (cardiac patients, hematological disorder, pulmonary disease patients. Diagnosed on ECG, Echo, X-ray chest, PT/APTT.BT/CT), patients patient with associated brain contusion and subdural Emphysema diagnosed on CT were excluded.

The study was conducted after approval from hospital research and ethical committee. All patients meeting the inclusion criteria with diagnosis of chronic subdural hematoma i.e. the crescent shaped hypodense area in subdural space on CT scan with base line Glasgow coma scale of 12 or less than 12 were enrolled in the study through. Out patient department and was admitted to neurosurgery ward for further work up. All CT scans were reported by a single expert radiologist who was a fellow of CPSP. The purpose and benefits of the study was explained to the patient and a written informed consent was obtained. All the patients were subjected to detailed history followed by complete physical and neurological examination and routine set of investigations were performed in all patients. The enrolled patients were put on the OT list for the next available OT day after performing anesthesia assessment through an expert anesthesiologist.On the OT day two burr holes aspiration were performed under general or local anesthesia. Two burr holes were made depending upon site and size of hematoma, complete irrigation was done until the fluid become clear. Water sealed closure was done and subdural drain was put in almost all cases for 36 to 72 hour post operatively. All the patients were followed up at 24$^{th}$ hour post operatively for the determination of effectiveness in terms of improvement at least 3 grades on Glasgow coma scales(GCS). All above mentioned information including name, age, gender and address was recorded in a predesigned Proforma. Strictly exclusion criteria was followed to control confounders and bias in the study results.

The data was entered, stored and analyzed in SPSS version 10 and presented in forms of tables.

## RESULTS

In this study 140 patients were enrolled. the age was 40-90 years with a mean of 65 years with standard deviation ± 2.31. Gender distribution was predominantly male 104(74%).Male to female ratio was 4:1.mean duration of chronic subdural hematoma was 2 months with SD +_0.21

Pre Operative Glasgow coma score(GCS) among 140 patients was analyzed as n=31(22%) patients had GCS range from 3-7, n=94(67%) patients had GCS range from 8-12 and n=15(11%) patients had GCS range from 13-15. Mean GCS was 8 with standard

**Table no 1. Pre-Operative Glasgow Coma Scale (n=140)**

| Glasgow Coma Scale | Frequency | Percentage |
|---|---|---|
| 3-7 | 31 | 22% |
| 8-12 | 94 | 67% |
| 13-15 | 15 | 11% |
| Total | 140 | 100% |

Mean Glasgow coma score was 8 with standard deviation ± 1.78

**Table no 2. Post -operative glasgow coma scale (at 24 hours) (n=140)**

| Glasgow coma scale | FREQUENCY | PERCENTAGE |
|---|---|---|
| 3-7 | 3 | 2% |
| 8-12 | 25 | 18% |
| 13-15 | 112 | 80% |
| Total | 140 | 100% |

Mean Glasgow coma score was 14 with standard deviation ± 0.51

**Table no 3. Effectiveness of Prodedure (n=140)**

| Effectiveness | Frequency | Percentage |
|---|---|---|
| EFFETIVE | 112 | 80% |
| NOT EFFECTIVE | 28 | 20% |
| Total | 140 | 100% |

Mean Glasgow coma score was 8 with standard deviation ± 1.78

**Table no 4. Association of effectiveness in age distribution**

| Effectiveness | 40-50 years | 51-60 years | 61-70 years | 70 above | TOTAL |
|---|---|---|---|---|---|
| EFFETIVE | 8 | 35 | 57 | 12 | 112 |
| Not effective | 3 | 13 | 10 | 2 | 28 |
| Total | 11 | 48 | 67 | 14 | 140 |

Chi Square test was applied in which P value was 0.0000

**Table no 5. Association of effectiveness in gender distribution**

| EFFECTIVENESS | Male | Female | TOTAL |
|---|---|---|---|
| EFFETIVE | 84 | 28 | 112 |
| Not effective | 20 | 8 | 28 |
| Total | 104 | 36 | 140 |

Chi Square test was applied in which P value was 0.8847

**Table no 6. Association of effectiveness in duraiton of csdh (n=140)**

| EFFECTIVENESS | 1-2 months | 3-4 months | TOTAL |
|---|---|---|---|
| EFFETIVE | 107 | 5 | 112 |
| Not effective | 27 | 1 | 28 |
| Total | 134 | 6 | 140 |

Chi Square test was applied in which P value was 0.8347

deviation ± 1.78. (Table no.1).

Post Operative GCS at 24 hours among 140 patients was analyzed as n=3(2%) patients had GCS range from 3-7, n=25(18%) patients had GCS range from 8-12 and n=112(80%) patients had GCS range from 13-15. Mean GCS was 14 with standard deviation ± 0.51. ( Table No 2)

Effectiveness of procedure was analyzed in n=112(80%) patients the procedure was effective while in n=28(20%) patients the procedure was not effective. (as shown in Table No 3).

In our study n=8(11.2%) patient were operated twice due to recollection of hematoma out of which 5 patient were converted into wide craniotomy and in remaning 3 simple irrigation was done= 4 (5%) patient develop chest infection and similar number of patient develop seizures. n=2(2.8%) patient devlop pnemo-encephalus which was treated by high concentration of oxygen. n=2(2.8%) develop intracerebral bleed. no complication was seen in n=112(80%).mortality rate was 5(3.5%)

Association of effectiveness of procedure in age distribution was analyzed as among 112 effective patients, 8 patients were in age range 40-50 years, 35 patients were in age range 51-60 years, 57 patients were in age range 61-70 years and 12 patients were above 70 years. Association of effectiveness of procedure in gender distribution was analyzed as among 112 effective patients, 84 patients were male and 28 patients were female. Association of effectiveness of procedure with duration of CSDH was analyzed as among 112 effective patients, 107 patients had subdural hematoma ranged from 1-2 months while 5 patients had subdural hematoma ranged from 3-4 months. (Table No 4,5,6).

## DISCUSSION

In this study we included 140 patients in order to analyze the clinical features and surgical results of CSDH. In our study most of the patients 48% were in

age group 61-70 years followed by 34% patients in age range 51-60 years while the incidence of CSDH was found more in male patients as compare to female patients. Similar results were found in study done by Sambasivan M et al[8] in which Forty patients (66.67%) were more than 50 years of age. More over a large study over a period of 30 years, 2300 cases of CSDH were seen and treated in which male preponderance among the cases was seen in a ratio of 5:1.[8]

In our study 25-70% of the patients a positive history of head trauma in the past, while 25-48% did not give any history of head injury in the past.[9,10,11] Falls and antithrombotic therapy are the most frequent risk factor for CSDH.[12] In study done by Sambasivan M et al[8] 70% patients had a history of head trauma, in which 40% had a history of fall while 30% had a history of road traffic accident. There were 30% patients who did not remember the history of head injury. None of the patients had a history of use of antithrombtic therapy.

The most common presenting symptoms are hemiparesis, followed by headache, urinary incontinence, behavioural changes, memory loss and transient ischemic attacks which co relate with studies of Wilkinson CC et all and Weigel R et all.[13,16]

There is no standard method for the treatment of CSDH. However Burr-hole craniostomy is the most commonly performed procedure for decompressing the hematoma within the past 20 years. The surgical procedure of choice in our hospital is two burr hole craniostomy with intraoperative irrigation. In most of our cases, neurological status improved after the surgical treatment.

In our study 31(22%) patients presented with GCS of 3-7 and 94(67%) patients presented with GCS of 8-12. While after surgery the GCS at 24 hours was improved upto 13-15 in 80% patients. Similar results were found in study done by Weigel R et al[16] in which GCS at presentation was recorded as 3-7 in 24% patients,and 70% patients had GCS range from 8-12. After surgery the GCS was improved upto 13-15 in 76% patients[16].

Our study shows that two burr holes aspiration was effective as 20% patients had moderate disability and 80% had excellent outcome. The overall outcome of two burr-hole craniostomy in our study was very much satisfactory. Similar results were observed in other studies done by Sambasivan M[8] , Busch G[11].

In our study the complications associated with burr hole aspiration was low, but most common were recollection, pneumoencephalus, seizure,and intracerebral bleed. Which co-relate well with study done by Sakho Y, Kabre A et all, and Liliang PC,Tsai YD et all.[10,12] in which complications like recurrence of hematoma, pneumocephalus,brain collapse, and intracerebral hemorrhage may occur in some patients. Mortality ranges from 0-8% depending on the preoperative clinical status. Empyema occurs in 2% of patients, In most of the series, long-term epilepsy is a rare complication and patients do not require antiepileptic drugs. The lack of cortical re-expansion, postoperative intracerebral hematoma and tension hydrocephalus are among other complications occurring after surgery.[10,12]

## CONCLUSION

Chronic subdural hematoma is common in male and elderly population. Most of the patients present with hemiparesis, headache, behavior changes and urinary incontinence. Two burr-hole evacuation has got excellent outcome with minimal complications.

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