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Outcome of Chronic Subdural Haematoma Patients Following Burr Hole Craniostomy and Irrigation without Post-Operative Drain

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Abstract **Original Research Article**

Objective: To evaluate the efficacy of burr whole craniostomy and irrigation without any post-operative drainage in the treatment of patients of Chronic subdural hematoma (CSDH). ***Methods:*** This was a prospective study. A total of 50 patients of CSDH were included in the study. The clinical history of patients was noted. At the time of admission, level of consciousness as well as Galsgow Coma Score (GCS), conditions of the pupil as well as long tract signs in any of the limbs were recorded. All patients undergone for computed tomography (CT) at pre and 48 hours after operation. The findings of CT were recorded. ***Results:*** The mean age of patients was 61.00±12.33 ranging from 20-90 years. Majority were males (78%). Headache (92%) and hemi paresis (76%) were the most common clinical presentation. Previous history of trauma was present among half of patients (50%). Incontinence was present in 26% of patients. Right side subdural haematoma was involved in 48% of patients. Bilateral was in 32% patients. After 48 hours post-operative, CT showed that 52% patients of unilateral CSDH did not had Residual collection not causing midline shift. Of the bilateral CSDH, 60% patients had no collection. Clinically, there was improvement among 92% patients. ***Conclusion:*** Burr whole craniostomy with intraoperative irrigation and without post-operative drainage is an effective treatment option for CSDH. The results of surgical intervention with one burr hole are as good as using 2 burr holes for drainage of hemispheric chronic subdural haematoma.

Keywords: Chronic subdural hematoma, Burr whole craniostomy, Irrigation.

INTRODUCTION

Chronic subdural hematoma (CSDH) is among the most common neurosurgical conditions. Although CSDH is usually not a life-threatening condition, its clinical course is not benign [1]. Perioperative morbidity ranges from 0% to 25% and mortality from 0% to 32% [2, 3]. The generally accepted mortality rate is usually 8%. Furthermore, even after a successful evacuation of CSDH, the excess mortality rate can be seen up to 1 year after surgery [4].

Three principal surgical procedures are commonly used as follows: twist-drill craniostomy, burr hole, and craniotomy. Many modifications of these procedures have been described; however, none have solved the main problem of CSDH surgery, namely a high recurrence rate. Recurrence of CSDH is usually defined as reaccumulation of hematoma fluid that needs reoperation; defined in this way, the recurrence rate ranges from 0.4% to 33.3% [5].

The literature offers evidence on the effectiveness of certain surgical nuances. Systematic reviews have shown the superiority of irrigation and placing a drain in the hematoma cavity to decrease the recurrence rate [6, 7]. Another independent factor of recurrence that might be impacted during surgery is the amount of air that enters the hematoma cavity (i.e., pneumocephalus) [8, 9]. Reduction of pneumocephalus is often disregarded during surgery, and most surgical techniques do not address this issue at all.

The present study was designed to evaluate the efficacy of burr whole craniostomy and irrigation without any post-operative drainage in the treatment of patients of CSDH.

MATERIAL AND METHODS

This was a prospective study conducted in a tertiary care hospital. The study was approved by the Ethical Committee of the Institute and consent was taken from guardian/patients before including in the study. A total of 50 patients of CSDH were included in the study. The clinical history of patients was noted. At the time of admission, level of consciousness as well as Galsgow Coma Score (GCS), conditions of the pupil as well as long tract signs in any of the limbs were recorded.

All patients undergone for computed tomography (CT) at pre and 48 hours after operation. The findings of CT were recorded.

Methods

During surgery, all patients were kept supine with head tilt to contra lateral side. Most patients were operated under local anesthesia and sedation, if required while in some patients, general anesthesia was given. A standard (single or double) burr whole craniostomy was made after cleaning and draping. Numbers of burr hole were assessed by the amount of collection on CT scan of cranium. Duramater was incised after haemostasis and a nick was given in subdural membrane following that controlled drainage of subdural collection was carried out. Color of effluent as well as presence of blood was also assessed. Thorough irrigation was carried out by normal saline till the effluent was totally clear. Pulsations of the brain were noted likewise tendency of the brain to come to surface was also recorded. After this, incision was closed without insertion of the drain and patients were shifted to post-operative ward.

Patients were assessed in immediate post-operative period once the effect of sedation was over and repeat examination was carried out at the end of 48 hours and findings were recorded in terms of clinical improvements in the symptoms and signs presents at the time of admission. A repeat CT scan of the cranium was carried out at the end of 48 hours and any residual collection; presence of mass effect (focal or diffuse) or pneumocephalus was recorded.

The descriptive statistics are presented.

RESULTS

Pre-operative examination

The mean age of patients was 61.00±12.33 ranging from 20-90 years. Majority were males (78%). Headache (92%) and hemi paresis (76%) were the most common clinical presentation. Previous history of trauma was present among half of patients (50%). Incontinence was present in 26% of patients (Table-1).

GCS 14-15 was among about half of patients (48%) followed by 9-13 (38%) and 3-8 (14%) (Fig.1). Right side subdural haematoma was involved in 48% of patients. Bilateral was in 32% patients. Occipital lobe was in 48% patients. Midline shift was among majority of patients (90%). Calcification was not observed in any of the patients (Table-2).

Operative procedure

Out of 40 unilateral CSDH patients, one burr hole was made in 13 (26%) patients while 2 burr holes were made in 27 (54%) patients. Similarly, 10 (20%) patients of bilateral CSDH, one burr hole on each side was made in 2 (4%) patients, 2 burr hole on one side (with larger collection) and one burr hole on other side was made in 4 (8%) patients while in 4 (8%) patients, 2 burr hole were made on each side. Membrane was present in all patients and effluent was blood mixed in 29 (58%) patients and yellowish in 21 (42%) patients. Copious irrigation was done in all patients till the effluent was clear. In 12 patients of unilateral CSDH, brain came back to surface while in 27 (54%) patients, brain came partially to surface while in 1 (2%) patient, brain did not come to surface at all. In patients of bilateral CSDH, brain came to surface in 4 (8%) patients and in 6 (12%) patients, brain came to surface only on one side while on other side, it came partially to surface (Table not shown).

Post-operative CT findings

After 48 hours post-operative, CT showed that 52% patients of unilateral CSDH did not had Residual collection not causing midline shift. Of the bilateral CSDH, 60% patients had no collection. Clinically, there was improvement among 92% patients (Table-3).

Table-1: General profile of patients

General profile	n=50
Age in years, mean±D, (Range)	61.00±12.33 (20-90)
Gender, no. (%)	
Male	39 (78.0)
Female	11 (22.0)
Clinical presentation#, no. (%)	
Headache	46 (92.0)
Altered sensorium	32 (64.0)
Hemiparesis	38 (76.0)
Seizure	10 (20.0)
History of#, no. (%)	
Incontinence	13 (26.0)
Previous trauma	25 (50.0)
Bleeding disorder	3 (6.0)
Intake of drugs	2 (4.0)

#Multiple response

Table-2: Distribution of GCS

GCS	No. (%) (n=50)
3-8	7 (14.0)
9-13	19 (38.0)
14-15	24 (48.0)

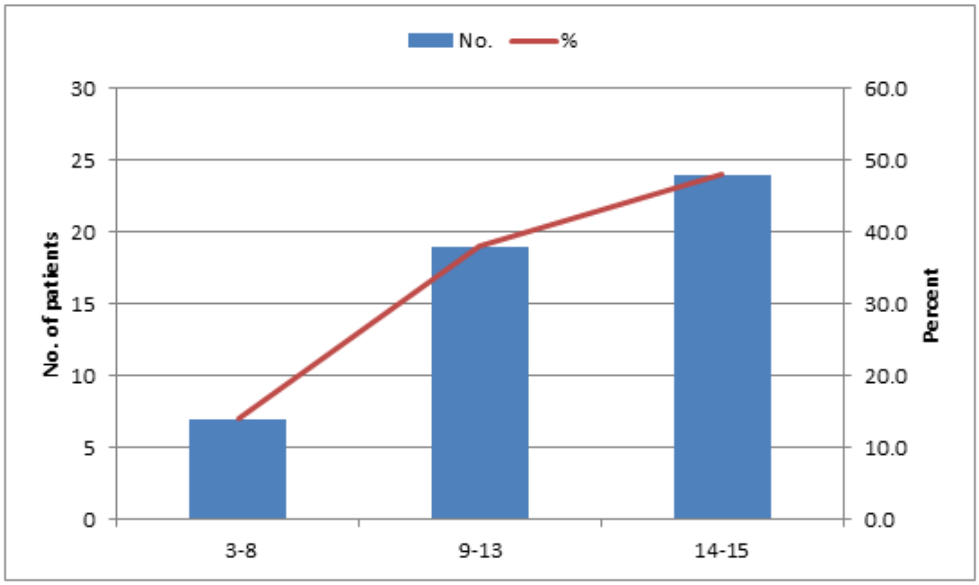

Fig-1: Distribution of GCS

Table-2: Distribution of pre-operative CT findings

CT findings	n=50
Side no. (%)	
Right	24 (48.0)
Left	16 (32.0)
Bilateral	10 (20.0)
Occipital lobe	24 (48.0)
Isodense	18 (36.0)
Hypo dense	29 (58.0)
Mixed density	3 (6.0)
Midline shift	45 (90.0)
Cortical atrophy	4 (8.0)
Lacunar infarct	3 (6.0)
Calcification	0 (0.0)

Table-3: Distribution of post-operative CT findings and clinical outcome

CT findings	n=50
Unilateral chronic SDH	**n=40**
No collection	10 (20.0%)
Residual collection not causing midline shift	26 (52.0%)
Residual collection causing midline shift	4 (8.0%)
Bilateral chronic SDH	**n=10**
No collection	6 (60.0%)
Collection present in one side	1 (10.0%)
Collection present in both sides	3 (30.0%)
Clinical outcome	
Improved	46 (92.0%)
Not improved	4 (8.0%)

DISCUSSION

Chronic subdural hematoma is a common neurosurgical problem in old age, because most of these patients are fragile geriatric group; the least invasive technique is preferred. Burr whole craniostomy is considered the gold standard for surgical treatment of chronic subdural hematoma [10, 11].

The aim of this study was to evaluate the efficacy of burr whole craniostomy and irrigation without any post-operative drainage in the treatment of patients of CSDH.

In this study, the mean age was 61 years old and this is explained in most studies due to the known pathologic changes in this age group [12]. The mean age of CSDH patients was 60 years in the study by Salama[13].

The present study showed male predominance constituted 78%. This finding was in agreement with the study by Mori and Maeda [14] in which percentage of males was 71.8% and Ernestus *et al.* [15] in which 66.3% were males. The predominance of male sex was due to the more vulnerability for trauma.

Regarding the location of CSDH, the right side was the most commonly affected side in this study. In contrast to this study, Salama *et al.* [13] reported left side being most commonly affected. Mori and Maeda [14] also reported left side being most commonly affected (52%).

Clinical features develop over a period of days to weeks. Sometimes, patients fail to recall events of head injury. The common predisposing factors are head injury, alcoholism, seizure disorders, brain atrophy, anticoagulation, and impaired surgical hemostasis. It is usually a trivial trauma [12].

Clinically, patient may present with headache, nausea, hemiparesis, vomiting, sensory deficit, language disturbance, gait problems, transient ischemic symptoms, convulsions, decreased level of consciousness, and raised intra cranial pressure. In this study, headache (92%) and hemi paresis (76%) were the most common clinical presentation. Previous history of

trauma was present among half of patients (50%). Incontinence was present in 26% of patients. Salama[13] found that the clinical presentation included hemiparesis, disturbed conscious level, headache, and rarely seizures.

The surgical techniques used for subdural hematoma evacuation vary from twist drill craniostomy to large craniotomy procedures [16, 15]. In this study, burr whole craniostomy and irrigation without any post-operative drainage in the treatment was used. Out of 40 unilateral CSDH patients, one burr hole was made in 13 (26%) patients while 2 burr holes were made in 27 (54%) patients. Similarly, 10 (20%) patients of bilateral CSDH, one burr hole on each side was made in 2 (4%) patients, 2 burr hole on one side (with larger collection) and one burr hole on other side was made in 4 (8%) patients while in 4 (8%) patients, 2 burr hole were made on each side.

Markwalder and Seiler [17] described no additional benefit with subdural drain. Reoperation rate has been observed to be low in chronic subdural hematoma treated with post-burr whole drains but no difference was observed in sub-acute subdural hematoma. Erol *et al*. [16] in their prospective study reported no significant difference in recurrence rate between simple burr whole craniostomy, irrigation and burr whole craniostomy with closed system drainage. Hamilton *et al*. [18] reported no significant difference regarding the incidence of post-operative complications or hematoma recurrence requiring subsequent surgery between the groups who underwent burr hole and craniotomy with or without drain.

Markwalder *et al.* [19] demonstrated persisting subdural collection in 78% of cases on the tenth day after surgery after burr hole craniostomy evacuation and closed system drainage. Mori [20] suggested complete replacement of subdural hematoma by normal saline to prevent influx of air into the subdural space reduce the recurrence.

In the present study, after 48 hours post-operative, CT showed that 52% patients of unilateral CSDH did not had residual collection or minimal collection not causing midline shift. Of the bilateral CSDH, 60% patients had no collection. Clinically, there was improvement among 92% patients. These results are comparable with previous studies of CSDH treated with burr hole and drainage system.

CONCLUSION

Burr whole craniostomy with intraoperative irrigation and without post-operative drainage is an effective treatment option for CSDH. The results of surgical intervention with one burr hole are as good as using 2 burr holes for drainage of hemispheric chronic subdural haematoma.

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