Original Article

Outcome of Burr-Hole Craniostomy for Chronic Subdural Hematoma

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ABSTRACT

OBJECTIVE: Objective of this study is to determine the outcome of Burr-hole craniostomy for chronic subdural hematoma (CSDH).

STUDY DESIGN: A descriptive study.

SETTING: Department of Neurosurgery, Liaquat University Hospital, Jamshoro study period 15th September 2010 to 16th March 2012.

METHODS: All patients of either gender presented with clinical and radiological evidence of CSDH and undergoing burr-hole craniostomy. The outcome evaluated by postoperative improvement of patients using Glasgow Coma Scale and Markwalder scale.

RESULTS: Among 33 subjects, the mean age of the patients was 65.94 years with age ranges between 30 – 88 years with majority males (63.6%). 57.6% had history of trauma and 66.7% presented with complain of headache. A significant improvement in the Post-Operative Markwalder grade and Glasgow coma scale ($p<0.01$) noticed as compare to pre-operative Markwalder grade and Glasgow coma scale.

CONCLUSION: Burr hole Craniostomy with closed drainage system under local anesthesia is a good choice of treatment. In CSDH, Burr hole Craniostomy is safe and results are comparable to those of the major series of the literature as the surgical procedure is standardized.

KEYWORDS: Chronic subdural hematoma, burr-hole craniostomy, disease outcome.

This article may be cited as: Vash Dev, Chohan AM, Umer M. Outcome of Burr-Hole Craniostomy for Chronic Subdural Hematoma. J Liaquat Uni Med Health Sci. 2015;14(02):68-72.

INTRODUCTION

Chronic Subdural Hematoma (CSDH) is an encapsulated collection of old blood or blood breakdown products, generally or completely liquefied and located between the dura and arachnoid mater present at least for 3weaks[1]. It is uncommon in young people and frequently observed in old age population who sustained minor trauma. Burr-hole craniostomy is the most proficient and harmless choice for surgical drainage of CSDH even under local anesthesia even in medically unfit patient[2]. Excellent functional outcome observed in patients who undergo surgical intervention at appropriate time[3]. Overall mortality rate ranges from 2.8% - 15.6% [4;5].

Presentation of CSDH varies from patient to patient & is not pathogonomonic(6). Atrophic brain associated with large subdural space predisposes the elderly peoples to the development of CSDH(7). Epidural haematoma formation usually occurs following rupture of arteries while chronic subdural hematoma occurs due to tear of bridging veins. Clinical features develop over period of days to weeks. Sometimes patients fails to recall events of head injury. The common predisposing factors are head injury, alcoholism, seizure disorders, brain atrophy, anticoagulation and impaired surgical haemostasis[8]. Clinically patient, may present with headache, nausea, hemiparesis, vomiting, sensory deficit, language disturbance, gait problems, transient ischemic symptoms, convulsion, and decreased level of consciousness and raised intra cranial pressure[9;10]. Computerized Tomography (CT) scanning is usually sufficient for the diagnosis where it appears as crescent shaped hypo-dense with concave surface towards the brain. Preoperative Magnetic resonance imaging (MRI) is not carried out in most patients with CSDH but can help in doubtful cases[11].

PATIENTS AND METHODS

This descriptive study conducted at the department of Neurosurgery, Liaquat University Hospital, Jamshoro between 15th September 2010 to 16th March 2012 through non-probability purposive sampling technique. All patients from both genders presented with clinical and radiological evidence of CSDH and went burr-hole craniostomy during the above mentioned period were included in this study. Drain was placed for 48 hours, patient kept in flat position, no irrigation done, patient well rehydrated. The relevant data like age, gender, presenting complaints like headache, paresis, and

scales like Markwalder scale[12], Glasgow Coma Scale (GCS) [13], data for Co-morbidity like Diabetes Mellitus and Hypertension and duration of hospital stay was collected on a pre-designed proforma. Patients according to GCS were categorized into class I (score 12-15), class II (8-11), and class III (score 3-7). CSDH was diagnosed by either CT scan or MRI.

After counseling about the benefits and risks of surgery, an informed consent was taken and Burr Hole Craniostomy was performed. The outcome was evaluated by postoperative improvement of patients using Glasgow Coma Scale and Markwalder scale. The data were entered and analyzed in statistical package for social scientists (SPSS v. 16).

Frequencies and percentages were computed for categorical variables like gender, risk factors, co-morbid, presenting complaints, CT scan findings, and GCS & Markwalder scales. Means and standard deviations were computed for quantitative variables like age and duration of hospital stay. Non-parametric Sign' test was applied to assess the effectiveness of Burr Hole Craniostomy for Chronic subdural hematoma by GCS and Markwalder Scales pre and post operatively. Multivariate analysis was not performed due to small number of patients. P-value <0.05 is considered as significant.

RESULTS

Out of total 33 patients observed, there were 21 (63.6%) male and 12 (36.4%) female patients with male to female ratio of 1.7:1. The mean age of patients was 65.94 with age ranges from 30 – 88 years. The mean duration of hospital stay was 7.45 ± 3.61 days. Most common cause of chronic subdural hematoma was trauma, 19 cases (57.6%) and among total, 15.2% had hypertension (Table I).

Table II shows clinical manifestations of the study subjects. Majority of the patients presented with complain of Headache (66.7%). Table II also revealed frequency of complications and outcome of the patients after operation.

27 (81.08%) patients were diagnosed on CT scan and six (18.2%) patients were diagnosed by MRI. Most of the patients, (n= 26, 79%) had mixed density lesion on CT scan followed by iso-dense hematoma in 4 (12%) patients and hypo-dense hematoma in 3 (9%) patients. The CSDH was right sided, left sided and bilateral in 45.4%, 39.3%, and 15.1% of the patients respectively.

About 88% patients had pre-operative Markwalder grades 1 or 2 whereas about 79% of the patients had grade 0 postoperatively (p<0.01). About half of the patients had class II GCS at the time of presentation whereas about 97% of the patients had class I GCS at the time of discharge (p<0.01). A detailed account of Markwalder and GCS grading is mentioned in table III. Thirty two patients came for first follow up at two weeks and twenty seven for second follow up at about six weeks after discharge. All patients were in satisfactory condition at the time of follow up.

TABLE I: BASELINE AND CLINICAL CHARACTERISTICS OF SUBJECTS

Variables	Number	Percentage
Age- years (mean ± SD)	65.94 ± 11.24	
Age Range – years	30 - 88	
Hospital stay - days(mean ± SD)	7.45 ± 3.61	
Gender		
Male	21	63.6
Female	12	36.4
Residence		
Urban	23	69.6
Rural	10	30.3
Education		
Illiterate	7	21.2
Literate	26	78.7
Etiology		
Trauma	19	57.6
Anti-coagulating drugs	2	6.1
Coagulopathy	1	3
Unknown	11	33.3
Co-Morbid	21	63.6
Hypertension	5	15.2
Diabetes Mellitus	3	9.1

DISCUSSION

Chronic subdural hematoma is one of the most frequently encountered clinical entity after trauma in older age group patient[14]. Current treatment options include burr-hole craniostomy, twist drill craniostomy or craniostomy are frequently preferred surgical options[15]. Early surgical intervention prevent the brain from permanent damage.

Our study consisted majority of male and elderly population. The same findings are also observed in studies conducted in Pakistan and outside Pakistan [16;17].

Most of the studies agree that CT-scan provide

TABLE II: CLINICAL MANIFESTATIONS AMONG PRESENTING SUBJECTS

Variables	Number (n=33)	Percentage
Presenting Complaints		
Headache	22	66.7
hemiplegia/paresis	19	57.6
Altered Consciousness	16	48.5
Amnesia	4	21.1
Speech disturbance	4	21.1
Seizures	2	6.1
Complications		
Pneumocephalus	2	6.1
Hematoma	1	3
Pneumonia	1	3
Outcome		
Survived	32	97
Died	1	3

TABLE III: MARKWALDER AND GCS GRADING (n=33)

Scale	Grading	At presentation	Pre-operative	Post-operative	At discharge	Z test (p-value)
	Grade 0	-	0 (0%)	26 (78.8%)	-	Z= -5.57 P-value <0.01
	Grade 1	-	16 (48.5%)	05 (15.2%)	-	
	Grade 2	-	13 (39.4%)	01 (3%)	-	
Markwalder grading	Grade 3	-	03 (9.1%)	0 (0%)	-	
	Grade 4	-	01 (3%)	0 (0%)	-	
	Expired	-	-	01 (3%)	-	
GCS	Class I (Score 12-15)	13 (39.4%)	-	-	32	Z= -7.57 P-value <0.01
	Class II (Score 8-11)	16 (48.5%)	-	-	0	
	Class III (Score 3-7)	4 (12.1%)	-	-	1	

diagnostic accuracy of about 80-90% in patients with chronic subdural hematoma[11;18]. Subjects >80% of CSDH were diagnosed on CT-scan in this study.

Trauma to the head is common cause in patient presented with CSDH.. This observation is comparable to the observations reported in other studies [19-22]. Non-traumatic conditions such as coagulopathy also contribute in the etiology of CSDH with relatively low frequency as compare to trauma [23].

Two (6.1%) patients developed Pneumocephalus which resolved on conservative management. Many of the previous published literatures mentioned Pneumocephalus as a most occurring complication after CSDH surgery [3;24].

One (3.0%) patient died who had large CSDH and presented in Markwalder scale 5 and developed wound infection as well as chest infection postoperatively. The main factor which contributed to death of this patient was his neurological condition at the time of admission and similar observations were reported by other authors [25;26].

Patients treated in our study with burr-hole craniostomy showed a significant improvement (p = <0.01) assessed by Markwalder grading. About 78.8% and 15% of the patients had Markwalder grades 0 and 1 respectively at the time of discharge from hospital. This is in comparison to other study conducted by Aung, TH and colleagues and Guzel, A et al. 2008 also shows good prognosis of patients treated with burr-hole craniostomy respectively[27;28].

This study shows recurrence of subdural hematoma in one patient (3%). A substantial data suggest recurrence rate ranging from 3.7 - 30%[29-32]. One patient (3%) died in our study who was presented with Markwalder score II. Study conducted by Ramachandran R et al. 2007 showed post-operation mortality rate of 5%[33].

CONCLUSION

Burr hole Craniostomy with closed drainage system

under local anesthesia is a good choice of treatment. In CSDH, Burr hole Craniostomy is safe and results are comparable to those of the major series of the literature as the surgical procedure is standardized. We recommend it in all patients as a first and minimally invasive attempt because satisfactory outcome is usually easier to achieve.

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