ORIGINAL ARTICLE

Outcome of Surgical Management of Chronic Subdural Hematoma

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ABSTRACT

Objective: *To determine outcome of surgical management of Chronic Subdural Hematoma.*

Study Design: *Descriptive Study.*

Materials and Methods: *Patients with Chronic Subdural Hematoma diagnosed on CT scan brain admitted to the Neurosurgery Department, Bolan Medical College/Hospital, Quetta Pakistan from January 2008 to December 2017. Patients included in the study were those who presented with CSDH only and all those patients were excluded who had undergone surgery previously elsewhere. At the time of admission the neurological status was classified according to a Grading Scheme which was proposed by Markwalder et al. Radiological evaluation was done by CT Scan before surgery and routine CT Scan of each patient was done one day after surgical intervention, one week after and anytime if required. Outcome was determined by GCS and GOS. Good Recovery and Moderate Disability were considered as favorable outcome while Severe Disability, Persistent Vegetative State and Death as unfavourable outcome.*

Data Analysis: *SPSS software was used for data analysis.*

Results: *A total of 145 patients were treated with surgical evacuation of CSDH. 121 (83%) patients were men while 24 (17%) were women with Male to Female ratio of 5:1.10 (7%) patients had Markwalders Grade 1, 57 (39%) had Markwalders Grade 2 while 46 (32%) patients had Grade 3 and 32 (22%) had Grade 4. Recurrence occurred in 20 (14%) patients. 129 (89%) patients had favourable outcome while 16 (11%) had unfavourable outcome.*

Conclusion: *The favourable outcome of surgical evacuation of Chronic Subdural Hematoma is quite high if operated early. Moreover, the course and outcome is affected by several factors particularly the initial neurological status at the time of diagnosis.*

Key Words: *Chronic Subdural Hematoma, Markwalders Grading, Recurrence, Glasgow Outcome Scale.*

INTRODUCTION

Chronic Subdural Hematoma is the accumulation of blood in between the coverings of the brain between arachnoid and dura matter in subdural space. It is the common neurosurgical entity that clinicians seen in routine neurosurgical practice. CSDH commonly occurs in the old peoples, may be several weeks after traumatic brain injury.[1] A rise in life expectancy in developing countries resulted in an increase in the incidence of that condition.[2-5] Its incidence is very high in the 7th and 8th decade of life is; however no age is exempt. In earlier decades the incidence rate of 1.72/100000 per year was estimated, but due to increasing age of 70 – 79 years the incidence rate became increased up to 7.35/100000 per year.[6] The clinical presentations of CSDH are variable. They could vary from no symptoms to headache, seizures, decline in memory and confusion. Patients could have difficulty in speech and walking. There may be weakness or numbness of any part of body such as arms, legs, and face as well as swallowing difficulties.[7]

Surgical evacuation is the best treatment in most

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of patients having CSDH. However some of these patients could be treated without surgery, especially when small hematomas develop after antiplatelet drug use. There are many observations of the normal mean pressure in subdural space in CSDH.[8] The indications for surgery are: patients who are symptomatic with neurological deficit and having GCS between 5 – 15, midline brain shift more than 0.5cm, thickness of hematoma more than 1.5cm and haematoma volume more than 25 ml. The main procedure remains the evacuation through burr hole (evacuation by one burr hole or by two burr holes, or by craniostomy) along with deep sedation by using infiltration of local anestheatic agent, and some time with General anesthesia. Thorough and meticulous irrigation of subdural space with normal saline is done and continued until returning normal saline become clear. After irrigation, a closed drainage tube and bag placed in subdural space. The method of evacuation of haematoma when done with local infiltration and sedation minimizes the risks of general anesthesia and surgery, and it can be performed when other co-morbid illnesses are present.[9,10] The aim of our study was to evaluate the outcome of management of chronic subdural hematoma by surgery as determined by Glasgow Outcome Scale so that we can share our experience with other health care professionals.

MATERIALS AND METHODS

All consecutive patients who admitted with chronic subdural hematoma diagnosed on the basis of CT scan brain in the Department of Neurosurgery, Sandeman Provincial Teaching Hospital and Bolan Medical Complex Hospital, Quetta, Pakistan from January 2008 to December 2017. We included the patient in this study if signs and symptoms were only due to CSDH. Patients who were operated previously anywhere else for CSDH and presents with recollection were not included in our study.

The basic demographic information were recorded like name, age, sex, address and hospital registration number. At the time of admission clinical status was classified and recorded according to a grading system for this neurological disorder. This grading system ranges from 0 to 4 which was proposed by Markwalder *et al.*[11,12] Radiological evaluation of CSDH including thickness of hematoma, hematoma density, midline shift and hematoma volume were calculated on the basis of CT scans obtained before doing surgery. Routine laboratory investigations done before the surgical procedure. Investigations included complete blood count with differential, complete profile for coagulation disorder including international normalized ratio (INR), prothrombin time (PT), activated partial thromboplastin time (APTT), platelets count and other biochemical investigations. If patient was taking any antiplatelet and anticoagulant treatment it was stopped on temporary basis before surgery and restarted one month after the surgery. If coagulation profile was abnormal then we corrected it by administration of plasma (FFPs), platelets or Vitamin K where needed before surgery.

Patients who were symptomatic with neurological deficit and with GCS between 5-15, midline brain shift more than 0.5cm, thickness of hematoma more than 1.5cm and volume of hematoma more than 25ml on CT scan (Fig-1) underwent surgical procedures. 145 consecutive patients with CSDH were managed by surgical therapy. One burr hole or two burr holes craniostomies were performed, evacuation of hematomas done and irrigation of subdural cavity with meticulous amount normal saline through one or two burr holes; membranectomy was done where necessary and possible. Closed drainage system was placed in subdural space and remained there for 1 – 2 days after the operation. Antibiotic were given to all patients prophylactically to prevent infection during the perioperative period. After surgery, patients were kept supine without head elevation or pillow for 48 hours to increase and facilitate gravitational drainage of remaining fluid in the cavity. To promote expansion of the brain patients were well hydrated given 2L of IV fluids each day for about 4 to 5 days, and patients were mobilized as early as possible. CT scan brain was done routinely after one day of surgery then after ten days and any time if required. Measurement of hematoma thickness before surgery and ten days after surgery was done by CT scan. CT scan also shows the expansion of the brain. Patients without any complication were discharged from the hospital on the 10th postoperative day and called for follow up after 6 to 12 weeks. Neurological and radiological assessments were done by GCS, GOS and CT scan. We consider Good Recovery and Moderate Disability in GOS as favorable outcomes and other components of GOS like Severe Disability, Persistent Vegetative State and Death, we considered them as unfavorable.

Data Analysis

SPSS software was used. Frequencies of Variables like

age, GCS Markwalder's clinical grade, CT density of hematoma, hematoma thickness, midline shift, brain atrophy, antiplatelet and anticoagulation use, seizures, recurrences, Good Recovery and Moderate Disability in terms of favorable whereas Severe Disability, Persistent Vegetative State and Death in terms of unfavorable outcome were described. Male to female ratio (M:F) was calculated.

RESULTS

A total of 145 patients were managed by surgical evacuation. There were 121 (83%) men and 24 (17%) women. Ratio between Male to Female ratio was 5:1 (Fig-3). Age ranged from 32 to 85 years and the mean age was of 72 years. Markwalder 's Grade 1 patients were 10 (7%), Grade 2 were 57 (39%),Grade 3 were 46 (32%) and Grade 4 were 32 (22%). On CT scan isodense hematomas were in 55 (38%) (Fig-2), hypodense were in 39 (27%) hyperdense were in 28 (19%) and mixed were in 23 (16%) cases. 23(16%) patients had midline shift less than 0.5cm, 74 (51%) had midline shift more than 0.5cm while 48 (33%) having midline shift more than 1cm. 106 (73%) patients had brain atrophy. Out of total of 145 patients 22 (15%) were on antiplatelet and Anticoagulant therapy. 16 (11%) patients had seizures. Recurrence was observed in 20 (14%) patients (Table 1). 129 (89%) patients with favorable outcome and 16 (11%) have unfavorable outcome (Table 2).

Fig. 1: *Right Frontoparietal Chronic Subdural Hematoma with component of acute hematoma.*

Fig. 2: *Left Frontoparietal Chronic Subdural Hematoma.*

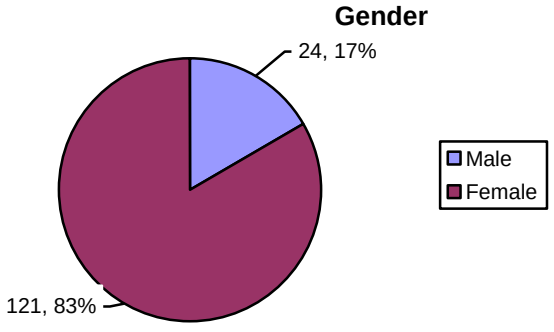

Fig. 3:

Table 1:

	No. of Patients N = 289	Percentage
Markwalder Grade		
Grade 0	0	0%
Grade 1	10	7%
Grade 2	57	39%
Grade 3	46	32%
Grade 4	32	22%
CT Scan Density of Hematoma		
Hypodense		27%
Isodense	55	38%
Hyperdense	28	19%
Mixed	23	16%
Midline shift		
Less the0. 5cm	23	16%
More the 0.5cm	74	51%
More the 1cm	48	33%
Brain atrophy		
Yes	106	73%
No	39	27%
Anti-platelet and AC Therapy		
Yes	22	15%
No	123	85%
Seizures		
Yes	16	11%
No	129	89%
Recurrence		
Yes	20	14%
No	125	86%

Table 2: *Outcome.*

Outcome		
Favorable	129	89%
Unfavorable	16	11%

DISCUSSION

Chronic subdural hematoma (CSDH) is thought to be a complex collection on the surface of brain between arachnoid and dura coverings of the brain and is composed of blood, blood degradation products and fluid. The first report of CSDH was that of Johannes Wepfer in 1657 which is considered as authentic as described by D'Errico and German. A patient who died as a result of an "apoplectic event, he found a large cyst which is filled with blood under the dura".[13] Virchow in 1857 hypothesized that inflammation plays a major role in the formation of a CSDH and the condition was earlier referred as "pachy meningitis haemorrhagica interna".[14] In 1914, Trotter emphasized the traumatic etiology.[15] Till the end of 20th century, there were controversies on the origin and natural history of this lesion.[16] Some authors recognized that trauma and inflammation may both be the factors that may co-exist in the development of CSDH and sometimes very trivial traumatic insult may lead to CSDH.[17]

Surgery is the best treatment when indicated but the type and extent of surgery is still debatable.[18]

The age range in our study was between 32 years to 85 years with mean of age 62 years. This differs with Ernestus et al and Rovlias et al.[18,19] In our study ratio between male and female was 121:24 (5:1) and it nearly correlates a study of Sanbasivan where ratio between male and female ratio was 6:1.[20]

In our study majority of the patient fall in Markwalder Grade 2 (57 patients) followed by Grade 3 (46 patients), Grade 4 (32 patients) and Grade 1 (10 patients). Preoperative CT scan shows mostly isodense hematoma in 55 patients, hypodense in 39 patients, hyperdense in 28 patients, and mixed in 23 in relation to the brain parenchyma density. This correlates to a study by Rovalis et al.[18] The CSDH density shows the proportion of amount of fresh blood clots in the cavity of hematoma and a high proportion means the active an high growth of blood vessels into the membrane of the CSDH. It may associated with higher rate of CSDH recurrence.[21-23] However our study shows no relation of hematoma recurrence with hematoma density which is similar with study by Ohba et al.[24]

74 patients of CSDH had midline shift on CT scan of more than 0.5cm, 48 patients of CSDH had midline shift more than 1cm while 23 patients of CSDH had midline shift less than 0.5cm. In our study patients having midline shift of more than 10mm have increased recurrence and poor outcome that correlates with most of the studies conducted intenationally.[25] In our

study 106 patients have brain atrophy and is one of the cause of developing CSDH and most of recurrences.[26] Previous studies correlates the rate of recurrence and the unfavorable outcome of CSDH with patients having more hematoma thickness and increased atrophy of brain, and this is in agreement with our series.[27-33]

In our series 22 patients out of 145 were on antiplatelet and Anticoagulant therapy and out of these 22 patients 10 have recurrences and 4 had poor outcome. In this regard findings of our series is consistent with previous studies.[34-38]

16 patients were having seizures on admission and were given antiepileptic drugs before and after surgery. These seizures are not significantly associated with recurrence and poor outcome in our series.

Recurrence is not uncommon after drainage. It ranges from 5 to 18%.[39,40] In our series it was observed in 20 patients (14%).

In our study 129 (89%) patients had favorable outcome while 16 (11%) patients had unfavorable outcome which is close to findings of international studies.[40]

CONCLUSION

CSDH is the commonest neurosurgical entity. The overall outcome of surgical treatment is far high in patients with good preoperative neurological status. Less midline shift, and less brain atrophy Moreover, outcome in patients having CSDH are affected and modified by several other factors.

Disclosure

The authors have no financial conflicts of interest.

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