ORIGINAL ARTICLE

Clinical Presentation and Postoperative Outcome in Patients with Chronic Subdural Hematoma

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ABSTRACT

Objective was to study the clinical features of chronic subdural hematoma and Postoperative outcome after one week of surgery in chronic subdural hematoma. It was a descriptive study. It was a hospital based study which was conducted in the department of neurosurgery at PIMS; from 1st July 2002 to 30th June 2003.Thirty patients of chronic subdural hematoma were included in this study. This study was conducted on thirty patients suffering from chronic subdural hematoma. These patients were selected on the basis of history, clinical features and C.T. scan or M.R.I. findings, showing the evidence of chronic subdural hematoma. For data analysis, spss 8 software was used.

Results: *Thirty patients were studied. Among them, there were twenty four male patients and six female patients. The male to female ratio was 4:1. The age range was 40 to 88 with average of 61 years. Twenty one patients (70%) gave a history of head injury. Nine patients (30%) did not remember any injury to the head. Twenty two patients (73%) had hemipresis. Twenty patients (66%) presented with headache. Seventeen patients (56%) had a history of bed wetting. Fourteen patients (47%) presented with behavioral changes. CT scan of twenty three (76.6%) patients showed unilateral hematoma while the remaining seven (23.3%) showed bilateral chronic subdural hematoma. Twenty eight were operated under general anesthesia while the rest were operated under local anesthesia. On discharge twenty six 86.6% patients showed excellent outcome. Mortality rate was 6.6%.*

Conclusion: *Chronic subdural hematoma is an important reversible cause of disability in the elderly. Most of them present with hemipresis, headache, and urinary incontinence. While some of them present with behavioral changes and memory loss. When patients were followed after one week of surgery it was found that most of them had an excellent outcome. Mortality and morbidity of chronic subdural hematoma has decreased markedly in recent years because of improved diagnostic facilities and prompt surgical intervention.*

Key words: *Chronic subdural hematoma, C.T. scan, Burr-hole craniostomy.*

INTRODUCTION

The first description of a chronic subdural hematoma was made in 1658 by J.J.Wepfer, followed in 1761 by Morgagni. Honore de Balzac described a possible case in 1840 including its traumatic origin and surgical treatment. Virchow, in 1857, denied a traumatic origin, and gave the name of pachymeningitis hemorrhagica interna to this pathology, which he explained by inflammatory processes. The traumatic etiology of chronic subdural hematoma was recognized in the 20th century, especially by Trotter in 1914.[1]

Chronic subdural hematoma is one of the most common clinical entities in daily neurosurgical practice especially in elderly, with average age being 63 years.[2,3] It displays wide diversity of features often simulating other neurological and psychiatrical disease processes like dementia, confusion, language difficulties, hemiplegia, seizures, transient ischemic attack symptoms and coma.[4,5] Recognition and keen observation of these features is the key to early diagnosis.[6] Elderly individuals may develop an asymptomatic chronic subdural hematoma as a result of minor trauma,

anticoagulation therapy, blood diathesis etc. Various theories have been proposed regarding its etiology and pathogenesis, the most important are osmotic theory and rebleed from the membrane around the clot.[7,8] Chronic subdural hematoma is most commonly diagnosed by either CT or MRI.[9]

Treatment options include two burr-hole drainage[10], single large burr-hole drainage[3], twist drill craniostomy[11] or a small temporal craniotomy[12] but the craniotomy is usually reserved for recurrent hematoma or residual hematoma membrane, which prevents re-expansion of the brain.[13] A subdural drain may also be used post-operatively.[14] After successful and timely management, most patients return to their premorbid level of functioning.[3,5,15] Complications associated with surgery include re-accumulation of hematoma, seizures, intracerebral hemorrhage, tension pneumocephalus and subdural empyema.[16,17]A mortality rate of 0-8% has been reported.[3,18]

The present study was conducted to study the clinical presentation and post-operative outcome in chronic subdural hematoma at the department of neurosurgery, Pakistan Institute of Medical Sciences, Islamabad.

MATERIAL AND METHODS

This study was conducted on thirty patients suffering from chronic subdural hematoma. These patients were selected on the basis of history, clinical features and C.T. scan or M.R.I. findings, showing the evidence of chronic subdural hematoma.

For the collection of information and observations, we used a proforma. This proforma included the information about the identity of the patient like name, age, sex, any history of head injury, mode of trauma, time elapsed since trauma, neurological status at the time of presentation, investigation performed, preoperative, operative and postoperative course, morbidity and mortality, total stay in the hospital and adjuvant therapy, if any was recorded.

Patients requiring burr – hole aspiration were operated either under general anesthesia or local anesthesia. After giving general anesthesia, patient was properly positioned on the operating table in supine position with the head tilted to one side. After making the skin incision, two burr-holes were made. Frontal burr hole was placed 3.5 cm from the midline on the coronal suture. Other burr hole was made in the temporal or parietal region depending upon the location and size of chronic subdural hematoma. After burr-holes, dura was cauterized and then incised at both sides of burr-holes. Dark colored fluid started coming out under pressure, its amount is noted down. It was washed thoroughly with 8 Fr. soft feeding tube until clear fluid started coming out. Head side of the table was also tilted down so that the entire clot could be evacuated thoroughly by irrigation. At the end, feeding tube is removed gelfoam applied at site of burr holes washed with saline so that no air should remain inside. Hemostasis was secured and the wound closed in layers.

According to our policy, all the patients were given third generation cephalosporins during and after surgery for five days. All the patients were shifted to the ward or Head Injury Unit. Their heads were kept twenty degree down. They were kept well hydrated. All the patients were assessed for improvement in neurological status post operatively, if the neurological status deteriorated repeat C.T. scan was done for recollection. The patients were discharged by third to seventh day after surgery. Patients were followed in our patients at one month interval after discharge. Glasgow outcome scale was used to assess the patients on follow up as in table a.

The different variables mention were age, sex, duration of trauma, mode of trauma, neurological status at the time of presentation, C.T. scan findings, operative and postoperative course, Glasgow outcome scale.

It was a descriptive study, the duration of which was from 1st July 2002 to 30th June 2003.

The disease to be studied was chronic subdural hematoma in elderly. It displays wide diversity of features often simulating other neurological and psychiatrical disease like dementia, confusion, language difficulties, hemiplegia, seizures, and coma. Recognition and keen observation of these features, early investigation with C.T. scan, showing chronic subdural hematoma and emergency burr holes drainage. After successful and timely management, most patients return to their premorbid level of functioning.

Data was entered in version of SPSS 8 and descriptive statistics were used to calculate the frequencies of clinical features, and postoperative outcome.

It was hospital based study, which was conducted in the department of Neurosurgery, PIMS, Islamabad. All the patients above 40 years of age. CT and MRI brain findings consistent with chronic subdural hematoma. All the patients having subdural hygroma, having subdural empyema, below 40 years of age and

Chronic subdural hematoma with under lying brain contusion were excluded from the study.

RESULTS

Thirty patients were studied. Among them, there were twenty four males patients and six female patients. The male to female ratio was 4:1. The age range was 40 to 88 with average of 61 years (Table 1).

Table 1: *Age Distribution.*

Age	No of Patients
40 – 50	8 (26.6%)
51 – 60	9 (30%)
61 – 70	6 (20%)
71 – 80	5 (16.6%)
81 – 90	2 (6.6%)

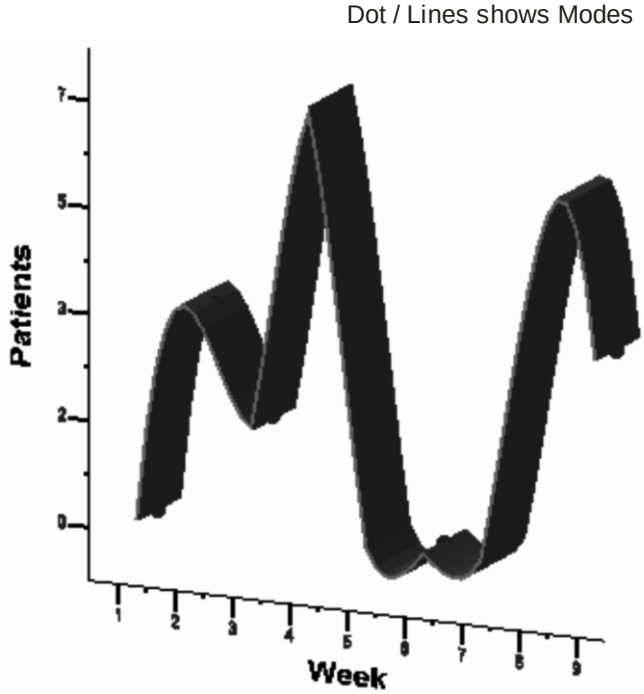

Figure A: *Duration of Trauma.*

Twenty one patients gave a history of head injury two to nine weeks before their presentation (Figure A). Mode of trauma was, eleven (36.6%) had a fall and ten (33.3%) had a history of road traffic accident. Nine (30%) patients did not remember any injury to the head when asked after treatment (Figure B). Three patients had deranged bleeding profile but they were not using any medication that could have altered their coagulation profile. Four patients had diabetes and six patients were hypertensive.

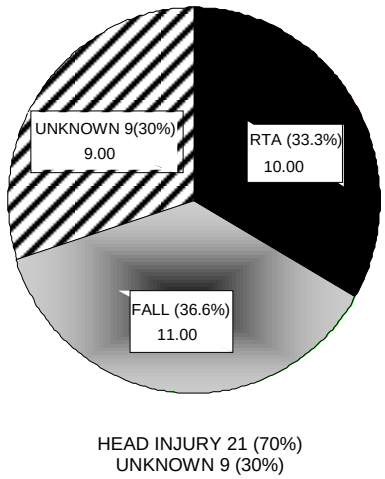

Figure B: *Mode of Trauma.*

Twenty two (73%) patients presented with hemipresis. Twenty (66%) patients had a history headache. Seventeen (56%) patients presented with urinary incontinence. Fourteen (47%) patients had behavioral changes. Two (6.6%) patients had memory loss and one (3.3%) patient had seventh cranial nerve palsy (Table 2). Two (6.6%) patients had a Glasgow coma score between 3-7.Fourteen patients (46.6%) had Glasgow coma score between 8 to12 and, fourteen (46.6%) patients had G.C.S. between 13-15 on presentation (Table 3).

Table 2: *Analysis of the Clinical Status of the Patients.*

Clinical Presentation	No. of Patients
Hemiparesis	22 (73%)
Headache	20 (66%)
Urinary Incontinence	17 (56%)
Behavioral Changes	14 (47%)
Memory loss	2 (6.6%)
Cranial Nerve Palsy	1 (3.3%)

Table 3: *Analysis of the Neurological Status of the Patients.*

Glasgow Coma Scale	No. of Patients
3 – 7	2 (6.6%)
8 – 12	14 (46.6%)
13 – 15	14 (46.6%)

None of the patient's skull X-rays showed any abnormality. CT scan of twenty three patients (76.6%) showed unilateral hematoma while the remaining seven (23.3%) showed bilateral chronic subdural hematoma. Density of hematoma was hypo dense in sixteen (53.3%) patients while fourteen (46.6%) patients had mixed density hematoma (Table 4).

Table 4: *C.T. Scan Findings.*

Location and Density of Hematoma	Number of Patients
Unilateral	23 (76.6%)
Bilateral	7 (23.3%)
Hypodense	16 (53.3%)
Mixed Density	14 (46.6%)

All the patients were operated in emergency on presentation. In twenty three patients two burr holes were made strategically over the most prominent collection of the hematoma. In seven patients four burr holes were made in bilateral chronic subdural hematoma. Twenty eight were operated under general anesthesia while the rest were operated under local anesthesia.

Post operative CT scan was done in only those cases which deteriorated neurologically. Two patients were operated twice for recollection. In one patient subdural drain was placed and had no recollection. None of the patients had craniotomy. One patient develops pneumocephalus and his condition deteriorated but improved after inhalation of 100% oxygen. One patient develops intracerebral bleed after evacuation of hematoma he was also hypertensive his neurological condition deteriorated and he died. Two patients develop severe chest infection one recovered and one died. Two patients had seizures post operatively and had to be started on anti epileptics (Table 5).

Table 5: *Analysis of Complications.*

Complications	No of Patients
Recollection	2 (6.6%)
Chest Infection	2 (6.6%)
Seizures	2 (6.6%)
Intracerebral Bleed	1 (3.3%)
Pneumocephalus	1 (3.3%)

On discharge twenty six (86.6%) patients showed excellent outcome (Grade V on Glasgow outcome score). Two (6.6%) patients had moderate disability (Grade IV on Glasgow outcome score) and two (6.6%) patients died (Grade I on Glasgow outcome score) (Table 6).

Table 6: *Outcome.*

Neurological Grade	No. of Patients
1. Death	2 (6.6%)
2. Vegetative	0
3. Severe Disability	0
4. Moderate Disability	2 (6.6%)
5. Good	26 (86.6%)

DISCUSSION

Chronic subdural hematoma (CSDH) is one of the most common clinical entities in daily neurosurgical practice. The diagnosis and treatment are well established, and have been discussed for years.[5] There is no doubt that it is a disease of the elderly people in which brain atrophy increases potential subdural space in which bridging veins bleed after trivial head injury.[2,3,4]

Although chronic and subacute subdural hematomas (CSDH) are amongst the commonest neurosurgical conditions, there are few studies on their incidence in the general population. The incidence range from 1-2 to7.4-14 / 100,000 / Year.[19,20,21.] Most large series showed that these hematomas occur in patients in there fifties and sixties with mean age ranging from fifty to sixty three years.

In our study the youngest patient with chronic subdural hematoma was forty years of age while the oldest patient was eighty eight years old. Twenty two

patients (73.3%) were more than fifty years of age. Sambasivan M. conducted a large study over a period of 30 years since 1966, 2300 cases of chronic subdural hematoma have been seen and treated. A male preponderance among the cases was seen, in a ratio of 5:1[22.] In our study male to female ratio is 4:1 that is 24 (80%) were male and 6 (20%) were female.

Twenty five to seventy percent of the patient gives a positive history of head trauma in the past, while 25-48% did not give any history of head injury in the past.[23,24,25] Falls and antithrombotic therapy are the most frequent risk factor for chronic subdural hematoma.[26] Chronic subdural hematomas are mainly related to slight or moderate head trauma with consecutive lesion of bridge or cortical veins and bleeding in the subdural space. Further predisposing factors are known impairment of coagulation (coagulopathies, treatment with anticoagulants, alcohol abuse), risk factors for degenerative disease of the arteries (diabetes mellitus, arterial hypertension), and development of pressure gradients (hydrocephalus, epileptic seizures, lumbar puncture, CSF drainage and cerebral atrophy).[27] In our study twenty one (70%) patients had a history of head trauma, in which eleven patients (36.6%) had a history of fall while ten patients (33.3%) had a history of road traffic accident. In our series nine patients (30%) did not recall the history of head injury. None of the patients had a history of use of antithrombotic therapy.

Chronic subdural hematoma (CSDH) is particularly common in the older patient. Chronic subdural hematoma can present with atypical, and sometimes unusual manifestations. It has an insidious onset and can, at times, be very difficult to diagnose. The most frequent presenting symptoms are headache, changes in mental status, and hemiparesis. Chronic subdural hematoma might also present as a transient ischemic attack.[110] It can also present as dysphasia, memory disturbance, hemianopia, dementia, memory disturbances, papilloedema, ataxia, cranial nerve palsies, and meningism.[26,28,29.] In our series twenty two patients (73.3%) presented with long tract signs, and twenty patients (66.6%) had headache and vomiting. Seventeen patients (56.6%) had urinary incontinence while fourteen patients (46.6%) had behavioral changes, two patients (6.6%) had memory loss and one patient (3.3%) had facial weakness.

Although medical history and physical examination should lead to diagnosis of chronic subdural hematomas, but many patients are likely to be misdiagnosed because many of these symptoms occur in other disease processes, such as transient ischemic attacks, stroke, dementia, and tumors. Computed tomography remains one of the most useful tools in the evaluation of these patients because of its rapidity, cost, availability, and pathologic sensitivity.[30.] It not only reveals the size, site, capsule formation, midline shift and the density of the clot but also the internal architecture, we classified CSDH into 4 types: the homogeneous type, the laminar type, the separated type, and the trabecular type.[31,32.] However, problem arises when the clot is isodense or there is bilateral chronic subdural hematoma. An isodense hematoma can be easily diagnosed by intravenous contrast which will glow up the inner membrane, cerebral cortex, and the cortical vessels. In such cases MRI is very helpful.[33-35] In our study CT scan, with and without contrast, was done in all the cases of chronic subdural hematoma. Twenty three patients (76.6%) had unilateral chronic subdural hematoma and seven patients (23.3%) had bilateral chronic subdural hematoma. Sixteen patients (53.3%) had hypodense hematoma and fourteen patients (46.6%) had mixed density hematoma.

There is no uniform agreement on the best method to treat chronic subdural hematoma and this is still a matter of debate. However over the past 150 years, a dramatic improvement in outcome was achieved following better understanding of the pathophysiology, the introduction of modern imaging techniques, and refinement of operative techniques.[36] Burr-hole craniotomy seems to have been the most commonly performed procedure for decompressing of chronic subdural hematoma within the past 20 years. The widespread use of the burr-hole technique is supported and justified by its safety. Morbidity and mortality rates of burr-hole craniostomy are comparable with those of twist drill craniostomy, while the recurrence rates are similar to those achieved with craniotomy. The downside of the craniotomy technique, however, is that it the greatest number of treatment related deaths, and highest morbidity.[36]

Burr-hole or twist drill craniostomy aims to release the hematoma fluid. In other words, removal of the hematoma membranes does not necessarily decrease the risk of recurrence. Therefore, it may be speculated that the hematoma itself is the promoter of the chronicity, and the removal of the hematoma fluid should suffice as the primary goal of surgery. This hypothesis is supported by recent laboratory studies showing that the hematoma fluid contains large concentrations of vasoactive cytokines. The high concentration of

vascular endothelium derived growth factor, could be involved in the formation of the hematoma membranes. Furthermore, the hematoma fluid contains inflammatory mediators and fibrinolytic factors which all play role in the further development of the hematoma. The intention of irrigation is to remove the hematoma completely or at least dilute its content. Clinical data support the beneficial effect of intraoperative irrigation, therefore continuous postoperative irrigation may be useful to reduce recurrence. Post operative drainage for several days might be useful to support the re-expansion of the brain into the space occupied by the hematoma. Results were better when the tip was in a frontal position (5% recurrence) temporal (33% recurrence) occipital (36% recurrence) and parietal (38% recurrence).[36.]

In our study all the cases were treated by burr hole craniostomy with intraoperative irrigation. In two patients, we used the frontal drain post operatively. One for recurrence and one for to support re-expansion of the brain. We did not need craniotomy in any of our cases.

The treatment of chronic subdural hematoma seems simple and effective however, postoperative complications like recurrence of hematoma, pneumocephalus brain collapse, and intracerebral hemorrhage still occur in some patients, and these complications are dependent on surgical technique, patient's age, and preexisting morbidity. Chronic subdural hematoma is subject to post-operative fatal and non-fatal complications. Mortality ranges from 0 to 8% depending on the preoperative clinical status. There is an average recurrence in 8% of the cases, chiefly linked to the absence of drainage. Empyema occurs in 2% of patients, especially when the drain is left in place more than 3 days. 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 others, complications occurring after surgery. Finally, 10% of the patients will have a permanent neurological impairment.[5,26,37-39]

In our series two most important factors that influence the outcome was chest infection and hypertension. Complications which developed in our patients were, two patients develop chest infection, two develop seizures, one intracerebral bleed, one pneumocephalus and two patients develop recollection. In our series there were two deaths (6.6%), two patients had moderate disability and 86.6% had excellent outcome. This shows that our results are quite satisfactory and comparable to results of most other author's.

CONCLUSION

After studying thirty cases of chronic subdural hematoma, it was found that most of them presented with hemiparesis, headache, and urinary incontinence. While some of them presented with behavioral changes and memory loss.

When patients were followed after one week of surgery it was found that most of them had excellent outcome. Conscious level as well as other clinical parameter improved markedly, but hemiparesis did not improve in some patients. Two patients died because of secondary medical problem.

Mortality and morbidity of chronic subdural hematoma has decreased markedly in recent years because of improved diagnostic facilities and prompt surgical intervention.

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