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Introduction to First Edition

It is our great pleasure to present this first issue of Journal of Bangladesh Society of Neurosurgeons.

In fact we were supposed to bring out the issue a long time back but due to total collapse of the computers due to virus we had to delay, we apologies to our readers for the delay. The present Executive Committee had to work very hard to retrieve and compile the issue especially our Scientific Secretary Dr. Asif Moazzam Barkatullah.

We would like invite all our readers to actively participate in improving the journal so that we can reach a certain level of recognition by the international authorities. Please feel free to advise us.

We remain grateful to all who has helped us like the review committee and the backup team of computer engineers

Prof. Kanak Kanti Barua
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Executive Editors Note

The Bangladesh Society of Neurosurgeons decided to start publishing a peer reviewed journal from July 2011. This journal will be published twice a year i.e. January and July.

It will publish original articles based on clinical trials, laboratory works and field works related to neurosurgery in a broad sense.

It will also accept review articles, Meta analysis, case reports, short communications and letters to editor.

The journal of Bangladesh society of neurosurgeons, Its editorial board and journal committee will accept no liability whatsoever for the consequence of inaccurate and misleading information, opinion or statement.

The Editors reserve the rights to shorten or to even modify the article after consultation with the review committee keeping the main object of the article in mind.

The Bangladesh society of neurosurgeons has decided to offer it first copy of the journal to all its members as a complimentary copy.

Complimentary copies will also be sent to all libraries of the medical colleges and other relevant academic institute of the country and related institute abroad.

Prof. Abul Khair
Executive editor
Bangladesh journal of Neurosurgery

SURGICAL OUTCOME OF PAEDIATRIC POSTERIOR FOSSA TUMOUR AFTER GROSS TOTAL REMOVAL AND SUBTOTAL REMOVAL

MH RAHMAN[1], MH RASHID[2], SU AHAMED[3]

Abstract:

This prospective study was done in Neurosurgery department, Dhaka Medical College Hospital. It was conducted from January 2003 to December 2005. During this period 40 paediatric posterior fossa tumour patients were admitted. The mean age of the patients was 8.31+3.1 years ranging from 3.5 to 15 years. The main complaints were headache with vomiting (100%), Dimness of vision (70%), Ataxia (52.5%), Blindness (25%). All cases had a definite diagnostic investigation at the time of admission. Plain x-ray skull was done in all patients followed by MRI scan (42.5%), CT scan (37.5) and both CT and MRI scan (20%). In all cases CSF diversion (VP shunt) were instituted. All patients were operated by suboccipital craniectomy followed by gross total removal of tumour in (62.5%) and subtotal removal in (37.5%). In all cases diagnosis was confirmed by histopathological examination. In cases of subtotal resection, symptoms (Headache, vomiting) appeared during 7-9 months follow up period in (7.5%) and subsequent follow up in (12.5%). But in gross total removal symptoms appeared in one case (2.5%) in 13-15 months follow up period.

Key Words: *Gross total removal, subtotal removal, paediatric, posterior fossa tumour*

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Introduction:

Childhood (0-15 years) brain tumour differ from those of adults, particularly in regarding their histological types and intracranial distribution. In pediatric patients medulloblastoma, astrocytoma, ependymoma and brain stem glioma are more in posterior fossa tumours. About 70% of childhood tumours are infratentorial in compare to adult are only 30%.[1]

Brain tumour are the 2nd most common malignancy next to leukemias in case of children. Primary brain tumour are responsible for 20% of malignant tumours diagnosed before the age of 15 years.[2]

Medulloblastoma or posterior fossa primitive neuroectodermal tumours are aggressive tumours characterized histologically by small dark cells with scanty cytoplasm. They constitute 20-25% of all pediatric brain tumours but are rare in adults.[3] Medulloblastoma is the most common type of childhood brain tumour. Tumour dissemination is associated with a marked reductions in 5 years survival rates to approximately 25%.[4]

Most histologically benign forms of astrocytomas occur in childhood. The most potentially curable form is the pilocystic cerebellar astrocytoma in children; this accounts for up to 55% of low grade astrocytomas in childhood and usually presents with clinical features related to hydrocephalus or posterior fossa cyst formation. Typically there is a large cyst with a single enhancing mural nodule, although these tumors can have multiple cysts or be completely solid.[5]

Ependymomas arise from the ventricular lining and are characterized by ciliary bodies on electron microscopy or ependymal rosettes histologically. They account for approximately 1-5% of primary brain tumours. About 70% of ependymomas occur in the fourth ventricle and often extend through the foramen of Luschka into the cerebellopontine angle cisterns.[6]

The surgical management of masses in the posterior fossa depends on the patients general condition and an evaluation of the imaging studies. An assessment

Md. Hafizur Rahman, Mirza Md. Hafizur Rashid, S.U. Ahamed, Department of Neurosurgery, Dhaka Medical College Hospital, Dhaka, Bangladesh

Correspondence : Md. Hafizur Rahman, Department of Neurosurgery, Dhaka Medical College Hospital, Dhaka, Bangladesh

of patients presented with tumour associated hydrocephalus needs attention and several management decisions will need to be made. Symptomatic associated hydrocephalus should be managed immediately and effectively.[7]

The goals of postrior fossa tumour surgery are definition of the extent of tumour, resection of as much of the tumour as can be achieved without causing significant neurological deficit and correction of secondary hydrocephalus with re establishment of CSF pathway.[8]

Surgery is the primary treatment for the majority of children with brain tumours and a surgical resection that is as complete as possible is important for the best long term outcome of the most tumors.[9]

Surgical debulking of medulloblastoma is the 1st line of therapy and a radical resection increases the chance for cure in patients with no metastasis at diagnosis adjuvant therapy is needed for all patients. Surgical resection is the treatment of choice for cerebellar astrocytomas. It is said to be the most readily resected tumour. Ten year progression free survival rates among patients who undergo a gross total resection without other adjuvant therapy.[10]

Ependymomas are the fourth most common tumour of the posterior fossa in children but the third most common after medulloblastoma and cerebellar astrocytomas to presented by obstructing the 4th ventricle, causing hydrocephalus and signs symptoms of increased intracranial pressure. They usually arise in the midline from the floor of the 4th ventricle near the area prostrema in the vomiting centre of the brain.[11]

Clinical Materials & Methods:

This prospective study was carried out in the department of Neurosurgery, Dhaka Medical College Hospital, Dhaka. It was conducted from January 2003 to December 2005. The sample size was 40. Patients with posterior fossa tumour and Patients having associated obstructive hydrocephalus was included in this study.

Data collection procedures- A printed research instrument (proforma) was prepared and the data were entered into the proforma. Information were history of illness, clinical examination of the patients, appropriate investigation (CT and / or MRI), response to VP shunt, definitive surgical procedure and operative findings and operative outcome at discharge and subsequent follow up (3 months to 15 months). 40 paediatric patients with posterior fossa tumour associated with hydrocephalus were admitted in the study period.

The collected data were edited, compiled and statistical analysis was down by using computer based software SPSS (statistical package for social science) 7.5 program. The data were presented in table. Patients were managed by surgical procedure, histopathology, radiotherapy and follow up.

Results:

In this study 40 cases of paediatric posterior fossa tumour have been evaluated.

The mean age of the patients was 8.31±3.1 years ranging from 3.5 to 15 years. More than two fifths (62.5%) of the patients were in the age range of 6 to 10 years followed by 22.5% in the age range of 11-15 years. However, 15.0% of the patients were in the age group less than six years (Table-I).

Table-I

Age distribution of the patients (n=40)

Age in years	No.	%
0-5	6	15.0
6-10	25	62.5
11-15	9	22.5
Total	40	100.0

The mean duration of illness was 8.1±4.0 months. The highest percentage of patients had duration of illness ranging from 6-10 months followed by 11-15 months and the lowest in the range of 0 to 5 months.

The most common presenting features were headache and vomiting almost 100%, difficulty in walking and sitting about 53%. More than twothird majority of the patients presented with dimness of vision and loss of vision. Out of 40 patient 10 (25%) cases had loss of vision (Table-II).

Table-II

Distribution of patients by clinical presentation (n=40)

Clinical presentation	No.	%
Headache with vomiting	40	100.0
Dimness of vision	28	70.0
Ataxia	21	52.5
Blindness	10	25.0

All cases had a definitive diagnostic investigation (CT or MRI) at the time of admission in the Neurosurgery unit. All cases had significant trivanticulomegally with a marked periventricular lucency.

All patients were operated by suboccipital craniectomy. Removal of C1 arch was perform in 18 cases. In no case dura was found to be involved by the tumour. The cerebellum was found relaxed with normal brain pulsation in 37 cases and with three cases intracranial pressure was found high. Tumours were found moderately vascular in 27 cases, less vascular in 13 cases. Gross total removal of the tumour was performed in 25 cases (62.5%) and subtotal removal was done in 15 cases (37.5%). Dural graft was required in 14 cases. Dura was repaired water tight (Table-III).

Table-III

Removal of tumours by definitive surgery (n=40)

Definitive surgery	No.	%
Gross total removal	25	62.5
Subtotal removal	15	37.5
Total	40	100.0

Among the studied 40 patients, 82.5% had good recovery from the diseases following definitive surgery. However, 3(7.5%) had moderately disability, one (2.5% patient had severe disability and 3(7.5%) patients succumbed to death during postoperative period.

All cases had confirmed diagnosis by histopathological examination. Patient having no postoperative complication was discharged within 10 days of postoperative period (Table-IV).

Table-IV

Histopathological diagnosis of the patient (n=40)

Histopathological class	No.	%
Medulloblastoma	17	42.5
Astrocytoma	13	32.5
Ependymoma	8	20.0
CPP (choroid plexus papilloma)	2	5.0
Total	40	100.0

The follow up period was upto15 months. All patients attended in first 3 months. In cases of subtotal resection, symptoms (headache, vomiting) appeared during 7-9 months follow up period in 3 cases (7.5%) and subsequent follow up in 5 cases (12.5%). But in gross total removal symptom appeared in one case (2.5%) in 13-15 months follow up period (Table-V).

Analysis of the outcome of treatment indicated that the proportion of complication was higher among the patients treated by subtotal resection compared to gross total resection and the difference was statistically significant ($p<0.01$) (Table-VI).

Table-V

Duration of follow up (n=37)

Follow up in months	No. of patients	Gross total removal	Subtotal removal
0-3	37	No symptom	No symptom
4-6	28	No symptom	No symptom
7-9	21	No symptom	Headache, vomiting- 3 cases
10-12	12	No symptom	Headache, vomiting, visual disturbances- 5 cases
13-15	8	Headache, vomiting- 1 case	Headache, vomiting, visual disturbances- 5 cases

Table-VI

Distribution of the patient by type of operative treatment and outcome

Outcome of treatment	Pattern of treatment						p value
	Gross Total		Subtotal		Total		
	No.	%	No.	%	No.	%	
No complication	23	92.0	8	53.3	31	77.5	0.007
With complication	1	4.0	5	33.3	6	15.0	
Death	1	4.0	2	13.3	3	7.5	
Total	25	100.0	15	100.0	40	100.0	

Discussion:

The incidence of brain tumours in the pediatric age group is approximately 2.1 – 2.5 cases per 100,000 population per year. Approximately 60 – 70% of childhood intracranial tumours arise in the posterior fossa. The cerebellum is the commonest site for pediatric brain tumours

The association of posterior fossa tumours with hydrocephalus, each a potentially lethal condition necessitates urgent surgical treatment in these seriously ill patients.

As almost all patients presented at a very late stage with a poor clinical state, definitive surgery cannot be performed at that instance. Immediate CSF diversion may at this stage is life saving. Moreover preoperative CSF diversion may prevent development of permanent morbidity e.g. blindness from raised ICP.

After shunting the patients definitive surgery was done. Gross total removal of tumour was done in 25 cases (62.5%) and subtotal removal was done in 15 cases (37.5%). In postoperative follow up period symptoms (headache, vomiting) was appeared during in 8 cases (20%) in subtotal removal of tumour but in gross total removal symptom appeared in one cases (2.5%). Analysis of the outcome of the treatment indicated that the proportion of complication was more in subtotal removal them gross total removal.

Conclusion:

Among fourty (40) posterior fossa childhood tumours most of them had obstructive hydrocephalus treated over a period of 3 years were studied. Most of the patients presented in late stage of the disease and had a worse hydrocephalus at diagnosis. Before removal of tumour CSF diversion like VP shunt was inserted in all cases. Definitive surgery was performed after elimention of signs and symptoms of raised intracranial pressure and improvement of the general condition of the patients. In post operative follow up period better outcome was found in gross total removal than subtotal removal. Post operative recovery was good. By analyzing the results of our study we can conclude that gross total removal of paediatric posterior fossa tumour has better long term outcome.

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EFFECT OF SUBGALEAL DRAIN IN THE MANAGEMENT OF CHRONIC SUBDURAL HAEMATOMA THROUGH BURRHOLE EVACUATION

SADER HS, T HOSSAIN, A ALAMGIR, M ISLAM, ATM ASADULLAH

Abstract:

Braground*: Over a period of two year since January 2005 to December 2006, 70 case of chronic subdural haematoma seen and treated.*

Description: *A male preponderance among the cases was seen in a retio of 6:1. The condition presented with various manifestations. All cases are diagnosed by CT Scan of head. These cases have been managed by burrhole evacuations with or without putting subgaleal drain.*

Conclusion: *This procedure has resulted in marked reduction of recurrence and membrenactomy. There have been 3 death between to group ;the mortality rate in group a 5.75 in group b 2.9%.*

Key words: *chronic subdural haematoma, Evacuations drainages.*

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Introduction:

As early as 1656 J.J Wefer reported a case of chronic subdural haematoma since then many reports have been appeared in the literature. This condition is considered to be Neurosurgically treatable, providing grating fying results.

Materials and Method:

Since January 2005 to December 2006 70 patients were admitted in Neurosurgery department in Dhaka Medical College Hospital who were diagnosed as chronic subdural haematoma in non contrast CT Scan of head. They were divided into two group. purposively in group –A and group-B. in group-A 1st and alternate cases were operated with drain and in group-B Second and alternate cases were operated without putting subgaleal drain . Trauma was accounted about group-A 85.7 percent. and in group- B 82.86 percent. All patients with chronic subdural haematoma were referred from all parts of the country. This accounts the large number of chronic subdural haematoma cases treated at this Medical College Hospital.

Table 1 & II show the age and sex incidence of the cases. A high percentage patient were in their 6th decade or ;atom. The male to Female ratio in this group 6:1. The male preponderance is due to greater exposure. Clinical presentation are shown in table 3. A definite history of head injury could be obtain in group-A 85.7 percents and group-B 82.86 percent and the remaining the patients could not remember any episode of trauma. It is note worthy in group-A 22.86 percent and group-B 20 percent of the cases had Bilateral chronic subdural haematoma. In Group-A 6 patient and in group –B 5 patient presented with refractory headache with period of remission and exacerbation the headache increased as assuming an upright position from prone position. Because of the symptoms the patients were afraid two sit or standard up.

Management:

70 patients of both group under went surgical intervention after proper preoperative evaluation through unilateral or bi lateral burr hole evacuation and irrigation the cavity by normal saline till clear fluid came out with or without putting subgaleal drain. Before closure or putting drain the subdural spaces were filled with normal saline. The subgaleal drain left for 24 hours then removed. The patient mobilized as soon as possible with physiotherapy. In 80 percents of cases deficit began to resolute within 48 hours. Scalp suture removed on the 7th post operative day and discharged home 7th or 8 post operative day.

Result:

All 70 patients in both group of chronic subdural haematoma were treated by burrhole evacuation and subdural space irrigated thorough normal saline. putting

Hossain SK Sader, Hossain Tofael, Alamgir Abdullah, Islam Manirul, Asadullah ATM, Dhaka Medical College & Hospital, Dhaka Bangladesh

Correspondence : Dr. Hossain SK, Dhaka Medical College & Hospital, Dhaka Bangladesh

subgaleal drain in group-A and without subgaleal drain in group-B. After surgical evacuation most of the patients in both groups improved dramatically according to GCS, Markwalder scale and GOS.

Operative morbidity in group-A 6 (22.93 %) and group-B 1(2.95 %) were noted out of 70 patients operative mortality in group-A 2 (5.7%) and group-B 1 (2.95 %) were noted.

Table-I

Age distribution in group a and in group-B. (n=70)

Age (year)	Group		Total
	Group A (n=35)	Group B (n=35)	
15-30	4 (11.4)#	2(5.7)	6 (8.6)
31-45	4(11.4)	7(20.0)	11 (18.0)
46-60	8 (22.9)	10 (28.6)	18 (25.7)
61-75	12 (34.3)	13 (37.1)	25 (35.7)]
76-90	7(20.0)	3 (8.6)	10 (14.3)
Total	35 (100.0)	35 (100.0)	70 (100.0)
Mean age ±SE (Range)	58.71±2.95 (18-88)	56.14 ±2.66 (22-90)	57.43±1.98 (18-90)*

Figure within parentheses denoted corresponding percentage

Out of 70 patients with CSDHs male patients were group A 28 (80.00%), group B 29 (82.90%) and female patients in group A 7 (20.00%) and group B 6 (17.1%)

Table-II

Sex distribution in group A and in group B. (n = 70)

Sex	Group		Total
	Group A (n=35)	Group B (n=35)	
Male	28 (80.0)#	29 (82.9)	57 (81.4)
Female	7 (20.0)	6(17.1)	13 (18.8)
Total	35 (100.0)	35 (100.0)	70 (100.0)

Figure within parentheses denoted corresponding percentage Male were mostly affected in both groups.

Out of 70 patients with CSDHs in both groups most of the patients
presenteed with headache and contralateral limb weakness.

Table-III

Shows distribution of Clinical Presentation in group A and in group B. (D = 70)

Symptoms & Sign	Group		Total
	Group A (n=35)	Group B (n=35)	
Headache	6 (17.14)#	5 (14.29)	11 (15.71)
Headache plus vomiting	5 (14.29)	6 (17.14)	1] (15.71)
Headache plus contralateral limb weakness	20(57.14)	18 (51.43)	38 (54.20)
Behavioral disturbance	2 (5.71)	2(5,71)	4(5,72)
Speech disorder	1 (2.86)	3 (8.57)	4 (5.72)
Seizure	1 (2.86)	1 (2.86)	2(2.86)
Total	35 (100.0)	35 (100.0)	70 (100.0)

Figure within parentheses denoted corresponding percentage

Out of 70 patients with CSDHs, in group A fronto, parietal 5(14.28%), parieto-occipital 22 (62.86%), fronto parieto-occipital (Bilateral) 8 (22.86%) and in group B Fronto parietal 6(17.14%), Parieto-occipital 22(62.86%), Fronto Parieto-occipital (Bilateral) 7 (24%).

Table-IV

Shows Location of CSDHs in group A and in group B. (n=70)

Location of haematoma	Group		Total
	Group A (n=35)	Group B (n=35)	
Fronto parietal	5 (14.28)#	6 (17.14)	11 (15.71)
Parieto-occipital	22 (62.86)	22(62086)	44 (62.86)
Fronto Parieto occipital (Bilateral)	8 (22.86)	7(20000)	15 (21.43)
Total	35 (1 00.0)	35 (100.0)	70 (100.0)

#Figure within parentheses denoted corresponding percentage

Table-V

Shows number and percentage of patients on the 1st postoperative day in group A and in group B according to GCS. (n =70)

Post operative GCS	Group		Total
	Group A (n=35)	Group B (n=35)	
5-Mar	2 (5.7)	1 (2.9)	3 (4.3)
8-Jun	2 (5.7)#	1 (2.9)	3 (4.3)
12-Sep	6(17,1)	6 (17.1)	12 (17.1)
13-15	25(7104)	27 (77.1)	52 (74.3)
Total	35 (100.0)	35 (100.0)	70 (100.0)

Chi square value=0.744, df=3, p value= 0.863

#Figure within parentheses denoted corresponding percentage

Out of 70 patients with CSDHs, most of the patients were in grade 0 in both groups.

Table- VI

1st Postoperative day grading of CSDHs in group A and group B according to Markwalder scale. (n=70)

Markwalder Scale (Post oprative period)	Group		Total
	Group A (n=35)	Group B (n=35)	
Grade 0	24 (68.6) #	26 (74.3)	50 (71.4)
Grade 1	6 (17.1)	7 (20.0)	13 (18.6)
Grade 2	3(8,6)	1 (2.9)	4(507)
Grade 3	2(5.7)	1 (2.9)	3(4.3)
Total	35 (100.0)	35 (100.0)	70 (100.0)

Chi square value=1.49, df=3, p value= U.685,

#Figure within parentheses denoted corresponding percentage

Out of 70 patients with CSDHs, in group A Death 2 (5.7 %) and group B Death 1(2.9%).

Table- VII

Shows post operative complication in group A and in group B. (n = 67) among 70 patients

Complications	Group		Total
	Group A (n=33)	Group B (n=34)	
Complication	6(22.9) 1	(2.95)	7(10.44)
No complication	27 (77.1)	33 (97.05)	60(89.56)
Total	33 (100.0)	34 (100.0)	67 (100.0)

Chi square value--3.72, df=1, p value= 0.05 (after Yates correction) #Figure within parentheses denoted corresponding percentage

Table-VIII

Showing condition of (both Groups) patients with CSDHs in relation to Glasgow outcome scale. (n = 70)

GOS	Group		Total
	Group A (n=35)	Group B (n=35)	
Grade 1	2 (5.?) #	1 (2.9)	3 (4.3)
Grade 4	8(22,9)	0 (.0)	8 (11.4)
Grade 5	25 (71.4)	34 (97.1)	59 (84.3)
Total	35 (100.0)	35 (100.0)	70 (100.0)

Chi square value=9.706, df=3, p value= 0.008. So result of our study is statistically significant.

#Figure within parentheses denoted corresponding percentage

Discussion:

CSDHs is a neurosurgical emergency which makes the surgeon worried with its malignant behavior. High morbidity and mortality of the patients following CSDHs has led to search for better treatment modalities their surgical treatment to improve the prognosis of the patients.

In this study, we have selected 70 consecutive patients of CSDH. These 70 patients grouped into group-A and group-B. 35 patients were in each group.

Group-A Management of CSDH after burrhole evacuation with subgaleal drain.

History of direct head trauma is frequently encounter risk factor. However, CSDHs may also occur in absence of head trauma. In our series direct head trauma was the most common cause of CSDHs 85.71% , in group-A and 82.86, in group-B and remained unclear 14.29% in group-A and 15.71% in group-B. In a relevant study the percentage of CSDHs with a history recent head trauma is 55% and caused is uncleared in 20% (Krupp and Jans 1995) which correlates with our study.

The operative morbidity in group-a was (18.18) and in group-B was 2.95%. The operative morbidity in relevant study show 4.2% and 3.8% (Kurpp and Jans 1995) which correlates with our study.

In our study highest number of patients were in the active period of life in group-A 71.4% patient were in GOS 5 and in group-B, 97. 10% patients were in Gos 5 Category (Kurpp and Jans 1995) which correlates with our study. In our study we compared group-A with group-B relation to GOS during 1st postoperative day using chi square value=9.706. df=3, p value= 0.008. So result of our study is statistically significant.

We conclude therefore that burr hole evacuation without closed system drainage should be the method of choice for the treatment of CSDH. Craniotomy should be reserved for those patients in whom the haematoma reaccumulates or residual haematoma membranes prevent re-expansion of the brain.

Conclusion:

The present study show the result of management of CSDHs by surgical intervention e.g. burrhole evacuation with or without subgaleal drainage system. In our study we found burrhole evacuation without subgaleal drainage is better procedure than of drainage system. The patients with subgaleal drainage group had complications in postoperative period like wound infections, neurological deterioration, even death which were less in group without subgaleal drainage system.

According to the all outcome variable like GCS, GOS and Markwalder scale shows in group-B is better procedure which was statistically significant.

Thus in the management of chronic subdural haematoma by burrhole evacuation without subgaleal drainage system is a better procedure.

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EVALUATION OF FACTORS INFLUENCING THE NEUROSURGEON'S DECISION REGARDING SURGICAL TREATMENT OF INTRACEREBRAL HAEMORRHAGE

Chowdhury SMNK[1], M Hossain[2], KMT Islam[3], Mahmood E[4], Hossain SS[5]

Abstract:

Background: *Spontaneous intracerebral haemorrhage (ICH) poses challenging decisions in neurosurgical practice. In fact, selection between surgical and conservative treatment is the main dilemma for the clinicians in the management of patients of all intracerebral haematoma. We conducted this study to evaluate characteristics and prognoses in patients with ICH .Another objective of the study were to evaluate the pattern of indications for surgical intervention.*

Patients and methods: *Between January 2008 and July 2009, 125 patients with ICH who fulfilled our surgical criteria were hospitalized, in the Neurosurgery Department of Dhaka Medical College Hospital, and included in this prospective study. Of these 125, 52 patients' relatives agreed to surgery and the remaining 73 declined surgery. Thus, those 73 patients were accepted as a control group, and underwent conservative treatment. All patients were selected mainly according to GCS and the volume of the hematoma on CT scans. We used the GCS to categorize our patients into the following 4 grades: GCS scores of 13 to 15, 9 to 12, 5 to 8, and 3 to 4 .The hematoma volumes were graded as (a) mild (<25cm3),(b) moderate (25–60cm3) or (c) massive (>60 cm3). Eligibility criteria for a surgical procedure consisted of (a) impaired consciousness as assessed according to the GCS score (GCS 9–12), (b) evidences of a neurological deficit, (c) deterioration or non-improvement within 3 days after beginning medical therapy, and (d) haematoma volumes >25 ml. Surgical treatment included open craniotomy, and external ventricular drainage. Preoperative GCS score and ICH volume were the major evaluating factors, and comparison of the 30-day mortality rate and Barthel index were used for outcome evaluation.*

Findings: *Our series consisted of 88 (70.4%) male and 37 (29.6%) female patients (Sex ratio 2.38). Peak of incidence at the sixth decade, very closely followed by the fifth decade of life. Patients with GCS score of 13 to 15, had shown no difference in mortality between Conservative and surgical treatments. But GCS score between 9 to 12 and ICH volume of more than 30 ml, the mortality rate with surgical treatment (17.86%) was lower than that with conservative treatment (42.85%,).GCS score Between 3 to 8 and ICH volume of at least 30 mL; surgical treatment was for life saving. When the GCS score was 5 to 12 and ICH volume less than 30 mL, the Mortality rates were lower for surgical treatment than for conservative treatment.*

Conclusions: *Intracerebral hematoma is a clinical entity that carries high risk of both mortality and morbidity.ICH volume is a more important factor than GCS score in determination of treatment .We advocate surgical treatment for patients with ICH when the ICH volume is30 mL or above at any range of GCS scores, and specifically when GCS score in between 9 and 12. Based on our experience, we also advocate delayed surgery (surgery after 36 hours but within 7 days).Conservative treatment is suggested for patients with ICH when GCS score is 13 and above, when the ICH volume is less than 30 mL at any range of GCS scores.*

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1. Dr. Sharif Md Noman Khaled Chowdhury, Assistant Professor, Department of Neurosurgery, Dhaka Medical College, Dhaka.
2. Dr. Hossain M, Assistant Professor, Department of Neurosurgery, BSMMU, Dhaka
3. Dr. Islam KMT,Medical Officer, Department of Neurosurgery, BSMMU, Dhaka
4. Dr. Ehsan Mahmood, Professor, Department of Neurosurgery. Dhaka Medical College.
5. Sk. Sader Hossain, Professor & Head of the department, Department of Neurosurgery, Dhaka Medical College, Dhaka.

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Address Correspondence to: S M Noman Khaled Chowdhury, Assistant Professor, Department of Neurosurgery, Dhaka Medical College, Dhaka, Bangladesh. Phone: +8801819019415, e-mail: nomankhaled@yahoo.com

Introduction:

Spontaneous intracerebral haemorrhage (ICH) poses challenging decisions in neurosurgical practice. ICH accounts for 8 to 14% of all strokes in Europe and the United States but between 20 to 35% of strokes in Asia.[1] Albeit representing the minor fraction of total strokes, ICH is a formidable disease, with a morbidity and mortality twofold to six fold higher than that for ischemic stroke.[2] Age, lesion size, intraventricular extension, limb paresis, communication disorder and level of consciousness have all been reported as predictors of unsatisfactory outcome.[3] Multiple clinical risk factors have been associated with a higher

incidence of ICH and controversy still remains about management (conservative non-surgical versus surgical evacuation) [4].

In fact, selection between surgical and conservative treatment is the main dilemma for the clinicians in the management of patients of all intracerebral haematoma. With regards to the indication for surgical removal of the haematoma, there certainly is wide consensus that alert patients with small haematomas (25 ml or less) but no neurological deficits do not require surgical evacuation, as moribund patients with extensive haemorrhage (85 ml or more) also may not.[5] Vice versa, many neurosurgeons would recognize the role of surgery as a life saving in cases of rapid deterioration from an initially good level of consciousness. Vigorous controversy, however, still remains regarding the question of whether surgical removal of clots improves outcome in primarily noncomatose patients who do have neurological deficits.[2] But fact is that, in addition to the initial destructive effect of the haemorrhage, there is experimental and clinical evidence that ICH produces a 'penumbra' of oedema and ischemic neuronal damage which is potentially recoverable.[5] Removal of haematoma improves perfusion of compromised brain parenchyma prevents intracranial hypertension and may also enhance the clearance of blood breakdown products, thus preventing secondary brain oedema and other potential neurotoxicity.[2]

As a result, there has been great interest in the potential benefits of acute hematoma evacuation. The efficacy of surgical evacuation was most recently studied in the ISTICH. Mendelow et al reported that there were no significant benefits in early surgery vs initial conservative treatment for spontaneous supratentorial intracerebral haematomas in the international STICH study. However, in their study, about 26% of the patients needed a treatment shift from conservative treatment to surgical treatment after an initial period of observation. Rebleeding and clinical neurological deterioration were the major determinants for the treatment shift.[6] Other clinical studies showed that early surgical treatment would be an effective treatment for hemorrhagic stroke in certain situations but the surgical criteria and surgical intervention time need to be more precise and strictly observed under the criteria of the neurological condition (GCS) and the ICH volume changes.[7] Some small, randomized, controlled trials of surgery for supratentorial spontaneous intracerebral hemorrhage have been conducted in Europe and North America [8] but none in our country. We conducted this prospective study to evaluate characteristics and prognoses in patients with ICH .Another objective of the study were to evaluate the pattern of indications for surgical intervention.

Materials and Methods:

Patient collection

Between January 2008 and July 2009, 168 Patients with ICH were admitted or referred to Neurosurgery Department of Dhaka Medical College Hospital. Of the 168, 125 selected patients who fulfilled our surgical criteria were hospitalized and included in this prospective study. Of those 125, 52 patients' relatives agreed to surgery and the remaining 73 declined authorization for surgery. Thus, those 73 patients were accepted as a control group, and underwent conservative treatment. The timing of surgery (as an emergency procedure or due to neurological deterioration) and technique (open surgery and ventriculostomy, mainly) were studied according to the time elapsed since onset of symptoms. All these 52 patients were followed for at least a period of 3 months, and the follow-up results of their treatments were obtained, in some cases, by direct examination, and in others through communication with the patient's family. The patient outcomes were assessed according to the Glasgow Outcome Scale (GOS).

Selection of Patients

The diagnosis of spontaneous intracerebral hemorrhage was made on acute onset of neurologic symptoms and signs in the absence of trauma and confirmed by CT scan. Patients were given additional diagnostic tests such as brain magnetic resonance imaging at the discretion of each medical team. Patients were excluded from the study if diagnostic tests suggested hemorrhage due to ruptured aneurysm, arteriovenous malformation, hemorrhagic transformation of cerebral infarcts, neoplasm, trauma, or any source other than spontaneous intracerebral hemorrhage. Our acute stroke team members subjectively provided different information regarding surgical intervention and conservative treatment to families during admission. Owing to ethical considerations in this very emergent condition, we

did not completely randomize our patients for study. Informed consent was obtained from each patient's family for surgical or conservative treatment after the family indicated full understanding of the options provided.

Grading of Neurological Status and CT Findings

All patients were selected mainly according to GCS and the volume of the hematoma on CT scans. The hematoma volumes were calculated according to the dimensions measured in the axial CT scans (height X width X length X 0.5) and graded as (I) mild (<25cm3), (II) moderate (25–60cm3) or (III) massive (>60 cm3)[4, 9, 10]. Side, location of the haematoma and intraventricular extension were carefully recorded. The intracerebral haemorrhage was defined as deep (basal ganglia, thalamus, internal capsule, deep periventricular white matter) or lobar (specific cortex and subcortical white matter). Large haematomas were classified according to the lobe most affected (for deep or lobar division) [4].

Outcome classification

The 30-day mortality and 3-month BI scores (0-100) was collected for evaluation. The outcome is compared to that conservatively managed intracerebral haematomas. For comparison ,we used the GCS to categorize our patients into the following 4 grades: GCS scores of 13 to 15, 9 to 12, 5 to 8, and 3 to 4 [7].

Surgical treatment criteria

Eligibility criteria for a surgical procedure consisted of (a) impaired consciousness as assessed according to the GCS score (GCS 9–13), (b) evidences of a neurological deficit, (c) deterioration or non-improvement within 3 days after beginning medical therapy, and (d)haematoma volumes >25 ml. Exclusion criteria comprised a comatose (GCS d" 8) or alert state (GCS > 14), patients without neurological deficits, patients showing improvement within 3 days after initiation of medical management, and patients harboring haematomas <25 ml.Under the hypothesis that early surgery would give a better outcome, the operative procedure was performed as soon as possible. However, delayed transportation from the local hospitals or the availability of neurosurgeon and an operating suite in our institution resulted in the variable time interval from the symptom onset to the operation. Aim of the surgery was complete haematoma evacuation. No fibrinolytic therapy has been performed.

Conservative Treatments

All patients received conservative treatment according to current practices. Treatment was not rigidly regimented, and the primary attending neurosurgeon was allowed to use his best medical judgment. Therapy included blood pressure control, intravenous fluids, hyperosmolar agents, H_2 blockers, maintenance of normoglycemia, early nutritional support, and physical therapy. We classified patients as hypertensive if systolic and/or diastolic blood pressure levels were raised above or were equal to 160mm Hg and 95mm Hg, respectively, during their hospital stay and follow up, and those with a well-known history of systemic hypertension with adequate treatment or not [4].We used medication for blood pressure control. The mean arterial pressure was maintained in a range of 90 to 120 mm Hg with antihypertensive medication (labetalol, perindopril, indepamide, ramipril etc). We also used a hypertonic agent (mannitol) when the CT scan indicated mass effect, when or clinical symptoms showed signs of raised ICP.

Surgical Treatment

The choice of operation depends on the neurosurgeon's preference. Surgical techniques included open craniotomy, and external ventricular drainage. The intention of surgical treatment was to control elevated intracranial pressure. An EVD tube was set into the lateral ventricle for drainage, if it was associated with IVH.

Results:

From 2007 to July 2009, 125 patients with ICH were treated in our department, including 52 patients who received surgical treatment and 73 patients who received conservative treatment. Our series consisted of 88 (70.4%) male and 37 (29.6%) female patients (Sex ratio 2.38).The age distribution showed the highest peak of incidence at the sixth decade followed by the fifth decade of life with a mean age of 61.2 years (Fig.-1).In the surgically treated group, 33 (63.4%) were male and 19 (36.5%) female, with an overall age span from 46 to 75, giving a mean age of 60.7. In the conservative treatment group, on the other hand, 55 (75.4%) were male and 18 (24.6%) female, their age ranging from 55 to 72 with a mean age of 62.1. The follow-up ranged from 3 months to 1 year.

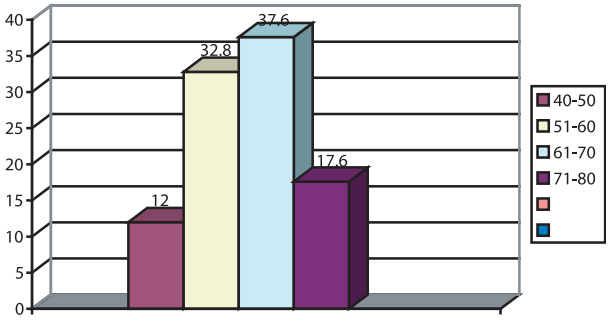

Fig.-1: *Age Distribution of population (n =125)*

Table-I

The patients' demographics are presented

The patients	Conservative treatment (n=73)	Surgical treatment (n=52)
Mean age (y)	60.7 ± 12.8	62.1 ± 13.0
Sex (M/F)	55/18	55/18
Right/Left	31/42	24/28
Lobar/Deep	44 /29	34/18
IVH	23	14

Regarding the previous medical history (Figure 2), 11 (8.8%) Patients had suffered from previous ICH and 18 (14.4%) from cerebral infarction or transient ischemic attack. Eighty two patients (65.6%) were classified as hypertensive: 49 (59.8.4%) were on antihypertensive drug treatment, 16 (19.5%) known hypertensive patients were on irregular medication and 17 (20.7%) were not known to have elevated level of arterial blood pressure until catastrophe. Thirteen (10%) patients had atrial fibrillation and three (2.4%) had ischemic myocardiopathy. Sixty eight (54.4%) patients were diabetics and among them nineteen (28%) patient were treated with diet, thirty five (51.4%) treated with oral hypoglycemic therapy and ten (14.7%) patient were treated with insulin therapy; four patient (5.9%) received no treatment whatsoever (Table-II).

Table-II

Previous medical history

Diseases	Number of population	Percentages
Previous H/0 ICH	11	8.8
Cerebral infarction or transient ischemic attack.	18	14.4
Hypertension	82	59.4
Diabetics	68	54.4
Atrial fibrillation	13	10
Ischemic myocardiopathy	3	2.4

The level of consciousness on admission determined by the GCS was as follows: 44 (35.2%) patients with a GCS below 9, 40 (32%) between 9 and 12, and 41 (32.8%) above 12 (Table-III).

Table-III

The level of consciousness on admission determined by the GCS

GCS	Conservative treatment	Surgical treatment
15-13 (n)	31	10
12-9 (n)	11	29
8-5 (n)	13	8
4-3 (n)	18	5

Forty seven (37.6%) haematomas were deep ((basal ganglia, thalamus, internal capsule, deep periventricular white matter) and seventy eight (62.4%) were lobar (specific cortex and subcortical white matter), the parietal, being the most frequently involved lobe 32(42.1%) followed by temporal lobe 18 (23.7%).

Seventy (56%) haematomas were left and fifty five (44%) right sided. When GCS was considered, we found that among the 40 (32%) cases with a GCS between 9 and 12, in 26 (65.0%) the haematoma was located in the dominant hemisphere, and in 14 (35%) in the non-dominant hemisphere. On the contrary, when the GCS was above 12, the distribution was: 11 (26.8%) left and 30 (73.2%), right.

Thirty-seven (29.6%) haematomas spread into the ventricular space, without secondary hydrocephalus in 26 (70.3%) patients, with moderate ventricular dilatation in 7 (18.9 %) and with severe hydrocephalus in 14 (3.2%).

We analyzed the time elapsed from onset of symptoms and signs to arrival at our hospital: 6 (4.8%) patients arrived within 6 hours from the onset, 46 (36.8%) between 6 and 24 hours and 53 (42.4%) after 24 hours. In 20 (16%) patients, onset time was unknown. Among the 52 (41.6%) patients who underwent surgery, 19 (36.5%) were operated on urgently (Within 24 hours), and in 33 (63.5%) cases surgery was delayed for the next hours or days after admission and initial evaluation. Time elapsed from onset of symptoms to arrival at the hospital was not different in patients who underwent immediate surgery (arrived within 24 hours) as compared with

patients who underwent delayed surgical treatment (after 24 hours).

When we consider the haematoma volume and its relation to treatment provided, we found that in the conservatively treated group, 31 (42.6%) haematomas had a volume below 30 ml, 12 (16.4%) between 30 and 60 ml and 30 (41%) above 60 ml. In the surgical group, 8 (15.4%), 32(61.5%) and 12 (23.1%) patients had haematomas with a volume <30 ml, between 30 and 60 ml and above 60 ml, respectively.

Table-IV

ICH volume for comparison

ICH volume	Conservative treatment	Surgical treatment
< 30 mL (n)	31	8
> 30 mL (n)	12	32
> 60 mL (n)	30	12

Table-V

The 30-day mortality rate of conservative or surgical treatment under different GCS scores and ICH volumes

	Mortality rate (%)	Conservative treatment (n=73)
Surgical treatment (n = 52)		
GCS score of 15-13		
ICH d" 30 mL	15(1) 6.67	2(0)0
ICH e"30 mL	16 (5) 31.25	8(1)6.5
GCS score of 12-9		
ICH d" 30 mL	4(0) 0	1(0) 0
ICH eŠ30 mL	7(3) 42.85	28(5)17.86
GCS score of 8-5		
ICH dŠ 30 mL	6(4) 66.67	3(1) 33.3
ICH eŠ30 mL	7 (7) 100	5(2) 40.0
GCS score of 4-3		
ICH dŠ 30 mL	6 (5) 83.4	2(1) 50.0
ICH eŠ30 mL	12 (12) 100.0	3(2) 66.67.0

Clinical results by combination of GCS grading and ICH volume are shown in Table 5. In cases of GCS score of 13 to 15, there was no difference in mortality rate between conservative and surgical treatments. In patients with a GCS score of 9 to 12 and an ICH volume of at least 30 mL, surgical treatment had a lower mortality rate (12.5%) than conservative treatment (31.28%). In patients with a GCS score of 3 to 8 and an ICH volume of at least 30 mL, surgical treatment also had a lower mortality rate than conservative treatment.

The ICH volume influenced the functional outcome. As the ICH volume increased, the BI score of both treatments decreased. When the ICH volume was less than 30 mL, the conservative treatment posted a better BI score than surgical treatment did.

Discussion

4.1. There appears to be no general agreement on the management of intracerebral haematomas. It is asserted that perifocal elevation of intracranial pressure, persistent reduction of blood flow, and biochemical factors from the intraparenchymal blood clot can cause secondary brain damage outside the primarily affected tissue around the hematoma, and that early surgical evacuation might be of benefit.[11]

Our aim of this study was to assess the efficacy of surgical treatment relative to medical treatment of spontaneous intracerebral hemorrhage and evaluation of our decision making criteria. Interestingly, over the period of our study the number of patients admitted to Neurosurgery that did not undergo Haematoma evacuation remained relatively large: 73 in 125 patients (58.4 % of ICH admissions in Neurosurgery Department.).In this interventional study, the patients who underwent surgery, including craniotomy and ventricular drainage, appeared to have better outcomes. Surgery is usually avoided for severely disturbed patients in deep coma.[8] But we have seen that surgical outcome is better than medical treatment even in this apparently hopeless victims. We believe that these positive results in surgical patients are due, on the one hand, to the dramatic reduction in clot volume, thus discontinuing an ongoing pathophysiological cascade leading to secondary damage of brain tissue [2]. We are convinced, however, that the essential issue for determining who will truly benefit from neurosurgical evacuation of a haematoma and who will not is appropriate patient selection and optimal timing of surgery. In this study, rigorous selection criteria for a surgical procedure were applied.

Stroke in Bangladesh

In our series, age distribution showed the highest peak at the sixth decade of life with a mean age of 61.2 years. Men (70.4%) have a higher incidence of spontaneous ICH than women especially among those more than 55 years old with sex ratio 2.38. Like many other studies [2, 4, 7] we have found that the most important nonepidemiologic risk factor for spontaneous ICH is hypertension. The level of education may also be risk factor. We found that lower the level of education, the higher the incidence of an ICH. This was attributed to a lower awareness of the value of primary health care in lesser educated people. As for other risk factors, only diabetics (54.4%) had significant devastating effect. The location of the ICH at the lobar and deep accounted for (62.4%) and (37.6%) of patients with ICH respectively. In this cooperative study, the 30-day mortality rate was 23.1 % with surgical treatment and 49.3% with control group (surgically indicated but received conservative treatment).

Location of haematoma is related to surgical outcome

There is a strong correlation with the location and site of the hematoma with the clinical deficits, comorbidity and the overall outcome. In a multivariate analysis, sensory deficit was significantly associated with ICH in the thalamus; lacunar syndrome and hypertension with ICH in the internal capsule–basal ganglia; seizures, nonsudden stroke onset, and hypertension with lobar ICH; ataxia and sensory deficit with cerebellar ICH; cranial nerve palsy with brainstem ICH; and limb weakness, diabetes, and altered consciousness with multiple topographic involvement. Although the overall in-hospital mortality rate was 31%, it varied among sites: 65% for multiple topographic involvement, 44% for intraventricular ICH, and 40% for brainstem ICH to 16% for ICH in the internal capsule–basal ganglia.[5, 12] The risk of a fatal outcome was reduced by 73.2% in patients with lobar haematoma as compared to those with ganglionic haematoma [13]. In our series, the lobar haematoma (specific cortex and subcortical white matter) has better outcome than those of deep haematoma (basal ganglia, thalamus, internal capsule, deep periventricular white matter).

Although size or volume may influence surgery-related decisions, the actual surgical accessibility of the clot is deemed more important. Lobar hematomas and those located nearer to the cortical surface are much more likely to be surgically treated than those located deeper in the thalamus and putamen. Overall, it seems that neurosurgeons remain optimistic about the benefits of surgery, but most are more strongly influenced by the lesion's surgical accessibility than by other patient- or hemorrhage-related features.[5]

Determination of Surgical indications more dependent on ICH volume than GCS score

The volume of ICH is a crucial point for determining decision making criteria for surgical intervention. Broderick et al [14] reported that the volume of ICH was the strongest predictor of 30-day mortality for all locations of ICH. Patients with a hematoma volume of 60 mL or more and a GCS score of 7 or less had a predicted 91% mortality rate within 30 days in the series of Broderick et al. There is no significant difference in outcome for conservatively and surgically managed patients in our study with an ICH volume of less than 30 mL regardless of GCS level. It is in agreement with the series of Cho DY et al.[7]In a prospective study of a series of 356 patients with ICH, Bilbao G et al.[4] observed that surgical rates when volume was moderate (between 30 and 60 ml) or large (above 60 ml), were 33% and 34% respectively and only 14% of patients with a volume below 30ml where operated on . Thus, it appears that the volumes of haematomas greater than 30 ml is linked to a poorer prognosis and are preferentially considered for surgical treatment.

In this present prospective study on patients with a GCS score of 13 to 15, regardless of ICH volume, surgical treatment for deep haematoma ((basal ganglia, thalamus, internal capsule, deep periventricular white matter)) was not significantly beneficial. At GCS score of less than 12 and ICH volume of at least 30 mL, surgical treatment is definitely better than conservative treatment. It is in agreement with the series of Cho DY et al.[7],Kanaya and Kuroda [14]. The Kanaya and Kuroda study[14] concluded that the result of surgical treatment (craniotomy) was less satisfactory than conservative treatment in patients with neurologic grade I or II (GCS score, 12-15) except when accompanied by a large hematoma (CT grades III and IV). Surgical treatment is the preferred treatment for patients with a neurologic grade of III or IV (GCS score, 9-12) except when dealing with a small hematoma (CT grades I and II).Surgical treatment in neurologic grade IV (GCS score, b8) will preserve life but will not necessarily provide a satisfactory functional outcome.[7]

Optimal time for surgical evacuation of haematoma.
Timing of surgery still remains a matter of discussion. Some recommend early surgery [11, 15, 16], while others, over 70% of neurosurgeons felt that delayed surgery (i.e. that carried out after 48 h post ictus) would be helpful [5, 17, 18]. In our study surgery after 36 hours had better outcome than surgery within 36 hours which shows variation with the above mentioned international study. Until a more definite answer emerges, the practical approach is that of initial close clinical observation and use of clinical judgments.

Treatment shift from conservative to surgical intervention

In determining the surgical criteria, though the ICH volume, GCS score and location of hemorrhage are most crucial deciding factors we should alert regarding clinical shift of patient. ICH volume is closely related to the GCS score. A more than 3 points decreases of GCS score usually reflect the expansion of the ICH volume and an increase in the surrounding edema [7, 19].A CT scan should do immediately for evaluation the patent. Usually Rebleeding or mass effect causing focal ischemia may be culprit and if it is positive shifting treatment from conservative to surgery should considered.

Recent advances

Great variability exists in the management of intracerebral hemorrhage around the world.[8, 20, 21] In agreement with our findings, some randomized controlled trials have recently shown that surgery tends to reduce the chances of death and dependency in patients with supratentorial intracerebral hemorrhage[7, 8,22,23,24] especially in superficial lobar hematoma; it is likely to be beneficial [7]. In this interventional study, the patients who underwent surgery, including craniotomy, and ventricular drainage, appeared to have better outcomes. We find that surgical intervention still has its role for deep-seated hematoma.

Conclusion

Intracerebral hematoma is a clinical entity that carries high risk of both mortality and morbidity. ICH volume is a more important factor than GCS score in determination of treatment. We advocate surgical treatment for patients with ICH when the ICH volume is 30 mL or above at any range of GCS scores, and specifically when GCS score in between 9 and 12.Based on our experience, we also advocate delayed surgery (surgery after 36 hours but within 7 days). Conservative treatment is suggested for patients with ICH when GCS score is 13 and above, when the ICH volume is less than 30 mL at any range of GCS scores.

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Review Article

CAVERNOUS ANGIOMA OF BRAIN: REVIEW OF 5 CASES

ALAM S[1], KHAIR A[2], HOSSAIN NK[3], FARAZI MA[4], ANSARI A[5]

Abstract:

There are four types of intracranial vascular malformations: AVMs, cavernous angiomas, capillary telangiectasias, and venous angiomas. Cerebral cavernous malformations (CCMs) are angiographically occult, mulberry like assembly of thin-walled vascular sinusoids lined by endothelium with no intervening brain parenchyma. CM (Cavernous Malformation) changes in size and number over time by progression, regression and denovoformation. Cavernous angiomas have a classic popcorn-like appearance on CT and MRI, indicating hemorrhage of multiple ages and calcification. They often have a classical hemosiderin ring (hypointense ring on T2-weighted images).

Here we have analysed 5 cases of cavernous malformation treated by surgery. All the patients had excellent operative outcome with no new neurological deficit.

Bang. J Neurosurgeons 2011; 1(1) : 19-23.

Introduction :

Cerebral cavernous malformations (CCMs) are a mulberrylike assembly of thin-walled vascular sinusoids lined by a thin endothelium lacking smooth muscle, elastin, and intervening parenchyma, surrounded by hemosiderin deposits and gliosis, which may or may not be thrombosed[1]. Cavernous malformations can be found throughout the the brain and the brainstem in a volume distribution, and also the spinal cord, the cranial nerves, and the ventricles[1,2].

There are four types of intracranial vascular malformations: AVMs, cavernous angiomas, capillary telangiectasias, and venous angiomas[1,2,3]. The incidence in the general population is roughly 0.5%, and clinical symptoms typically appear between 20 to 30 years of age. Once thought to be strictly congenital, these vascular lesions have been found to occur *de nov)*[1,2,3.]

1. Dr. Shamsul Alam, MBBS, MS (Neurosurgery), Assistant Professor, Dept. of Neurosurgery, BSMMUE-mail:dr_shamsul @hotmail.com
2. Dr. Abul Khair, MBBS, FCPS, WHO Fellow in Neurosurgery, Professor, Dept. of Neurosurgery, BSMMU.
3. Dr. Kamrun Nessa Hossain, MBBS, MD (Radiology & Imaging), Consultant, Lab aid, Uttara Branch, Dhaka.
4. Dr. Md Mohsin Ali Faraz, MBBS, MS (Neurosurgery), Resident, Neurosurgery Department BSMMU
5. Dr. Ayub Ansari, MBBS, MS (Neurosurgery), Assistant professor , Neurosurgery Dept. BSMMU.

Correspondence : Dr. Shamsul Alam, MBBS, MS (Neurosurgery), Assistant Professor, Dept. of Neurosurgery, BSMMUE-mail:dr_shamsul@hotmail.com

Most vascular malformations are present at birth (congenital) and are suspected to arise between three and eight weeks of gestation, but the specific defect in embryogenesis has not yet been identified for each type of malformation[3,4].

Cavernous malformations/angiomas are composed of cystic vascular sinusoids lined with a vascular endothelium monolayer and no intervening neural tissue[3,4]. These are slow-flow lesions and hemorrhage at approximately 0.5% per year. Like AVMs they can present with either hemorrhage or seizure[5]. Approximately 70% of these lesions occur in the supratentorial region of the brain; the remaining 30% occur in the infratentorial region. the brainstem is the most common site of involvement in this compartment (9–35% of all cases[5].

The incidence of CMs ranges from 0.4 to 0.9% of the general population[3]. They constitute 8 to 15% of all cerebrovascular malformations, and they occur in the supratentorial compartment in 63 to 90% of cases. Posterior fossa CMs represent 7.8 to 35.8% of all cases and the brainstem is the most common site of involvement in this compartment (9–35% of all cases.[5,6].

CM are angiogenically immature lesions with endothelial proliferation increased neoangiogenesis[6]. Cerebral cavernous malformations exihibit braod range of are dynamic behaviors, changing in size and number over time, progression, regression and denovoformation. They can range from 0.1 to 9 cm and usually reach a larger size in children than adults (who usually have cavernous malformations only 2-3 cm in size)[6].

Methods :

All the patients underwent clinical evaluation, routine and specific investigation mainly MRI of Brain with contrast was done. Proper craniotomy and upon the basis of neuroanatomy proper cortical incision were applied .Angioma was removed in pieces by sucker, microrounger under the illumination of high power microscope. Histopathological result were collected properly and postoperative care were monitored regularly.

Results :

In table -I results of all 5 cases were reviewed.

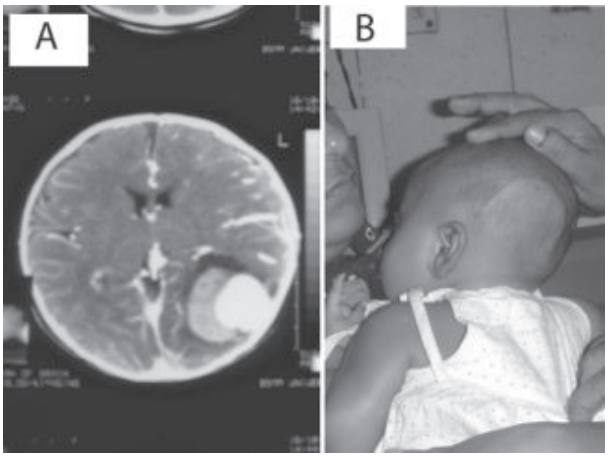

Fig.-1: (Case 1) *Partially thrombosed cavernous angioma in CT scan (A)and postop scar (B)*

Table-I

Summary of cases presenting symptoms, radiography findings operative outcomes.

Case no	Age/ Sex	Presentation	Location of angioma	Name of Operation	Complication	Follow-up
1.	2yrs /F	Headache, seizure	Parieto-occipital lobe	Craniotomy and total excision	Nil	3 yrs
2	28/M	Partial seizure	Left parietal lobe	Left Superior parietal lobule approach	Still occational partial seizure	3 yrs
3	32/M	Sudden severe headache, Rt sided weakness, leg>hand	Lt Fronto-parietal lobe	Left Superior Parietal lobule approach	Nil, Single attack of partial seizure in post op period.	3 months
4	18/M	Headache , Ataxia, visual blurring	Rt cerebello-tonsillar region	Midline suboccipital craniectomy	Nil	2 months
5	38/M	Sudden dysphasia, dysphonia, ataxia, quadreparesis H/o cerebral cavernoma surgery 8 years back	Lt Ponto medullary junction	Midline suboccipital craniectomy and cerebello-medullary fissure approach	Nil	2 months

Discussion :

Case –1: A 2 years old girl presented with excessive crying and occational vomiting and irritability . Her visual problem was noted by her mother . Her CT revealed ruptured cavernous angioma with mass effect. She underwent craniotomy and gross total removal of the cavernous angioma without any further neurological deficit.

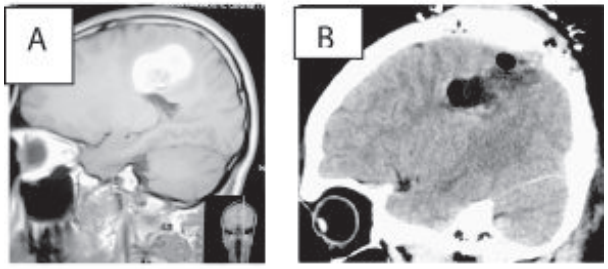

Fig. 2 (Case 2): *Preoperative MRI(A) and immediate postoperative CT scan(B)of same patient showing no residual cavernous angioma.*

Case –2: 28 years old man presented with focal motor seizure mainly in the right leg with occational headache. He underwent MRI investigation and revealed cavernous angioma of left parietal lobe. Parietal craniotomy and superior parietal lobule approach done and total cavernous angioma was removed uneventfully.

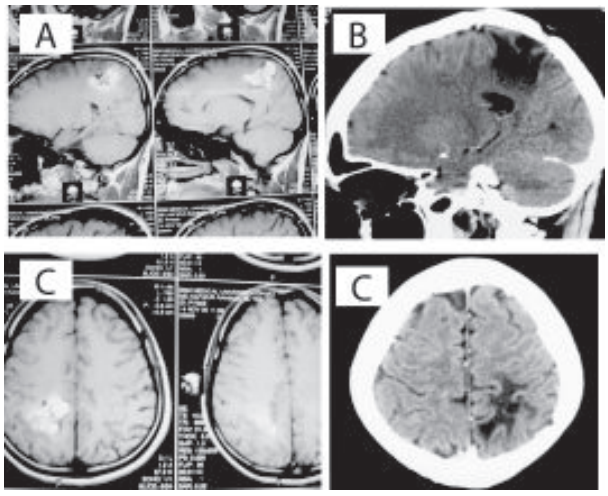

Fig. 3 (case 2): *Preoperative MRI(A,C) showin typical popcorn appearance of cavernous angioma and delayed postoperative CT scan(B,D)of same patient showing no recurrence of cavernous angioma.*

Case –3: 32 years old man presented with sudden severe headache, vomiting, and proressive right sided hemiparesis. Initially he was treated conservatively for 2 weeks. His motor weakness improved. He underwent parietal craniotomy and superior parietal lobule approach done and total cavernous angioma was removed uneventfully.

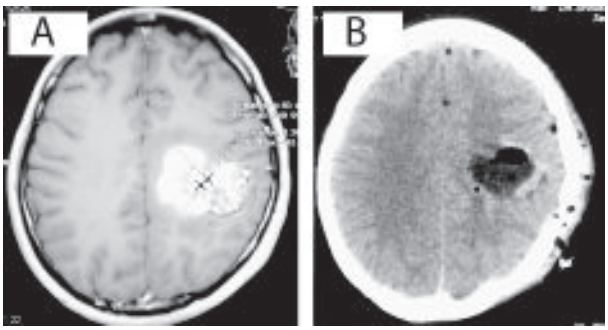

Fig. 4 (Case 3): Preoperative MRI(A) and immediate postoperative CT scan(B)of same patient showing no residual cavernous angioma.

Case –4: 18 years old boy presented with sudden headache, vomiting, ataxia and visual dimness . His CT scan revealed cerebellar ruptured cavernous angioma with fourth ventricular compressiona and moderate obstructive hydrocephalus. He underwent midline suboccipital craniectomy and with C1 laminectomy and gross total removal of angioma. His postoperative course was uneventful.

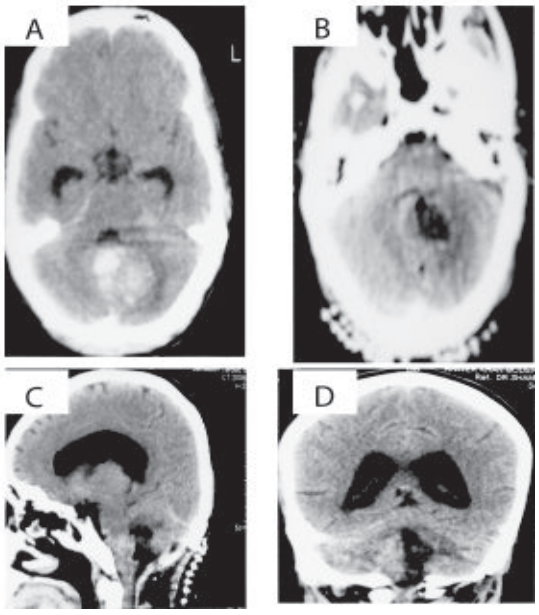

Fig.-5 (Case 4): *PreoperativeCT Scan(A,C) and immediate postoperative CT scan(B,D)of same patient showing no residual cavernous angioma.*

Case –5: 38 years old man presented with sudden onset of dysphagia , dysphonia, dysarthria, and gross quadreparesis and respiratory distress. He underwent emergency tracheostomy to enhance trachio-bronchial toileting. He had a history of supratentorial craniotomy 10 years back where histopathology revealed cavernous angioma. His latest MRI revealed recent ruptured cavernous angioma of ponto-medullary region along with evidence of previous surgery and some discrete cavernous angioma in different location. He underwent midline suboccipital craniectomy and near total removal of cavernous angioma and his postoperative course was uneventful. His motor power in all limbs improved and tracheostomy wound closed. His dysphagia still persist .

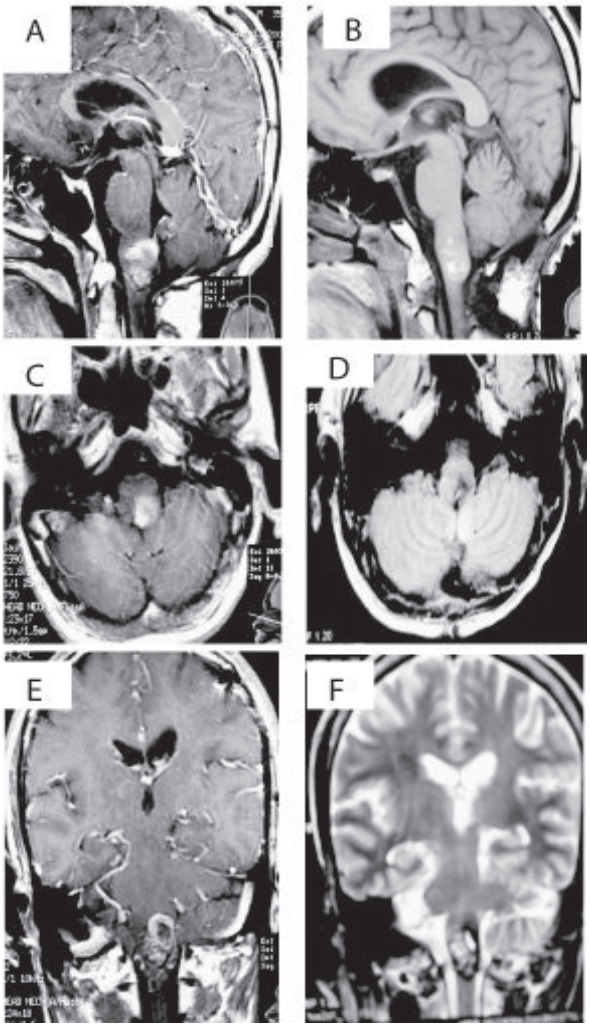

Fig. 6 (Case 5): *Preoperative MRI(A,C,E) and early postoperative CT scan(B,D,F)of same patient showing some residual cavernous angioma in Medulla oblongata.*

Magnetic resonance imaging:

Cerebral cavernous malformations are characterized by small, nonsymptomatic hemorrhages typically confined to the location of the lesion, only occasionally resulting in clinically significant hemorrhaging[6]. Hemoglobin degradation products such as methemoglobin, hemosiderin, and ferritin present at the siteof the lesion alter the local magnetic environment allowing for magnetic resonance imaging (MRI) detection[6,7].

Cavernous angiomas have a classic popcorn-like appearance on CT and MRI, indicating hemorrhage of multiple ages and calcification. They often have a classical hemosiderin ring (hypointense ring on T2-weighted images). (Osborn). They show minimal to no enhancement on contrast CT or MRI and are not detectable by angiography[7].

Best imaing tools is MRI T2 sequence, standard TI ,T2WI may be negative in Type 4 lesions[7].

DSA usually normal hence known as Angioraphically occult vascular malformation.(osborn)[8].

AVMs are direct artery to vein fistulae that hemorrhage at a rate of 4% per year. They usually have tortuous feeding arteries, a dense nidus, and large draining veins that may be seen on CT. AVMs may have associated feeding artery aneurysm secondary to the high flow state. AVMs most commonly present as an ICH or seizure and less commonly as focal neurologic deficit from vascular steal or mass effect[8].

Approximately 70% of these lesions occur in the supratentorial region of the brain; the remaining 30% occur in the infratentorial region. Cavernous angiomas can also occur in the spinal cord[8].

In up to 30% there is a coincidence of CCM with a venous angioma, also known as a developmental venous anomaly (DVA). These lesions appear either as enhancing linear blood vessels or caput medusae, a radial orientation of small vessels that resemble the hair of Medusa from Greek mythology[9].

Causes : Cerebral cavernous malformations can be present at birth (congenital) or develop after birth (acquired). Most CCMs are caused by a mutation in one of three particular genes[1]. The gene mutation may occur for the first time in the affected individual (sporadic) or be inherited from a parent (familial). Acquired CCMs can be caused by an injury to the brain or spinal cord1,[9].

Risk factors for developing clinically significant hemorrhage

The most widely cited risk factor for clinically significant hemorrhage. Rao et al [10] found a more dramatic increase risk of haemorrhage (0.39% to 23% per annum). Another important risk factor is found in young women wishing to become pregnant. The hormonal state of pregnant women is such that endothelial cell proliferation may increase the risk for hemorrhage substantially1. Other controversial risk factors include age and location[10].

Clinical presentation:

The clinical presentation of these lesions is highly variable, ranging from incidental finding at neuroimaging to discovery in autopsy after fatal hemorrhage . The most common symptom of cavernous malformation is seizure followed by focal neurological deficits, acute hemorrhage, and headache[10]. The onset of symptoms occurs most commonly in the third and fifth decade of life but can occur at any point in life, from children to the very elderly. All seizure types, including simple seizures, complex partial, and generalized seizures, have been known to present in patients with supratentorial CCMs1,[10]. The pathogenesis of seizure is related to the presence of iron products after red blood cell breakdown secondary to multiple micro-hemorrhages[10].

Related disorder :

- Arteriovenous Malformations of the Brain
- Moyamoya Disease
- Blue Rubber Bleb Nevus
- Von Hippel-Lindau Disease[10]

Staging , Grading or classification criteria :

Zabramski classification of Cavernous angioma:

Type 1= Subacute heamorrhae (hyperintense on TIWI, hyper or hypointense on

T2WI.)

Type 2=Mixed signal intensity on TI. T2WI with degrading haemorrhage of various ages(classic popcorn ball lesion)

Type 3=Chronic haemorrhage (hypo to iso on TI-T2WI.)

Type 4=Punctate microhaemorrhae (black dots)[4].

Role of Surgery :

The removal of CCMs in adults is usually fairly straightforward. Hemorrhage can occur, but blood flows slowly in a CCM so the risks of surgery are not great. During surgery, the lesion is removed and the bleeding around it is coagulated. Removal of a CCM in the brainstem can sometimes prove to be more complicated than in other areas of the brain (i.e. cerebellum)[10].

Role of Radiosurgery: It is suggested that surgical excision provides immediate protection from the risks of recurrent haemorrhage, establishes a tissue diagnosis, allows complete removal at the primary intervention, avoids complications of radiation-induced damage and is performed more easily in these vascular anomalies due to the presence of a capsule with surrounding gliotic tissue[10].

Conclusion:

The management of patients with cavernous angioma continues to evolve. Our current recommendations for management are as surgery to the patients who are symptomatic with acute severe or progressive neurological deficits, seizure and a single hemorrhage in the cerebrum, cerebellum. When the hemorrhage is in the brainstem, thalamus, or basal ganglia, operation have to be done in subacute stage.

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TRAUMATIC SIMULTANEOUS ACUTE SUBDURAL AND EXTRADURAL HEMATOMA, A CASE REPORT

ELAHY MF, ISLAM MM, KAWSAR KA

Abstract:

We report an unique case of brain trauma, harboring acute subdural haematoma and extradural haematoma on the both side.

Keywords: *extradural hematoma, head injury, subdural hematoma.*

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Introduction

Occurrence of simultaneous acute subdural hematoma (ASDH) and extradural hematoma (EDH) after single trauma is rare. Also, it is the ASDH that determines the severity of injury and outcome, due to its associated underlying brain injury. In the present communication, we present an unique case of simultaneous occurrence of ASDH and EDH, on both side in a comatose patient.

Case Report

A 60-year-old male presented 30 hours after road traffic accident with severe head injury in a decorticating state. CT scan of head showed left-sided frontal acute subdural hematoma and right- sided posterior parietal extradural hematoma (Fig 1- a, b).

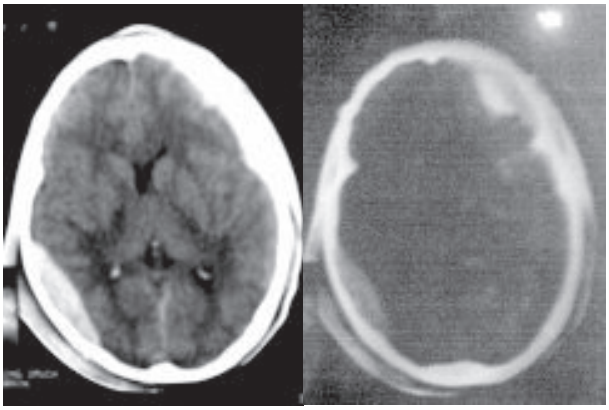

Fig: 1- a Fig: 1- b

Department of Neurosurgery, Dhaka Medical College Hospital
Correspondence : Dr. Md. Fazle Elahy, Department of Neurosurgery, Dhaka Medical College Hospital

Immediate surgery was under-taken and left-sided frontal craniotomy was performed. A large acute subdural hematoma was evacuated, leaving a lax dura with augmentation. Right posterior parietal craniotomy was performed. A big extradural hematoma was evacuated, with stay sutures performing. As the dura was lax and pulsatile, bone-flap was replaced and wound closed. The patient recovered very well after surgery and was discharged with GCS 15. Check CT scan, after 4 weeks of surgery, showed completed evacuation of hematomas (Fig: 2- a, b).

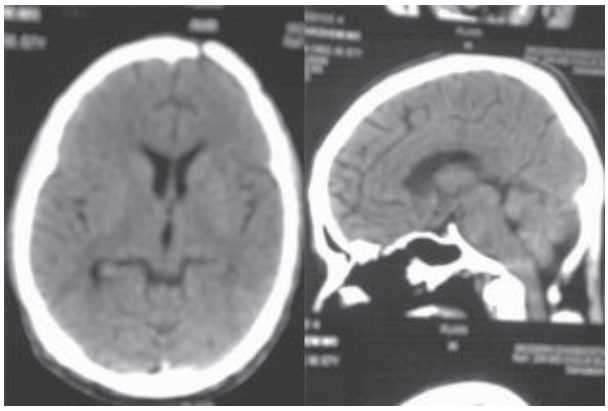

Fig: 1- a Fig: 1- b

Discussion

Surgical evacuation of the traumatic EDH is one of the most 'cost effective' of all surgical procedures in terms of quality of life and years preserved1. In spite of advances in modern head trauma management, patients with acute SDH have worse prognosis than any other type of head trauma, with mortality rates reaching as high as 60%[2].

The mechanism of formation of traumatic EDH and SDH are entirely different. EDH, primarily located in the temporal or temporo-parietal region is due to tear of anterior or posterior divisions of the middle meningeal arteries with an associated linear vault fracture. The skull deformation probably initiates the process of dural stripping. In cases of acute SDH, it is the bleeding from contused, lacerated brain cortex, torn bridging veins, or a torn cortical blood vessel, which leads to subdural hematoma accumulation. Approximately, half of SDH patients have associated traumatic brain lesions including contusions, hematomas or cortical lacerations. It is well established that the primary underlying brain injury dictates the final outcome in SDH patients[2].

In the present case, the presenting CT scan showed an acute subdural hematoma in left frontal region and a biconvex shaped extradural hematoma in right posterior parietal aspect of brain. Intra-operatively, clot was appreciated and evacuated. After evacaution of hematomas dura was pulsatile. The postoperative CT scan showed complete evacuation of hematomas on both side. In *Rahul Gupta, Sandeep Mohindra, Saurabh Kumar Verma* retrospect, careful reading of CT scan (Fig 1) shows well-delineated margins of parietal clot, as compared to hazy outline of frontal region clot, suggesting the presence of both ASDH and EDH. Further, the resolution of ASDH was catalyzed by CSF outflow after subarachnoid breech, indicating minimal primary brain injury[3].

Conclusion

This is an unique case of head injury where both ASDH and EDH occurred simultaneously and urgent evacaution of hematomas determined the final outcome. Further, even in poor grade trauma patient, resolution of hematomas may occur.

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PRIMARY CALVARIAL MENINGIOMA - REPAIRED BY ACRYLIC BONE CEMENT: A CASE REPORT

TALHA KA[1], HAYDER M[2], ISLAM MS[3], RAHMAN MM[4], SELINA F[5], SELVAPANDIAN S[6]

Abstract:

We present a lady with scalp swelling and headache. CT scan of brain showed a right parietal bony lesion without any dural or parenchymal invasion. Tumour was removed. Bony gap was repaired by acrylic bone cement. Post operative recovery was uneventful. Biopsy report of tumour was primary calvarial meningioma. This is a very rare type of CNS tumour. Only very few cases were reported before.

Key words: Primary calvarial meningioma, cranioplasty.

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Introduction :

Extracranial meningiomas are rare, the reported incidence being 1-2% of all meningiomas[1]. There are inconsistencies in nomenclature and inclusion criteria of meningiomas arising in locations outside the dural compartment[2]. They have been referred to as ectopic, extradural, calvarial, cutaneous, extraneuraxial or intraosseous meningiomas. To avoid this confusion, Lang et al has proposed a single term 'primary extradural meningioma' (PEM) for such lesions[2]. The dura and the dural sinuses are displaced away from the inner table of the skull in these cases. Bone remodelling and calvarial thickening is frequent with these tumours. Consequently, they are classified as purely extradural (Type I), purely calvarial (Type II) or calvarial with extradural extension (Type III). According to the site of location of the tumour they are further subdivided into convexity (C) or skull base (B) forms.

Calvarial thickening at the site of origin of meningioma is common. The meningothelial cells invade into the calvarium and expand the bone. However, diffuse and widespread bone thickening is rare. Most of the similar cases reported were in the region of the frontal bone and involved the orbit and presented with the symptom of proptosis. En- plaque involvement of the dura is also associated with gliomatous, carcinomatous, sarcomatous and melanomatous invasion of the meninges.

Many different hypotheses exist regarding the origin of primary extradural and calvarial meningioma. They are thought to arise from ectopic meningocytes or arachnoid cap cells trapped in the cranial sutures during moulding of the head at birth[3]. Misplacement and entrapment of meningothelial cells into suture or fracture lines as a result of trauma has also been speculated as the probable cause of calvarial meningioma[4]. Involvement of multiple sutures is also reported[5]. However, only 8% of the calvarial meningiomas are in relationship with a cranial suture. Cutaneous meningiomas could be congenital in origin where they can arise from arachnoid cell rests located in the skin as a result of defective closure of the neural tube wherein the meningeal tissue is 'pinched' off into the surface[6]. They are also thought to arise from multipotent mesenchymal cells as a reaction to an unidentified stimulus[7].

Calvarial meningiomas are known to be associated with intracranial hypertension[5]. The marked dural thickening overlying and adjacent to the tumour as well as the hyperostotic bone is attributed to cause intracranial hypertension. Dural sinus occlusion can also be an important cause of the raised intracranial tension. However, despite the extensive and diffuse frontoparietal hyperostosis, there was no evidence of raised intracranial tension in our case.

1 Dr. Khandaker Abu Talha MBBS, MCPS, MPH, MS (Neurosurgery), Associate Consultant, Neurosurgery, Square Hospitals Ltd. Dhaka.
2. Dr. Masum Hayder, MBBS, Clinical staff, Neurosurgery, Square Hospitals Ltd. Dhaka
3. Dr. Md. Shariful Islam, MBBS, RMO, Neurosurgery, Square Hospitals Ltd. Dhaka
4. Dr. Md. Moshiur Rahman, MBBS, RMO, Neurosurgery, Square Hospitals Ltd. Dhaka
5. Dr. Farhana Selina, MBBS, MD, Specialist, Anesthesiology, Square Hospitals Ltd.
6. Dr. S. Selvapandian, MBBS, MCh,Consultant, Neurosurgery, Square Hospitals Ltd. Dhaka.

Correspondence : Dr. Khandaker Abu Talha, Associate Consultant, Neurosurgery, Square Hospitals Ltd. Dhaka, 18/F, West Panthapath, Dhaka-1205 , E-mail- katalha@squarehospital.com; katalha@yahoo.com Mobile- 01711-815612.

Biologically, calvarial meningiomas have been observed to be benign and slow-growing. Calvarial meningiomas are more prone to develop malignant changes (11%) when compared to intracranial meningiomas (2%)[8]. Meningiomas presenting with scalp swelling, osteolytic skull lesions and extracranial soft tissue masses are more aggressive in nature[9].

Computerized tomography with bone windows is helpful and MR imaging is useful in the evaluation of the extent of extradural and calvarial involvement. Angiography is non-specific and of little value. The differential diagnosis includes plasmacytoma, chondroma, chondrosarcoma, haemangioma, myeloma, eosinophilic granuloma, aneurysmal bone cyst, metastatic cancer or fipous dysplasia.

Surgical resection is the treatment of choice. Although radiotherapy is advocated, it is usually not recommended unless there is evidence of rapid progression of the disease. In cases of diffuse involvement of the calvaria, a wide surgical resection is advisable whenever possible followed by a cranial reconstruction[10].

Case report:

We present a 43 year old diabetic, hypertensive, and non asthmatic right handed menopausal lady who presented to us with the complaints of swelling in her right side of head for about 3 years. This swelling gradually increased in size and with in 1 and half months it became pain full. She had no history of trauma, vomiting. She had never experienced any convulsion and loss of consciousness. CT scan of brain revealed patchy irregular hyper density with mild focal expansion and speculated appearance of bone is noted in parasagittal aspect of right parietal bone. On examination her vitals were normal. She was conscious and oriented. There was no cranial nerve deficit. Motor and sensory system was intact. No cerebellar deficit was noted. All other systemic examination reveals no abnormalities. Examination of swelling-(scalp) there was round swelling over right parietal area of the scalp. There was no punctum, no discoloration and hair loss of the skin over the swelled area. The swelling measured 5 cm × 5 cm. It was tender, bony hard non pulsatile and swelling was fixed with overlying bone.

Patient was scheduled for surgery under general anesthesia. Plan was craniectomy and cranioplasty. U shaped right fronto-parietal skin incision was marked. Skin flap was reflected keeping the base towards base. Bone over the lesion was punched out, eroded and moderately vascular. There was no dural attachment of tumour. Tumour bone (5 cm × 5 cm) was removed with the help of craniotome. A strip of tumour (1 cm × 2 cm) over the superior sagittal sinus area was drilled off. Craniectomy size bone flap was made by bone cement. New artificial bone (acrylic bone cement) flap was fixed with no. 1 vicryl. Burr hole gaps were filled with bone dust.

Under microscope specimen showed bony tissue. It revealed loose fibrovascular tissue in the bone marrow space. Some of these spaces showed proliferation of oval and spindle cells forming whorls and focal syncytial pattern. Intranuclear pseudoinclusion identified. Not much of atypia or mitosis was seen. The histologic appearance was consistent with meningioma WHO grade-I.

Her post operative recovery was uneventful. She was discharged on her 8th postoperative day after sutures were removed. Her headache subsided after surgery. At the time of 2 months follow up she was doing well and there was no complain of pain. Follow up CT scan of brain showed well alignment of cranioplasty flap without any bony gap or new tumour.

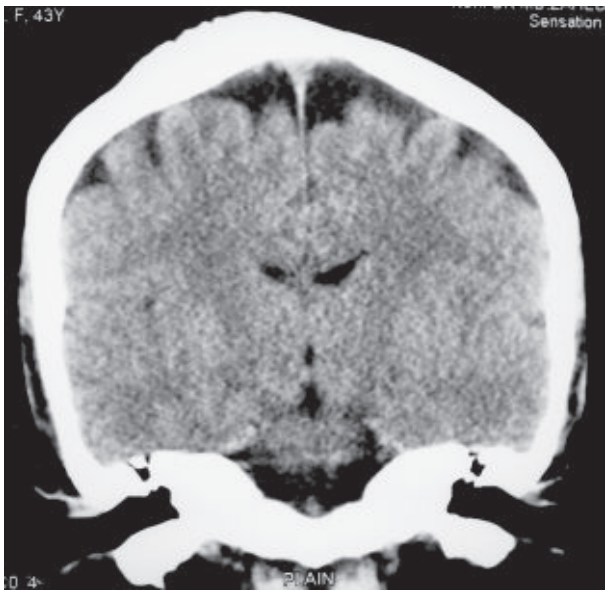

Fig.-1: *Pre-operative CT scan of brain shows calvarial meningioma without dural invasion.*

Fig.-2: *Intra operative picture shows cranioplasty by bone cement.*

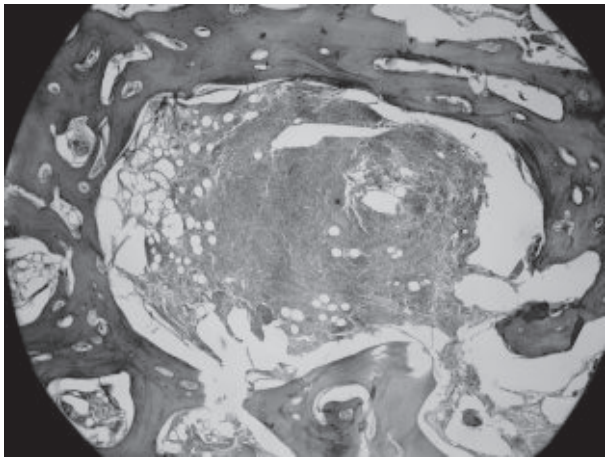

Fig.-3: *Histopathological slide shows diploic meningioma.*

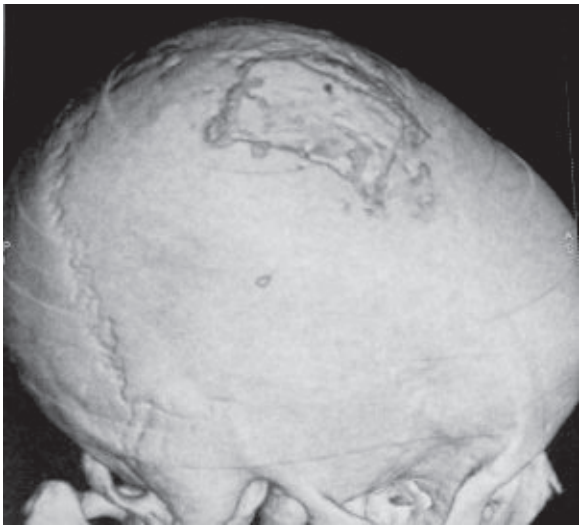

Fig.-4: *Post operative 3-D CT shows good repair of bony gap by cranioplasty flap.*

Discussions:

We are presenting a case of primary calvarial meningioma that underwent craniectomy and cranioplasty. Only few cases have been reported on primary calvarial meningioma so far.

Muzumdar et al described a sixty three year old female complained of painful and progressive proptosis and chemosis of the left eye for six months[11]. CT scan showed an en-plaque enhancing tumour extending over both frontoparietal convexity and into the superolateral aspect of the left orbit displacing the eyeball inferiorly. He underwent a left frontoparietal craniotomy with wide resection of the involved calvarium. The extradural meningioma also removed along with the involved markedly thick dura.

Kavita et al described a 60 year old female presented with persistent left sided headaches for six months without any neurological deficit[12]. CT scan showed an enhancing tumour extending over left frontoparietal convexity with thickened calvarial bone all along the length of the tumour. The location of our tumour was right parietal parasagittal. Like the tumour of Kavita our tumour didn't invade dura.

Khawaja et al described a 50-year-old male patient presented with headache and gradually expanding scalp mass over a few months[13]. Imaging showed localized skull expansion at the vertex, and osteolysis of the inner and outer plates of the skull with brain tissue herniation through a defect in the inner plate. The patient underwent wide surgical excision, dural repair, and mesh cranioplasty, following which his headaches ceased. Histological examination showed WHO grade I meningioma. Our patient also presented with gradually increasing painful swelling in right parietal region without any neurological deficit. Our case also reported as WHO grade- I meningioma.

Nil et al described a 44-year-old man presented with gradually increasing painless hard scalp swelling of the right frontoparietal region for 8 years[14]. The patient had no neurologic deficit. CT revealed a right-sided frontoparietal intradiploic contrast enhancing mass expanding the calvaria with prominent bone destruction extendeding through the skull defect both intra- and extracranially. The tumor and the surrounding bone were removed, followed by cranial reconstruction. There was no intradural extension of the lesion. Histologically, the tumor was diagnosed as chordoid meningioma . In our case presentation, radiological findings of the lesion was same and also did not require dural excision.

Abdolreza et al described a 62-year old male farmer presented with a soft fluctuating enlarging mass in the left fronto-parietal region over last 8months[15]. The patient had undergone scalp radiotherapyfor treatment of ringworm about 45 years ago. Skull x-rays and CT showed a lytic lesion of the skull in the left fronto-parietal region. MRI of head showed an extradural intradiploic enhancing mass lesion without intracranial extension. The patient underwent surgery for resection of the mass lesion. It was easily suctioned and had extension to the peripheral diploe. The infiltrated bone around the lesion was resected so that a rim of healthy bone with normal strength was reached. The dura was intact and the lesion was easily peeled off. Pathologic examination of the lesion revealed fibrillary meningioma with areas of syncithial differentiation. However in our case the lesion was intradiploic hard one without dural invasion.

After removal of the tumour, bony gap was successfully repaired by acrylic bone cement. Follow up CT scan of brain showed well aligned replacement of bone graft by bone cement. Other criterions of the primary calvarial meningioma showed a fair similarity with other published cases. We present the rare case for reminding the classification of meningiomas where non-dural attached primary tumours presents a very small group. Cranioplasty by bone cement also showed a good result for primary calvarial meningioma.

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AN UNUSUAL ORBITOCRANIAL THROUGH AND THROUGH PENETRATING INJURY BY IN SITU TETA: CAN WE DO BETTER FOR THIS TYPE OF UNFORTUNATE PATIENT ?

SMNK Chowdhury[1], FH Chowdhury[2], MMH Rashid[3], AM Barkatullah[4], SS Hossain[5]

Abstract:

Through and through orbitocranial penetrating injury by in situ teta is extremely rare. We managed such a case in Dhaka Medical college hospital with many limitations. Inspite of all possible supports that were available in our set up, patient did not survive. Presentation, investigations, surgical and other supportive management will be highlighted.

***Key Words**: .Orbitocranial. Penetrating. Injury. Teta.*

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Introduction:

Penetrating orbitocranial injuries are rare. They may appear to be associated with intracranial injuries with or without secondary complications, may ultimately prove fatal.

We report a case of very unusual (probably the first reported case) orbitocranial through and through penetrating injury by teta which was in situ before operation.

Case Report:

A fifteen years old young boy presented with the H/O penetrating injury in his right eye by a long teta inflicted by robber during robbering on him at local market. Initially he was managed in local hospital. 10 hours later he presented to us. During this period he developed generalized convulsion for four times. On examination, we found teta penetrating his right eye with handle and small part of metallic portion remaining outside (figure-1). On occipital region or other parts of scalp ,there was no exit wound but apex of teta could be palpated under the skin in right occipital region .there was no other external injury. His vital signs were stable, GCS was 08(E1M5V2).There was no obvious limb weakness on painful stimulus.

1. Sharif Md Noman Khaled Chowdhury, Assistant professor, Department of Neurosurgery, Dhaka Medical College, Dhaka.
2. Forhad Hossain Chowdhury.Resident, Department of Neurosurgery, Dhaka Medical College, Dhaka.
3. Mirza Md Hafizur Rashid, Neurosurgeon. Department of Neurosurgery, Dhaka Medical College, Dhaka.
4. Dr. AM Barkatullah, Associate Professor, Department of Neurosurgery, BSMMU, Dhaka
5. Sk. Sader Hossain, Professor & Head of the department, Department of Neurosurgery, Dhaka Medical College, Dhaka.

Address correspondence to: Chowdhury Noman Khaled S M, M S., Assistant Professor, Department of Neurosurgery, Dhaka Medical College Hospital, Dhaka, Bangladesh. Phone +8801819019415, e-mail- nomankhaled@yahoo.com

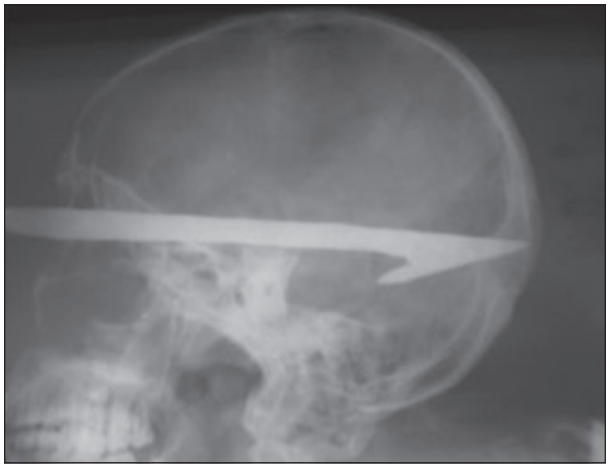

Fig.-1

On emergency basis, we advised for-

X-ray skull,

CT scan of head with bone window

Cerebral angiography

The patient party could not afford cerebral angiography on emergency basis. X-ray (figure-2) and CT scan showed that teta has passed under the right orbital plate through the eye ball, superior orbital fissure, right temporal, occipital lobe and occipital bone above and right to midline. There was no intracranial haematoma. Reverse thorn of teta was clearly visible. We also consulted with our opthalmological colleagues and they participate in surgical team.

Patient underwent emergency operation under GA. Part of teta exterior to eye right eye was cut with metal cutter. A right sided pterional craniotomy done and middle cerebral and other related vessels were

Fig.-2

found intact and away from the teta. Then through a right occipital craniotomy teta was removed carefully, followed by removal of dead brain and tissue with toileting as per as possible.

Postoperatively anesthesiologist suggested for ICU support but unfortunately ICU bed was filled up; patient was managed in post operative room. Postoperatively, convulsion was going on which was managed by i.v. fosphenytoin, GCS remained unchanged. On second POD patient developed fever and convulsion, respiratory distress, GCS deteriorated to E1M4V1 =o6.Later patient was shifted to ICU (fortunately ICU bed became available). Post operative CT scan of brain could not be done due to poor economic condition of the patient. Inspite of all possible support in our set up patient expired on fourth POD.

Discussion:

In this case teta has passed through the superior orbital fissure which is one of the natural pathways for orbitocranial penetrating foreign body. For proper management of such a patient complete neurological examination with x-ray of skull is needed.[2] A CT scan is also needed to delineate the trajectory, position, relation with anatomical structures with the foreign body.[4] It is also needed to see any haematoma or other pathology that may develop with the penetrating injury. Such type of injury may also be associated with cerebral arterial or venous sinus injury.[3, 6, and 8].So in our case cerebral angiography was advised but patient party could not afford it. So, during operation vascular injuries were excluded by pterional and occipital craniotomy before removal of teta.

The significant reasons for surgery in such a case are

a) To remove intracranial haematoma,
b) To remove necrotic brain to prevent infection, mass affect and ischaemia, [5, 9]
c) To control active bleeding,
d) To remove foreign body to prevent infection and it's further complications.[9]

Approach to surgery varies in such a case; some are conservative while others are more aggressive.[2, 7]

Before operation we discussed among ourselves regarding management options for the patient. There were two opinions among us. One opinion was for emergency operation and the other was for initial conservative management followed by surgery few weeks later. Points in favor of emergency removal of teta were-

1. In such a case, surgical principle is in favor of removal of foreign body followed by surgical toileting.
2. Conservative management in such a case will invite infection, septicemia, abscess formation etc.
3. It would be very odd looking and nuisance to keep teta in situ during conservative management period.
4. Pressure from patient party and other groups (news paper worker) for removal of teta.

The second opinion was in favour of initial conservative management with aggressive antibiotic, anticonvulsant and other supportive therapy, then removal of teta on a later date after formation of wall (gliosis &fibrosis) around it with adopted brain. Second group put their defense on the point of death from infection that patient might die from infection during conservative treatment period but one should not forget that emergency can kill the patient and has got more chance to iatrogenic neurological deterioration. They also argued that human body has wonderful adaptation capacity even with this type of teta in brain and chance of late infection is less.[1, 8.]

Though decision was taken in favor of emergency surgery but ultimately patient did not survive.

Conclusion:

This type of orbitocranial injury is probably extremely rare. There is no trail based management guideline for such a patient. Management given to this patient was probably inadequate for the survival of the young

guy. Is it possible to set up a better management guideline as well as improvement of our set up, for such an unfortunate patient?

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