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RESEARCH ARTICLE

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"CLINICAL STUDY OF SURGICALLY TREATED RUPTURED CEREBRAL ANEURYSMS-OSMANIA GENERAL HOSPITAL TWO YEARS EXPERIENCE"

Abstract

Objective: The aim of this study is to analyze the outcome of surgical clipping of the ruptured cerebral aneurysms with emphasis on the prognostic factors affecting this outcome.

Methods: This is a study of cerebral aneurysm cases admitted in Osmania General hospital, Hyderabad from January 2010 - Dec 2011. Aneurysms were classified by location and size. Clinical condition was graded on admission according to classification ofs the World Federation of Neurological Surgeons (WFNS) grading. Outcomes were evaluated at discharge using the. Glassgow Outcome scale with overall rates of mortality, procedural complication and morbidity.

Result : 44 patients underwent clipping for cerebral aneurysms over the period of 2 yrs in dept of neurosurgery Osmania gen hospital. Age ranged from 25 to 70 years . Two thirds of patients were females.Day of ictus at time of surgery ranged from 4 to 12day .Anterior circulation aneurysms were operated in maximum number with preponderance of A com aneurysm .Two thirds of patient were admitted in WFNS good grades. 13 patients expired post operatively who were in poor grades at time of admission.

Conclusion:.Outcomes influenced by factors like age, poor grade cannot be modified but the outcomes is also influenced by modifiable factors like vasospasm, infections, metabolic causes which are preventable and can be corrected to improve the patient outcome.

Key words: Cerebral aneurysm, surgical clipping, vasospasm.

INTRODUCTION

Aneurysmal subarachnoid hemorrhage (SAH) is a common and frequently devastating condition, accounting for 5% of all strokes .considerable advances have been made in endovascular techniques, diagnostic methods, and surgical and perioperative management Paradigms. Nevertheless, outcome for patients with SAH remains poor, with population-based mortality rates as high as 45% and significant morbidity among survivors [16]

AIMS AND OBJECTIVES

1. To analyse the clinical data of all the patients who were admitted for cerebral aneurysm clipping..

2. To analyse the outcome of surgery and to assess the factors involved in favourable or unfavourable outcomes .

METHODOLOGY

All the patients who were operated for intracranial aneurysm in the dept of neurosurgery of Osmania general hospital , Hyderabad ,India between Jan 2010 –Dec 2011 formed the study group.

Demographic data , detailed history of symptoms and other morbidities were recorded

All patients underwent a detailed systemic and neurological assessment , data was entered in SAH proforma,

Routine hematological and biochemical parameters were assessed. All patients were started on oral nimodepine 60 mg 6 hrly and antiepileptics and measures to control blood pressure were taken .Clinical SAH grading of each patient was noted using and with WFNS scale .Imaging features like CT scan, MRA, CT angiogram or conventional

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angiogram were also recorded., fisher grading was used .

The anatomic characteristics of aneurysm , presence of vasospasm ,presence of multiple aneurysms and other abnormalities in the cerebral vasculature were noted..

Operative details,

Types of approach, whether temporary clipping used, intra operative complications were noted . Timing of surgery with respect to day of ictus early surgery was defined as in first three days, intermediate as 4 to 7 and late after 7 days.

By using standard microsurgical techniques aneurysms were obliterated by clippingAnaesthetic monitoing consisted of ECG, digital oximetry, capnography and intraarterial BP monitoring

post operative course all patients were on nimodepine 60 mg 6 th hrly for 3 weeks and antiepileptics and post operative ctscan was done in any case of deterioration to rule out hydrocephalus, rebleed or infarcts

All post operative events like fresh deficits, infections or metabolic dysfunction were recorded

Outcome of each patient at the time of discharge was assessed by GOS

Favourable outcome – as good recovery to moderate disability GOS 4-5

Unfavourable outcome was death/ vegetative/ severe disability.1-3

End point of study was recovery/discharge from hospital to death during hospital stay.

GLASSGOW OUTCOME SCALE(1975) table

GR	features
1	dead
2	vegetative state
3	severe disability
4	moderate disability
5	good recovery

RESULTS

44 patients underwent clipping for cerebral aneurysms ranging from 25to70 years mean being 48.3 yrs. Maximum number of patients were seen in age group of 51-60 yr. Two thirds of patients were females. Male to female ratio being 1: 2.72. Days from hemorrhage to admission varied from 2 -13 days . Headache was most common symptom followed by Loss of consciousness. 32 patients were in 4 to 10 days and 8 were admitted after 11 days indicating that many patients underwent late surgery 2/3 of our patient were in good grade, more than half of our patient were in fisher Gr 3, anterior circulation aneurysms were operated in maximum number .2 patients had multiple aneurysms Location wise ACOM 19, where as ICA and MCA both were 8, followed by 2 ACA and 2 PICA.

Operatively temporary clipping used in majority of cases while there 4 cases of intraoperative rupture.Postop 8 patients had vasospasm, 21 patients had infections, 5 cases of hydrocephalus for which 2 needed shunting.

Mortality -13 patients expire (29.5 %) . maximum mortality was seen in 51-60 age(54%) , in WFNS grade 4 (76%),and fisher grade 3(69%) Outcome with respect to WFNS.There were 10 patients in pre op WFNS 1, 2 expired remaining 3 were moderately disabled,and remaining 5 remained in same pre op status In Gr 2 out of 17 pts 1 fully recovered and 16 were in gos 4. In Grade 4 ,9 died and remaining three were moderately disabled and 1 was severely disabled. Gr 5 both the patients died.

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RESEARCH ARTICLE

S. No	Age group	Male	Female	Total
1	21-30	2	4	6 (13.6%)
2	31-40	3	9	12 (27.2%)
3	41-50	0	5	5 (11.3%)
4	51-60	3	10	13 (29.5%)
5	61-70	5	3	8 (18.1%)

TABLE-1 AGE AND SEX DISTRIBUTION

S. No	Grading	No. of patients	Percentage
1	Gr. I	10	22%
2	Gr. II	17	38.6%
3	Gr. III	2	4.5%
4	Gr. IV	13	29.5%
5	Gr. V	2	4.5%

TABLE-2 Pre op WF NS

Grade	No. of patients	Percentage
1	1	2.2%
2	18	40.9%
3	25	56.8%

TABLE-3 FISHER GRADING

S. No		No. of patients	Percentage
1	A Com	19	42%
2	Mca	L 4 & R 4	9%
3	ICA	L bifurication , R bifurication & L supraclinoid	1 6 1
4	PCom	R	2
5	ACA	A1 A2	3 2
6	PICA		2

TABLE-4

THE EXPERIMENT
INTERNATIONAL JOURNAL OF SCIENCE AND TECHNOLOGY

ISSN-2319-2119

RESEARCH ARTICLE

S. No	Post-op	No. of patients	Percentage
1	Ischemic deficits	8	18%
2	Chest infection	12	27%
3	Wound infection	5	11.3%
4	Meningitis	8	18.1%
5	DVT	2	4.5%
6	Hydrocephalus	2	4.5%
7	Metabolic	16	36.3%

TABLE-5 POST OPERATIVE COMPLICATIONS

S. No	Post ictal days	No. of patients
1	1-3	0
2	4-11	11
3	>11	2

TABLE-6 DAYS SPECIFIC MORTALITY

Mortality in WFNS	Deaths
1	2
2	0
3	0
4	9
5	2

TABLE-7 Mortality in WFNS

S. No	Fisher grading	No. of patients	Percentage
1	Grade –I	0	0
2	Grade II	4	30%
3	Grade III	9	69%

TABLE-8 Mortality with fisher grading

THE EXPERIMENT
INTERNATIONAL JOURNAL OF SCIENCE AND TECHNOLOGY

ISSN-2319-2119

RESEARCH ARTICLE

Discharge out come	No. of patients
1	13
2	0
3	2
4	22
5	7

TABLE-9 Discharge out come GOS

Predictors for unfavourable outcomes were analysed to find out whether there was statistical significance with various variables in favourable versus unfavourable outcomes in the study. Fishers test was used to analyse p value for categorical variables while t-test for continous variables. Statistical significance was seen with respect to hypertension, GCS, WFNS grades, Hydrocephalus.

Prognostic factors for unfavourable out comes

TABLE 10

Mean

Variables	favorable out come	unfavourable outcome	p <.05 Significant
Age mean	45.9	53.5	.08
Sex male Female	 8 23	 5 8	.4780
Hypertension Absent Present	 21 10	 4 9	.0436
Smoking absent Present	 23 8	 6 7	.09
Gcs at time of admission Mean Std deviation	 13.5 9	 9.8 7.09	.006
WFNS 1-3 4-5	 27 3	 2 12	.002
Post op Hydrocephalus Abs	1 30	4 9	.002

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THE EXPERIMENT
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Temporary clipping Yes No	30 1	0 2	.0242
Intraop rupture Yes No	2 29	2 11	.5695
Anterior circulation Posterior circulation	30 1	10 3	.07
Fever pre Absent	20 8	7 5	1.0
Vasospasm absent Present	27 4	9 4	.2

DISCUSSION

This Discussion reflects on the results and observations of 44 patients operated for intra cranial aneurysms Of 44 patients 2/3 were females, male to female ratio being 1:2.38 in female preponderacee is seen in western statistics 54-61% Age preponderance was seen mainly in age 51-60 yr with 29.5%, banerji reported 67%.Bloomfontein study shows 61.4% in> 40 ys affected . brazil study ages ranged from 5 to 77 years (median age 45.4 years). h/o prior bleeds seen only in 6% patients as compared to ranganadh et al 25%, again which shows our patients go to hospital only when the disease is severe. 43% of patients were hypertensive as compared to seiler int coop study where incidence was seen was 33 & 22%, respectively.[10] Hypertension was one of poor prognostic factor. In study done by quershi et al risk factors of SAH 54% were hypertensive,46% had smoking history which increased the risk of SAH as compared to study 30% of patients were chronic smokers, 15% of our patients were diabetics & 25 % with cardiac dysfunction, Sites of aneurysms – common site was ACOM 42 % followed by ICA. 18% and MCA 18% comparable with pakarinen/ banerji studies .anterior circulation aneurysms were more than posterior circulation[19,20]. Only 2 patients showed multiple aneurysm, only symptomatic aneurysm was operated in both the cases. In another series from rio group also 89%showed good condition (gr 1-3) and 10% in gr (4-5) .Study group medhat , nadir et al 2004 showed 80 % of admission in good grade [4]One patient showed rebleed during preop stay, rebleed rates vary from 11-25 % in int coop study.Vasospasm was seen in 8 patients post operatively seen as newly infarct in CT scan , 18.5% as compared to 3 -5 reported from ljugrren, seiler etc decrease in rate this is due to aggressive triple therapy.[10] Most of our patients were operated in period of 4 -10 post ictal phase , 71 % and 38.6 % after 11 days. As contrast to inagawa , lunggren , International co operative study where in patients are operated early [3,20]. Studies from kasell, ohnan, Suzuki [14] showed that outcome was poor in late period especially with poor grade.Temporary clipping was used in most of patients except in 4 patients , and this did not bear any statistical significance with respect to outcomes of the patient in this study, although there are reports which say temporary clipping in poor grade patients may play role in un favourable outcome due

exacerabating of vasospasm .

Intra operative rupture occurred in 3 patients, out of which 2 patients died ., which was not found to be of statistical significance. Intraoperative aneurysm rupture has no impact on the outcome, neither in patients with good initial condition nor for poor grades patients as seen in literature [4]

Post op complications

Neurological deterioration with in 24 hr of surgery was in 4 patients out of whom 3 patients were in poor grade, Post ischemic deficits were seen in 8 patients.2patients developed hydrocephalus which needed permanent shunting. Presence of hydrocephalus with respect to poor outcome was significant
Infections formed the major group which contributed to morbidity and prolonged hospital stay, metabolic complications were seen in 16 patients.
This study has mortality rate of 29.5%,, higher mortalty was seen pts operated late phase,and in patients with poor grade lungreen showed 4% in early surgery, inagawa 10 %, seiler .7% , sambasivan 4 % in early surgery [3,11,12,20]. None of our patients were operated in early phase In delayed surgery mortality ranged from 20% in kasell to 28% in drake ..where as yasergil and Suzuki showed mortality at around 7% [14]

Factors affecting the out come

1) **Age**:

The incidence of aneurysm in the study population gradually increases for each decade and peaks in the sixth decade. Many studies suggest that advanced age is associated with poor outcome; however, other studies demonstrate that young and old people in the same clinical condition experience similar outcome.[6] . In our study there was no correlation between age and outcome . Other variables such as hypertension or atherosclerosis are more frequent in elderly patients; which may have an adverse effect on outcome.[7]

2) **Sex**:

In this study we found a female to male ratio of 2.79:1 which is higher than other ratios reported in the literature that range from 1.3:1 to 1.6:1,[5]On the other hand, gender did not correlate with outcome.

3) Cigarette smoking:

Cigarette smoking is associated with aneurismal subarachnoid hemorrhage and is also known to increase the risk of intracranial aneurysm formation and hasten the rate of growth.

4) Hypertension and diabetes mellitus:

Recent studies show that hypertension is not a major factor in the etiology of saccular aneurysm, although it may cause more aneurysms in susceptible individuals and may promote aneurismal rupture [1]. In our study the prevalence of hypertension was 42.5% which is higher than the general population., hypertension is probably partly a reflection of the Cushing response to intracranial hypertension. On the other hand, diabetes mellitus was found in 15% of the study population. This is much similar to the prevalence of diabetes in the total population. Other studies found no correlation between diabetes and the risk of aneurismal SAH [20]. Analysis of our results showed that diabetic status did not have a prognostic value in outcome, but there was a tendency for diabetic patients to have poor outcome. A high significance was seen with WFNS to immediate outcome this is comparable to other data in

literature .While fisher grading was not found to have statistical significance

5) Timing of surgery

In this study we did not find correlation between timing of surgery with outcome as none of our patients were in early group

6) Hydrocephalus

Chronic hydrocephalus complicates between 6% and 67% of cases of SAH[2] This variation is due, in part, to differences in definition of hydrocephalus, criteria for diagnosis and timing of evaluation. Furthermore, the development of hydrocephalus has a negative impact on outcome [13 15] .Our study also has statistical significance with hydrocephalus post op

9) Aneurysm site and size

In our study neither aneurysm size nor site correlates with the overall outcome . This is in contrast with other reports in the literature[1]. Site specific differences may be related to other factors rather than surgery, such as the degree of vasospasm or hydrocephalus and the size and location of hematoma.

C- Postoperative factors

We studied some postoperative factors that we thought to have major impact on the overall outcome. These factors include: vasospasm, cerebral infraction , and systemic complications these were not found significant statistically significant. Studies of lumgrenn and international coop study showed infections, rebleed, medical complications and vasospasm as the cause for poor outcomes[3,9] Prognostic factors predictors for unfavourable outcomes were Poor grade , poor gcs, hypertension, patient with hydrocephalus , post op ventilator support were attributed with poor outcomes as comparable to studies of ,hunt and hess [16] All the studies have shown that early surgery for better grade patients with good recovery, poor grade , with delayed referral, ishchemic deficits , post operative infections show high morbidity. Rosenorn aj [13] reported outcome based on GOS poor with advanced age , bad WFNS grade, fisher grade 3 and 4 , posterior circulation aneurysm , giant aneurysm and vasospasm. For Posterior circulation aneurysm endovascular treatment is better alternative.In conclusion outcomes influenced by factors like age, poor grade can t be modified but the outcomes is also influenced by modifiable factors like vasospasm, infections, metabolic causes which are preventable and can be corrected to improve the patient outcome Limitations of this study are small number of patients, imaging modalities like angiogram suite, TCD studies not available and follow up not possible due poor patient compliance, only 6 patients out of 31 discharge turned up for follow up. Further studies in India and subset of patients needed to determine characteristics / factors and prognostications in the long term outcome of aneurysms

CONCLUSIONS

Aneurysms were seen in 6th decade of life with female preponderance.
22 cases /yr was the average incidence.
70 % of patients reached the hospital at 7 -10 days after ictus.
Warning leaks seen only in 3 patients suggesting that episodes of previous not detected.
Majority of patients were in WFNS Gr1-3 .
Most of patients operated in late phase .
Favorable outcome was seen in pts with good grade ,
Favorable outcome was seen in 65 % at time of discharge and mortality was 29.56%

THE EXPERIMENT
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RESEARCH ARTICLE

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Devi Chendira Pemmaiah[1]*, syedjaleelkirmani[2], Bhaskar[3]

1.Lecturer in neurosurgery, Nizams institute of medical sciences, panjagutta, Hyderabad 500082
2.Asst prof of neurosurgergery, Osmania meical college, Hyderabad 500082
3.Professor of neurosurgery, Osmania medical college, Hyderabad 500082