How to Cite:
Khan , M., Haq, N. U., Sharafat, S., Jamal, B., Safeer , S., Haq, M. I. U., Khan, S., Ullah , A., Jehanzeb, J., & Khan, A. (2022). The effects of surgical clipping on the outcomes of patients with ruptured middle cerebral artery aneurysms A multi center study. *International Journal of Health Sciences*, *6*(S7), 6673-6679. https://doi.org/10.53730/ijhs.v6nS7.13774

The effects of surgical clipping on the outcomes of patients with ruptured middle cerebral artery aneurysms A multi center study

Musawer Khan
Senior Registrar MTI Mardan Medical Complex, Mardan

Naeem Ul Haq
Assistant Professor Neurosurgery MMC Mardan

Seema Sharafat
Assistant Professor Neurosurgery MTI LRH Peshawar
Corrosponding Authors email: seemasharafat@yahoo.com

Bakth Jamal
District Specialist Neurosurgeon Nasser Ullah Khan Babar Memorial Hospital Kohat Road Peshawar
Corrosponding Authors email: sdrbjbangash@yahoo.com

Sadaf Safeer
Junior Registar Neurosurgery MMC hosptial mardan

Mian Iftikhar Ul Haq
Assistant Professor Neurosurgery Hayatabad Medical Complex Peshawar

Sajid Khan
Assistant Professor Department of Neurosurgery Prime Hospital Peshawar

Anwar Ullah
Consultant Neurosurgery dhq hosptial Timergira lower dir

Jehanzeb
Consultant Neurosurgery dhq hosptial charsadda

Azam Khan
Assistant Professor Department of Neurosurgery Saidu teaching Hospital swat

***Abstract*---**The objective of the study: To determine the statistical importance of each predicted factor in terms of prognosis for patients with ruptured MCAAs, we focus on those who have had surgical

International Journal of Health Sciences ISSN 2550-6978 E-ISSN 2550-696X © 2022.
Manuscript submitted: 9 May 2022, Manuscript revised: 18 July 2022, Accepted for publication: 27 August 2022

treatment for their aneurysms. Materials and methods: A total of 104 patients with ruptured MCAAs were examined in this retrospective analysis, which covered the years 2018 through 2020 and was conducted by the Neurosurgical Department at MMC Hosptial Mardan , pakistan . Patient characteristics (age, sex, comorbid conditions), aneurysm location (proximal, bifurcation, or distal), aneurysm dome size (small, large, or giant), aneurysm size at the time of surgery (ultra-early, early, or delayed), and Intracerebral Hemorrhage (ICH) volume are all assessed as potential predictors. Mean, standard deviation, covariance, and correlation were determined for each parameter (through the linear regression model). Results: The World Federation of Neurological Surgeons (WFSN) grading system was used to evaluate each patient's clinical status; a score of 5 indicated excellent quality in 37 (35.3%), while a score of 4 indicated a fair rate in the remaining 28 patients. Maximum sac diameters ranged from 7 to 12 millimeters in 40% of patients, with aneurysms affecting the MCA bifurcation in 67% of cases. A total of 57 points (54.3%) were linked to ICH. After three months, 32 patients (30.47%) had a positive result, whereas 73 (69.52%) did not. Among the patients followed for an entire year, 46 (43.8%) had positive results, whereas 59 (56.19%) did not. Patients with ICH had far fewer favorable outcomes, as measured by mean Mrs. Conclusion: The presence of ICH dramatically impacts the prognosis of individuals with MCAAs, increasing the risk of death and disability. The time of surgery has a significant effect on patient outcomes. Thus it's essential to think about doing the operation as soon as possible.

***Keywords*---**Aneurysms, ICH, MCA, MCA aneurysms, Early surgery Surgery delayed

Introduction

The percentage of cerebral aneurysms caused by MCAAs is 20%. The sylvian bifurcation is the epicentre of hemodynamic turbulence in the body[1]. Subarachnoid haemorrhage (SAH) and, often, intracerebral haemorrhage result from rupturing this aneurysm (ICH). The location of the accompanying ICH seems to be a significant prognostic factor; temporal ICHs and intrasylvian hematomas are the most common presentations[2]. Optimal administration is still being debated regarding MCAAs' strategy: Endovascular coiling or stenting procedures have progressed rapidly and now provide outcomes comparable to those of surgical clipping Treatment priorities are selected at random[3]. In this research, we focus on identifying the statistical significance of each predicted factor regarding the prognosis of patients with ruptured MCAAs by analyzing data from just those patients who had surgical treatment for their aneurysms[4].

Materials and Methods

This research looked back at 104 instances of MCAA ruptures seen at the Neurosurgical Department at MMC Hosptial Mardan , pakistan , between January 2018 and December 2020. Aneurysmal rupture and Subarachnoid Hemorrhage

(SAH) were present in 48 of the 104 cases, while ICH was present in 57. Conditions for participation are: All surgically treated adult patients with ruptured MCAAs, regardless of aneurysm location or rebleeding. Endovascular embolization/stenting for aneurysms; patients hospitalized for aneurysms in areas other than the MCA; post-traumatic aneurysmal rupture aneurysms that have not yet burst CT angiography and preoperative angiography have been utilized for diagnosis. Patient characteristics (age, sex, comorbidities), aneurysmal location (proximal, bifurcation, distal), aneurysmal dome size (small, big, gigantic), surgical scheduling (ultra-early, early, delayed), and ICH volume are all assessed as potential predictors of outcome.

A rating scale for clinical effectiveness

Based on the patient's Glasgow Coma Scale (GCS) and the presence or absence of focal impairments, a clinical grade has been given to each patient at the time of admission using the World Federation of Neurological Surgeons grading score. The outcomes of all patients have been categorized as either "good," where mild disability is considered a positive consequence, or "bad," where severe impairment or a vegetative state are considered damaging alternatives (not favorable outcome). We used the Modified Rankin Scale to measure the patient's functional status three months and a year following treatment (MRS). We gave it a positive (MRS = 1-3) and negative (MRS = 4-6) evaluation.

Needs Surgical Procedures

A trans-Sylvian technique using regular microsurgical dissection was employed to obliterate MCAA by a personal craniotomy, which was broader than usual for aneurysms [7]. Aneurysmal clipping was done alone in 44 individuals who did not have ICH and after ICH evacuation in 24 patients. A duroplasty was done without replacing the bone flap in cases of brain edema.

Analyses

Excel and MATLAB were used to analyze the data. We estimated the mean, standard deviation, covariance, and related co-efficient (through the linear regression model).

Results

Our research comprised patients ages 22 to 96, with a mean of 59 13 years. Sixty women (62%) and 45 men (38%) out of 104 patients. Table 1 shows the WFNS grade, Fisher scale, and ICH score upon study entry. Fifty-seven patients (54.3%) have ICH. Most patients (23) have an ICH score of 2; 12 have 3, 11 have 4, 6 have 5, and 5 have 1. CT Angiography is grade IV in 54.3% of patients. WFSN grading scale: 5 for 37 patients (35.3%), 4 for 28. 40% of patients had an aneurysmal diameter between 7 mm and 12 mm, and 67% included the middle cerebral artery bifurcation. In 57 patients (54.28%), we conducted ultra-early surgery (12 h) from the beginning of symptoms, in 35 patients (33.33%) in early surgery (48 h), and 13 patients (12.38%) in delayed surgery (> 48 h). In ultra-early surgery patients, 8.7% of aneurysms rebled after the initial occurrence, compared to 17.14% and 15.30% in early and delayed surgery patients. At three months, 32 (30.47%) patients had a

favorable result, Mrs 2, whereas 73 (69.52%) did not. 46 patients (43.8%) had favorable results in one year, whereas 59 (56.19%) did not. Table 2 shows the death rates at three months (15 patients) and one year (21 patients). ICH patients had worse mean Mrs outcomes (see below). Table 3 summarises all statistically significant data. The presence or absence of ICH, patient age, clinical condition at admission (WFNS grade), surgical scheduling, and SAH severity was statistically significant (p-value 0.05). (Fisher scale). Diameter and aneurysm seats don't affect the outcome. Our investigation found no statistical significance between the last two factors and the surgical result.

Table 1: Evaluating clinically, radiologically, and for ICH at admission.

ICH score	No of the patients (%	WFSN	No of the patien (%)	Fisher scale	No of the patients (%
One	(8.2%)	One	21 (20%)	One	09 (8%)
Two	22 (40%)	Two	09 (10%)	Two	16 (15%)
Three	13 (21%)	Three	09 (10%)	Three	24 (22%)
Four	12 (19%)	Four	29 (25%)	Four	58 (53%)
Five	7 (10%)	Five	36 (34%)	Five	
six	0 (0%)	six		six	

Table 2: Things followed after three months and a year.

MRS Level	Three-month patient count	the number of patients who survived for a year
One	7 (5%)	25 (22%)
Two	12 (12%)	7 (7%)
Three	12 (13%)	14 (14%)
Four	7 (5%)	13 (13%)
Five	12 (13%)	12 (12%)
six	40 (36%)	13 (13%)
seven	14 (15%)	21 (21%)

Table 3: Summary of each value considered and their influence on the outcome.

Standards	Result		P value
	Good	Poor	
No-ICH	29 (60.41%)	19 (39.5%)	0.01
ICH	17 (29.8%)	40 (70.1%)	
Age (Years)	57.25 ± 11.3	64.33 ± 10.9	0.001
WFNS I-II-III	29 (72.5%)	11 (27.5%)	0.001
WFNS IV-V	25 (38.4%)	40 (61.5%)	
Diameter of the aneurysm sac			NS
< 7 mm	14 (58.3%)	10 (41.6%)	
7-12 mm	18 (41.8%)	25 (58.1%)	
12-24 mm	11 (36.6%)	19 (63.3%)	
> 25 mm	3 (37.5%)	5 (62.5%)	
The seat of the aneurysm			NS
Prossimal	5 (31.2%)	11 (68.7%)	

Bifurcation	33 (47.1%)	37 (52.8%)	
Distal	8 (42.1%)	11 (57.9%)	
Ultra-early surgery	32 (56.1%)	25 (43.8%)	0.005
Early surgery	11 (34.3%)	24 (65.7%)	
Delayed surgery	3 (23.1%)	10 (76.9%)	
Fischer I-II	16 (64%)	9 (36%)	0.005
Fisher III	11 (47.9%)	12 (52.1%)	
Fisher I-V	19 (33.4%)	38 (66.6%)	

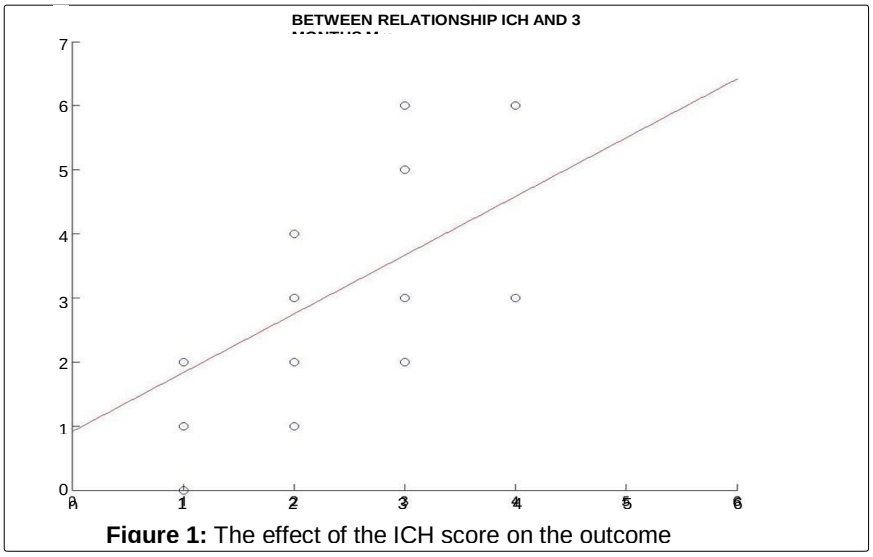
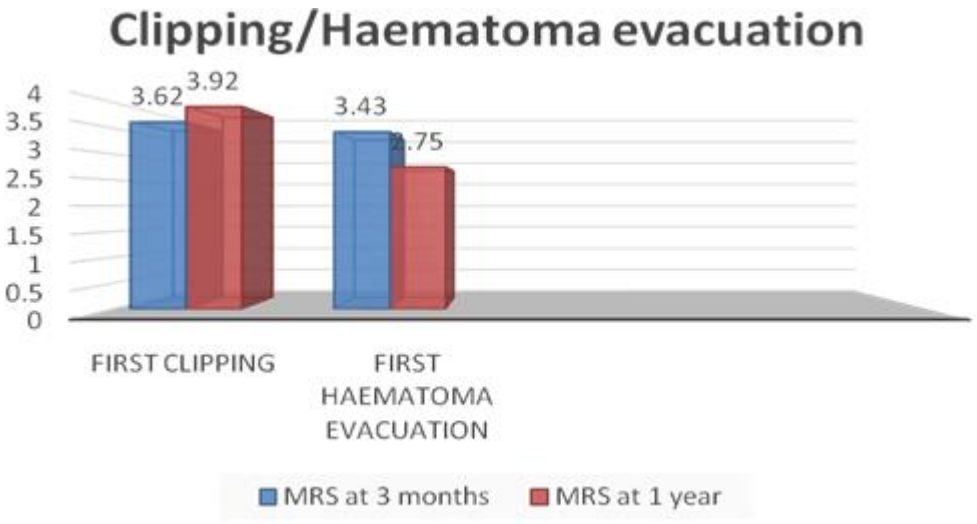


Figure 1: The effect of the ICH score on the outcome



Discussion\sMCAAs

The MCA is the largest of the cerebral arteries; it begins at the ICA bifurcation and travels laterally below the anterior perforated material within the Sylvian fissure. Its diameter is typically 4 mm (range, 2.4-4.6 mm) [5]. The MCA gives out branches that go to the frontal, parietal, and temporal opercula lobes. Near the main MCA bifurcation, aneurysms of the MCA artery (MCAAs) account for 18-40% of all intracerebral aneurysms[6]. Classifications have been proposed to help find the best approach to managing MCAAs, which might vary depending on their shape, size, placement, and projection. Intertruncal (type 1), inferior (type 2), lateral (type 3), insular (type 4), and difficult MCA bifurcation aneurysms (MCAbifAs) were identified by Dashi R, et al. [8]. (type 5). Species similar The author provided an extensive description of head positioning, dissection using Sylvian scissures, and both interim and final clipping. MCAbifAs vary in morphology because of their position on the main artery[7]. Three types of MCAAs are included in our study: The M1 proximal segment, the MCA bifurcation, and the distal portions of the M1 may all include MCAAs (M2-M3). Saccular, blister-like, or fusiform shapes may be seen in MCAAs ranging in size from 7 mm to over 24 mm[8].A procedure that may be chosen by the patient The argument between endovascular coiling/stenting and surgical clipping has been going on for quite some time. In their study of 140 MCAAs treated with endovascular coiling, Bracard et al[9]. found a persistent occlusion rate of 83.3% one year after treatment. With a 6% coiling-related morbidity and mortality risk for ruptured aneurysms, Brinjikji et al. [10] observed an obliteration rate of 82.4% at follow-up[10]. Endovascular coiling had a 93% obliteration rate in 30 patients, whereas surgical clipping had a 92% obliteration rate in 78 patients, as described by Kim KH et al[11]. Coiling was recommended for patients with serious medical concerns or the risk of perforating MCA lenticulostriate arteries during surgery. However, the author favored surgical clipping over endovascular coiling embolization[12]. Interventional neuroradiologists and neurosurgeons have developed expertise in endovascular coiling in recent years. The risk of death and severe injury from both methods are equivalent. Despite similar functional results, Diaz OM et al found a higher overall incidence of problems and retreatment in the endovascular group. Patients with middle cerebral artery aneurysms are under-represented in the International Subarachnoid Aneurysm Trial (ISAT) Collaborative Group because of the anatomy of the aneurysmal neck[13]. Microsurgical clipping is still the preferred treatment approach in most centers because of the aneurysms' superficial location and the ICH they usually produce. The aneurysmal dome may be easily accessed during surgery. The release of CSF aids in controlling intracranial pressure, and this is made possible by surgical intervention[14].

Conclusion

Our findings showed MCAA patients with ICH had a higher death and disability risk. In patients with a poor-grade entrance and intraparenchymal hemorrhage, ultra-early surgery should always be considered. Clinical exam, procedure length, MCAA topography, and cerebral hemorrhage (54.3%). They investigated just MCAA patients. MCAs are MCAbifAs (67%). 54.3% of patients benefit from early therapy, according to the Modified Rankin Scale (MRS). 8.7% rebleeding (ultra-early, early and delayed surgery). One hour between symptom onset and surgery is connected

to poorer 3-month and 1-year outcomes, linking surgical time to Mrs. Score. All patients were treated within 12 hours. [13–15] ICH is popular. Over three months and one year, 1 point increases the ICH score and Mrs scale. 30-day ICH severity beats 1-year surgery. ICH kills. Early cisternal decompression helps bleed out. Aneurysm cutting and hematoma removal boosted outcomes.

References

1. Hallout S (2015) Surgical Treatment of Middle Cerebral Artery Aneurysms without Using Indocyanine Green Video angiography Assistance: Retrospective Monocentric Study of 263 Clipped Aneurysms. World Neurosurg 84: 972-977.
2. Baharoglu MI, Lauric A, Safain MG, et al. (2014) Widening and High Inclination of the Middle Cerebral Artery Bifurcation Are Associated With Presence of Aneurysms. Stroke 45: 2649-2655.
3. Morgan MK, Mahattanakul W, Davidson A, et al. (2010) Outcome for middle cerebral artery aneurysm surgery. Neurosurgery 67: 755-761.
4. Backes D, Rinkel GJ, Laban KG, et al. (2016) Patient- and Aneurysm-Specific Risk Factors for Intracranial Aneurysm Growth: A Systematic Review and Meta-Analysis. Stroke 47: 951-957.
5. Orz Y, AlYamany M (2015) The impact of size and location on the rupture of intracranial aneurysms. Asian J Neurosurg 10: 26-31.
6. Kim KH, Cha KC, Kim JS, et al. (2013) Endovascular coiling of middle cerebral artery aneurysms as an alternative to surgical clipping. J Clin Neurosci 20: 520-522.
7. Wang HJ, Ye YF, Shen Y, et al. (2014) Surgical Treatment of Poor Grade Middle Cerebral Artery Aneurysms Associated with Large Sylvian Hematomas Following Prophylactic Hinged Craniectomy. J Huazhong Univ Sci Technolog Med Sci 34: 716-721.
8. Dashti R, Hernesniemi J, Niemel M, et al. (2007) Microneu- surgical management of middle cerebral artery bifurcation aneurysms. Surg Neurol 67: 441-456.
9. Bracard S, Abdel-Kerim A, Thuillier L, et al. (2010) Endovascular coil occlusion of 152 middle cerebral artery aneurysms: initial and midterm angiographic and clinical results. J Neurosurg 112: 703-708.
10. Brinjikji W, Lanzino G, Cloft HJ, et al. (2011) Endovascular Treatment of Middle Cerebral Artery Aneurysms: A Systematic Review and Single-Center Series. Neurosurgery 68: 397-402.
11. Diaz OM, Rangel-Castilla L, Barber S, et al. (2012) Cere- brovascular Middle Cerebral Artery Aneurysms : A Sin- gle-Center Series Comparing Endovascular and Surgical Treatment. World Neurosurg 8: 322-329.
12. Molyneux A, Kerr R, Stratton I, et al. (2002) International Subarachnoid Aneurysm Trial (ISAT) of neurosurgical clipping versus endovascular coiling in 2143 patients with ruptured intracranial aneurysms: a randomized trial. Lancet 360: 1267-1274.
13. Stapleton CJ, Walcott BP, Fusco MR, et al. (2015) Surgical management of ruptured middle cerebral artery aneurysms with large Intraparenchymal or Sylvian fissure hematomas. Neurosurgery 76: 258-264.
14. Jabbarli R, Reinhard M, Roelz R, et al. (2016) Intracerebral Hematoma Due to Aneurysm Rupture: Are Risk Factors Beyond Aneurysm Location? Neurosurgery 78: 813- 820.