

A PROSPECTIVE STUDIES OF AN INSTITUTIONAL OUTCOME OF ANTERIOR CIRCULATION ANEURYSM BETWEEN SURGICAL VS INTERVENTIONAL RADIOLOGICAL PROCEDURE

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Abstract

Background: The prevalence of unruptured aneurysm is documented as 2.7% of intracranial aneurysm. Most patients get medical attention after a ruptured aneurysm, which manifests as a thunderclap headache in the emergency department. The ruptured aneurysm was presented as subarachnoid hemorrhage [SAH], intracranial hemorrhage with or without focal neurological deficit., or intracranial hemorrhage. Once an aneurysm is ruptured, the catastrophic complications are rebleeding and death. The Locksley study shows the rupture rate of unruptured aneurysms per year is 7%. Wiebers and colleagues reported a zero risk of rupture for aneurysms less than 10 mm in diameter and a risk of 1.7% per year for aneurysms larger than 10 mm. The International Study of Unruptured Intracranial Aneurysms (ISUIA) shows that the cumulative rate of rupture was 0.05% per year for aneurysms less than 10 mm and about 1% for those larger than 10 mm in diameter. Aneurysms larger than 25 mm had a 6% rupture rate in the first year. Factors associated with aneurysmal rupture are size, location, rate of growth of the aneurysm, age, systemic hypertension, cigarette smoking, etc. This study was conducted in a government Omandurar multi-speciality hospital in Chennai, Tamil Nadu, in prospective manner. This is a comparative study to evaluate the outcome of intracranial aneurysm between surgical outcome and intervention radiological procedures like coiling, stent-assisted coiling, balloon remodeling, and flow diversion technology. Cases admitted with subarachnoid hemorrhage were taken for investigations like CT brain, MRI brain with MRA, MRV, and digital subtraction angiography to rule out intracranial aneurysmal bleeds. The anterior circulation aneurysm was only taken for comparative study. Depending upon patient clinical status and affordability, patients are categorized into 1 and 2. The category 1 patient was taken for intervention radiological procedures like coiling, balloon remodeling, flowdivertors, and stent-assisted coiling. The second category of patients taken for surgical procedures is craniotomy and aneurysmal clipping. The preop Glasgow coma scoring was recorded. The postop outcome was measured based on modified Glasgow coma outcome scoring and Karnofsky scoring. Aim of the study: This is a prospective comparative study to evaluate the outcome between the aneurysmal clipping outcome and the intervention radiological procedure outcome **Materials and Methods:** This study was conducted in the Omandurar multispeciality hospital in prospective manner from July 2022 to May 2023. Patients admitted to the ER with subarachnoid hemorrhage, aneurysmal rupture, or unruptured aneurysm with a neurological deficit were taken for study. Patients are either taken for a surgical procedure or an interventional procedure, depending on the circumstances. Each group represents a number of patients. Each category of patients was subdivided into green, yellow, and red depending upon GCS scoring, fisher grading of SAH, and WFNS scoring. Outcomes were analyzed by immediate postop GCS outcome scoring and Karnofsky scoring at the 26th week of the postop period. **Result:** The prospective study shows a comparative outcome of surgical vs. intervention procedures based on

Karnofski scoring at the 6th week of the post-op period. The mean duration of hospital stay for surgery is 15 days, compared to 7 days for IR. The total number of patients with a KFS score >90 in surgery patients is 13 out of 27 (49%) versus 18 out of 25 (72%). **Conclusion:** The immediate cause of mortality in subarachnoid haemorrhage is rebleed. The current trend of management for aneurysm is surgical exposure and interventional radiological procedures.

INTRODUCTION

The ruptured cerebral aneurysms were a topic of intensive focus by neurosurgeons among neurosurgeon in 20th century. High patient mortality and morbidity after aneurysm rupture due to subarachnoid hemorrhage [SAH], Intra Cerebral Hemorrhage [ICH], Intra Ventricular hemorrhage [ICH]. Prevalence of aneurysm numbers increased due to modern imaging modality like Computed Tomography [CT], Cerebral angiogram, and Magnetic Resonance Imaging [MRI]. The prevalence of unruptured aneurysm is documented as 2.7% of intracranial aneurysm. The Locksley study shows the rupture rate of unruptured aneurysms per year is 7%.^[1] Wiebers and colleagues reported a zero risk of rupture for aneurysms less than 10 mm in diameter and a risk of 1.7% per year for aneurysms larger than 10 mm.^[2,3] Factors Associated with Rupture rate of aneurysm are gender, systemic hypertension, age, diabetes, personal habits like smoking and alcohol. Other factors associated with rupture of aneurysm is size of aneurysm, rate of growth of aneurysm, location of aneurysm etc. Ruptured aneurysm mortality is higher among high grade of ‘Hunt and Hess’ grading patients.^[1] Various mode of management are surgery and interventional radiology. The surgical management are craniotomy and clip application, interventional management are coiling, stent assisted coiling, flow divertors. Surgical management has been conventional and traditional management of aneurysm management which is more common available treatment strategy. Interventional procedures are recent advance management available in advanced centers only. This is a prospective comparative study to evaluate the outcome between the aneurysmal clipping outcome and intervention radiological procedure outcome.^[4]

MATERIALS AND METHODS

This study conducted in Omanthur multi-specialty hospital in a prospective manure from July 2022 to May 2023. Patients admitted in ER with subarachnoid hemorrhage with aneurysmal rupture or unruptured aneurysm with or without neurological deficit taken for study. Patients either taken for surgical procedure and interventional procedure depending upon circumstances. The first group contain n=27 numbers of patients in surgical group [Category1], and Category2 contain n=25patients which is designed as interventional group [Catogery2]. Pre op severity of Each category

patients depending upon GCS scoring, fisher grading of SAH, WFNS Scoring. Outcome analyzed by immediate postop GCS outcome scoring, karnofsky scoring at 26 weeks of postop period.

Discussion: The current trend of management for aneurysm is surgical exposure and interventional radiological procedures. In surgical management, patient position in supine with 15-to-30-degree deviates to contralateral side. The pterional craniotomy was taken under general anesthesia, sylvian fissure dissection taken, Internal carotid and optic nerve identified. Carotid bifurcation has been traced, after aneurysm identification appropriate clip applied. Bony land marks with aneurysm, and its orientation are analyzed in preop by digital subtraction angiography. Neck vessel control took for ICA segment aneurysms. M1 segment control took place in Middle Cerebral Artery [MCA] bifurcation aneurysm. The intra op surgical complications are blood loss, aneurysmal rupture. The post op complications are infections, hydrocephalus development, ventilator dependent complications. Mean duration of hospital stay for surgical group was been 16 days.

The endovascular procedure was conducted in Neuro-Cath lab under general anesthesia with femoral arterial puncture with sheldinger technique, 6F French sheath catheter where inserted, soft flexible coils were used to occlude the aneurysm flow. Stent assisted coiling took where wide neck aneurysm has been present. Intra op complications of endovascular procedure has been aneurysmal rupture, coil slippage, reluctant of aneurysm occlusion. Delayed complications are coil perforations. Mean duration of hospital stay for endovascular procedure is seven days.

RESULTS

In this study, duration was eleven months, total numbers of 52. The sex prevalence of this study is 1:2 male: female ratio. Over all prevalence is, male is higher than female.^[2] This study revealed highest numbers of incidence has been 4th to 5th decades associated with co-morbidity [Figure 1 & 2]. Personal habits like smoking, alcohol are risk factors for aneurysm developments. Most common site of anterior circulation is Acom region, Pcom, ICA bifurcation, and MCA bifurcation. High grade

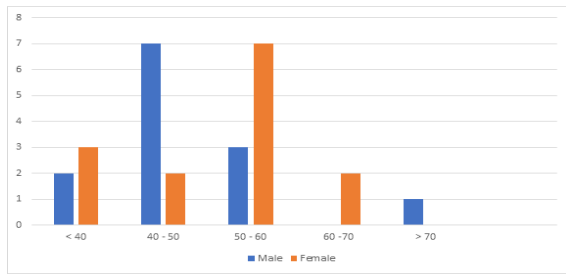


Figure 1: Age wise SAH statics [Category 1]

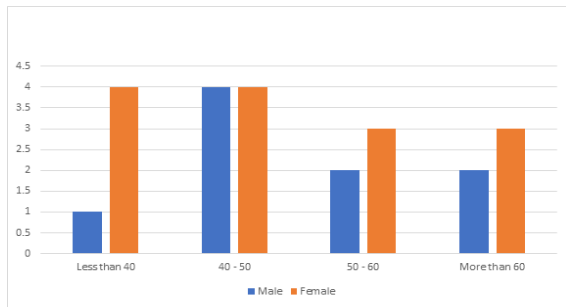


Figure 2: Age wise SAH Incidence in Category 2

The [Figure 1] represents surgical category age wise subarachnoid incidence. [Figure 1 and 2] represents Highest incidence subarachnoid hemorrhage [SAH] has been 4th and 5th decades of life.

SAH Fisher Grading Census

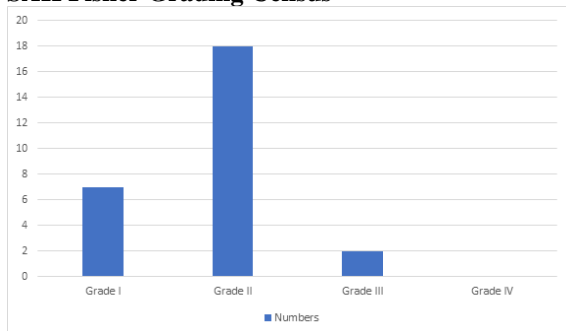


Figure 3: Fisher Grading census Category I

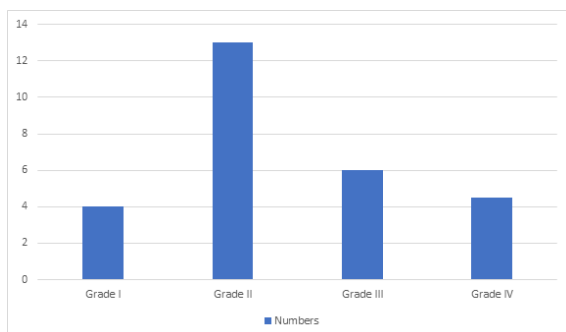


Figure 4: Fisher Grading census Category II

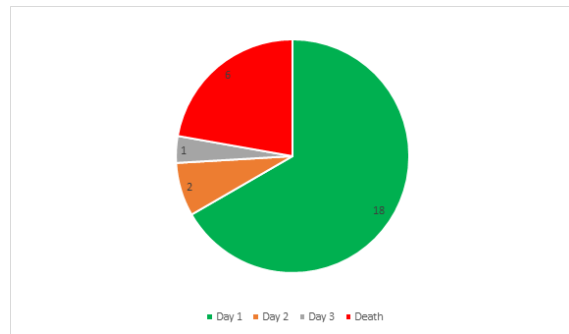


Figure 5: No of Patients extubated in day 1,2,3 & Death in Category 1

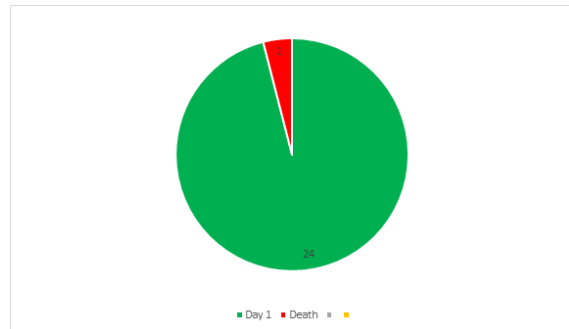


Figure 6: No of Patients Extubated Day 1,2,3&Death in Category 2

[Figure 3] shows highest number of hospital incidence has been gr II fisher grading. [Figure 4] The intervention group shows highest incidence of fisher grading is grade 2. [Figure 5] shows patients outcome among surgical group in earlier post op period. Red signifies mortality. [Figure 6] shows no of patients out come in interventional radiology group. One patient expired in immediate post op period in category 2

DISCUSSION & CONCLUSION

The immediate cause of mortality in subarachnoid haemorrhage is rebleed. The current trend of management for aneurysm is surgical exposure and interventional radiological procedures. Various study shows Ruptured rate of Unruptured Intracranial Aneurysm is depending upon size, site, age, and patient co-morbidity, multiplicity, smoking and alcohol habits. Prevalence of unruptured intracranial aneurysm (UIA) is 0.6 to 2.7%. The cumulative rate of rupture was 0.05% per year for aneurysms less than 10 mm and about 1% for those larger than 10 mm in diameter. Cavernous carotid aneurysms are known to have a lower risk for haemorrhage. In this study category 1 n=27 those who all undergone surgical management and category 2 contain n=25 those who underwent interventional radiology procedure.^[5]

In Category 1 study shows 21/27 patients were in GCS 15/15. Good GCS group patients post op surveillance n= 16 patients (71%) in post op period and death is n= 4(19%). On 6th week post op period

total numbers of patients with GCS 15/15 is 13/27(49%). The Karnofsky scoring greater than 90 on 6th week post op period in category 1 patient is 10/27 (37%). Karnofsky scoring 80 to 90 on 6th week of post op period in category 1 patient is 6/27 (22%). Total number of patients with less than 60 Karnofsky scoring in this group is three. The mortality rate in category 1 Patient is 7/27 (28%). Mean hospital stay for category 1 Patients is 13 to 16 days.^[6]

In category 2 Patients those who underwent interventional radiological procedures details are below. Total numbers(n) in category 2 is n= 25. Among twenty-five patients 22/25 patients undergone coiling., 2 patient underwent stent assisted coiling, 1 patient underwent ballooning with coiling. In category 2 patients(n=25) total numbers of patients with GCS 15/15 was 20. In good GCS patient 6th week follow up shows 11 out of 20 patients Karnofsky scoring is >90., five patients have KFS>80%, two patients had been expired., two patients' loss follow-up. In category 2 Patients total numbers of patients with good Karnofsky scoring is (80 and above) is 18(72%). One patient has been recorded with low KFS 60 SCORING., three patients' loss follow-up. Total numbers of death in category 2 are three. Among death patients one patient's preop GCS is 4/15., remaining two patients GCS is 15/15. The mean duration of hospital stay for IR patients is

Seven days. Chi-square test for intra op complication p-Value of this study is 0.06. Immediate post op and late post op period outcome Chi-square test value shows p-Value is 0.32 which no significant difference among this study. Even-though various mode of treatment strategy available to manage aneurysm, the conventional mode is surgical management. Endovascular is cost constraint and new born technique obtained only in established centre. Long term outcome of endovascular procedure yet to come under special studies are going till date.^[7,8]

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