



## ACOM ANEURYSM AN INSTITUTIONAL EXPERIENCE

**Dr. Gandhiraj  
Thirumalaisamy**

Post graduate, Govt. Rajaji Hospital, Madurai

**Dr. Srisaravanan  
Jeevarajan\***

M.S.,MCh., FNS(Japan), Professor, Department of Neuro Surgery, Govt. Rajaji Hospital, Madurai. \*Corresponding Author

**ABSTRACT**

**Aim of the Study :** Anatomical variation of Acom aneurysm its size, projection of dome and its surgical importance as institutional experience in Govt. Rajaji Hospital, Madurai.

**Method and Results:** 5 patients admitted and referred to Neuro surgical Department of Govt. Rajaji Hospital, Madurai with complaints of Headache, loss of consciousness and alter sensorium, paucity of movements of upper and lower limb from the period of 2016-2018. CT angio was done shows Acom aneurysm with SAH around basal cistern and subarachnoid spaces. They were planned for under GA craniotomy and clipping of Acom aneurysm.

**Observation :** In this study, we experience the difficulty regarding surgical management of Acom aneurysm regarding with size, projection of dome and its anatomical variations.

**Conclusion :** In this paper presentation, the institutional experience of Acom aneurysm with variable surgical difficulties regarding its anatomical variations.

**KEYWORDS :** Hunt and Hess, Modified fissure scale, Subarachnoid haemorrhage, WFNS grading,

**Introduction :**

Anterior communicating artery (ACoA) region as the most common site for intracranial aneurysms. The incidence of Acom aneurysm 40%.

**Embryology of the Anterior Communicating Artery Region**

Embryology and development of the Acom region allows for the better understanding of surgical anatomy and common anatomical variations.

Based on Hager Paget's, At 35 days (12- to 14-mm stage), the primitive anterior division of the internal carotid artery (ICA) develops, that is the stem of the ACA. By 40 days (16- to 18-mm stage), the stem of the ACA elongates medially toward its opposite side same artery. It is at this stage that a midline plexiform anastomoses begins to form between the adjacent and elongating ACAs. At 44 days (20- to 24-mm stage), the channels of the midline cluster of plexiform anastomoses coalesce and form one or more ACoAs.

In addition, the coalescing channels of the midline cluster of plexiform anastomoses give rise to a median ACA that originates from the ACoA. In humans, the median ACA, also known as the *median artery of the corpus callosum*, subsequently regresses and disappears, but it persists in other vertebrates. The development of this artery may result in variation and dissolution of the paired ACAs.

With the formation of the ACoA at 44 days (20- to 24-mm stage), the adult configuration of the intracranial arteries is established, and the circle of Willis is complete.

Given this description, we can predict the most common congenital anomalies of this region, which are (1) multiple or fenestrated ACoAs, (2) triplicate A2 segments, and (3) the azygous A2 segment.

Perlmutter and Rhoton found two or three ACoAs in 30% and 10%, respectively, of their 50 cadaver brain dissections. In addition, they confirmed that absence of the ACoA is exceedingly rare. Hager Paget calculated that the ACoA is absent in only 0.2% of cases. Persistence of the median artery of the corpus callosum creates three A2 segments.

Baptista identified triplicate ACAs in 13.1% of his specimens (50 out of 381), but Perlmutter and Rhoton found triplicate ACAs in only 2% of their specimens (1 out of 50).<sup>5</sup> An azygous or solitary A2 segment arises when the paired ACAs regress after formation and enlargement of the median artery of the corpus callosum. An azygous A2 has been identified in only 0.26% of general autopsies<sup>7</sup> and in only 0.22% of unselected angiograms. The higher incidence of azygous A2 segments

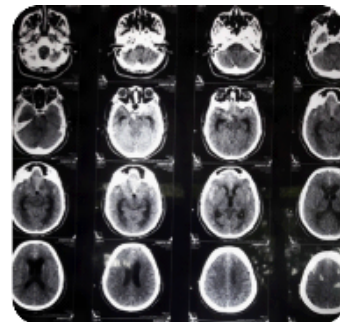
in aneurysm series results from the fact that 41.1% of azygous A2 segments have a terminal aneurysm.

**Microsurgical Anatomy of the A1 Segment–Anterior Communicating Artery–A2 Segment Region**

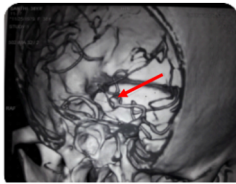
The ACA is divided into five anatomic segments, A1 to A5.4 The A1 segment starts at the ICA termination and ends at ACoA junction. The A2 segment starts at the ACoA junction, follows the course of the rostrum of the corpus callosum, and terminates at the junction of the rostrum and genu of the corpus callosum. It is commonly referred to as the pericallosal artery. The A3 segment follows the curve of the genu of the corpus callosum and terminates where the ACA turns posteriorly above the genu. The A4 and A5 segments run over the body of the corpus callosum; the transition from A4 to A5 is arbitrarily set at the level of the plane defined by the coronal suture.

**Case : 1**

- 38 year old female, admitted with complaints of sudden onset headache/alter sensorium who was never experienced this kind of headache ever in her life and patient developed alter sensorium after the incidence of headache. Patient was initially admitted and treated in Govt. Hospital in Dindigul then she was referred to Govt. Rajaji Hospital, Madurai for further evaluation and management. Patient was admitted in Neuro Intensive Care unit, she is not a known hypertensive. Her clinical grading Hunt and Hess was - 3; WFNS was -2.
- After stabilization CT was taken shows subarachnoid haemorrhage in the interhemisphere region and around basal cistern and bilateral sylvian fissure and dilatation of the ventricles was noted. Modified fisher scale was 3.



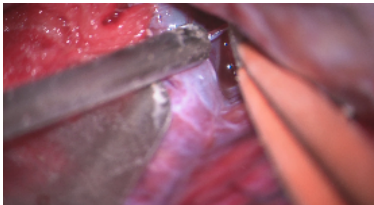
- Then we planned to take CT angio it shows Acom aneurysm size measuring 0.5 x 0.7 cms, neck measuring 2.5mm, the aneurysm coursing anteriorly.



Saccular Aneurysm  
Neck Measuring 2.5mm  
Coursing Anteriorly

**Intraoperative Difficulties :**

Bridging vein in the sylvian fissure was seen that was interrupt the sylvian dissection further so we encountered that bridging vein then we proceed the sylvian dissection.



**Post Op CT Brain**



Artifact Of clip In Acom region

Post operative GOS was 5 and patient was discharged on 12<sup>th</sup> post operative day.

**CASE-2**

37 Male admitted with complaints of headache ,neck pain;loss of consciousness. Patient was initially admitted in medical ward of Govt rajaji hospital Madurai. Emergency call over was given to neuro surgery. Patient not a known diabetic or hypertensive. His admission blood pressure was 130/80 mmhg. His clinical grading of Hunt and Hess -2;WFNS-1. Patient was immediately take over to neuro surgery intensive care unit and appropriate fluid management was done. Patient was stabilised and CT brain was taken. CT brain shows thin subarachnoid hemorrhage in sylvian cistern and basal cistern and inter hemisphere region. His modified fisher scale was 1.

**CTANGIO:**

Bilobed aneurysm ,neck size 2-3mm ,projecting one on right one on left side



Bilobed aneurysm  
Neck 2-3mm  
Projecting one on Rt side  
Another on Lt side

**PLAN;**

Patient was planned for craniotomy and clipping under GA

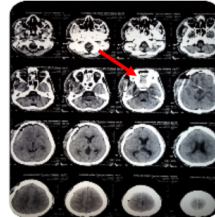
**INTRAOPERATIVE COMPLICATION;**

Intra operatively aneurysm was ruptured while dissecting dome of aneurysm from arachnoid adhesion but however we managed rupture with double suctioning and best anesthetic team clipping was done.



**POST OPERATIVE CT BRAIN;**

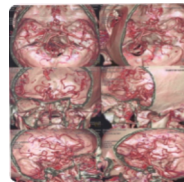
Post operative changes was seen in right pterional region. Clip artefact was seen in interhemisphere region. Post operative patient was managed well he was discharged on 13th post operative day.



POST CHANGES IN Rt Pterional region

**CASE-3**

65 Year old male patient admitted with complaints of head ache , loss of consciousness and vomiting. Patient was initially admitted in srivilliputhur govt hospital then referred to Government hospital Madurai. Patient was known hypertensive but not taking any regular treatment. At the time of admission patient clinical grading of Hunt and Hess was 4 and WFNS was 4. His blood pressure was 170/110 mmhg. After initial stabilization with fluid and anti hypertensive management CT brain was taken it shows subarachnoid haemorrhage in sylvian fissure and inter hemisphere region his clinical grading was-3. Then we planned to take CT angio , It shows saccular Acom aneurysm coursing antro superiorly ,Neck 0.5 cms ,Size0.78-1cms.



SACCULAR ACOM ANEURYSM  
Coursing antro superiorly  
Neck 0.5 cms  
Size 0.78-1cms

**PLAN;**

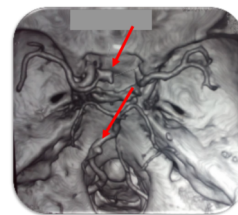
Under GA patient planned for craniotomy and clipping

**POST OPERATIVE MANGEMENT;**

Patient managed well with fluid and anti hypertensive drugs and tracheostomy was done on 3<sup>rd</sup> post operative day ,because of age and associated comorbidity and poor admission clinical status patient not improved well in the post operative period. Patient went against medical advice and lost follow up.

**CASE-4**

50 year female admitted with complaints of head ache ,vomiting ,altered sensorium. Patient was initially admitted in Virudunagar Government hospital then referred to our Govt Rajaji hospital Madurai. Patient admission clinical grading of Hunt and Hess -4 and WFNS-4 at the time of admission . After admission patient was very well managed with TRIPLE H therapy. Patient not a known hypertensive and diabetic. Initial blood routine examination and coagulation profile was done, her blood pressure was 130/90mmhg ,electrolytes was with in normal limits. CTbrain was taken shown thin subarachnoid hemorrhage in sylvian fissure and inter hemisphere region and modified fisher scale was 1



Multiple aneurysm  
Acom neck 0.3cms  
size 0.7  
Projection upwards anteriorly  
V4 0.6cms

**CTANGIO ;**

Multiple aneurysm one on Acom another on V4 segment of vertebral artery intra cranial segment.

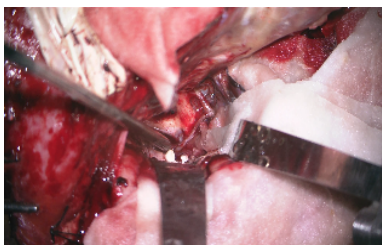
Acom neck 0.3cms ,size0.7Projection upwards anteriorly  
V4 0.6cms

**PLAN :** Acom aneurysm clipping under GA with left pterional approach

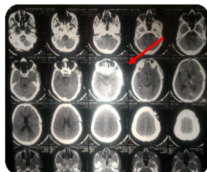
**INTRAOPERATIVE DIFFICULTY;**

Severe adhesion was seen which was delineated and dome was separated from adhesion, clipping was done .then dome was opened

checked for any undue bleeding.



**POST OPERATIVE CT BRAIN**



Post op changes in Lt Pterional region

**POST OPERATIVE STATUS OF PATIENT;**

GOS was 5 and was discharged on 12 post operative day.

**CASE-5**

60 Year old gentleman admitted with complaints of sudden onset of vomiting 3 episodes and loss of consciousness since morning .who was admitted in Govt Rajaji hospital medical ward. His native around Madurai. He was not a known diabetic or hypertensive. His clinical grading of Hunt and Hess was-3 and WFNS was 4. Patient CT brain was taken after initial stabilization shows diffuse thick subarachnoid hemorrhage and his modified fisher scale was 4.adequate fluid management and nimodipine was given. His blood routine value, electrolytes and coagulation profile was with in normal limits. Patient was managed in neuro intensive care unit monitor accordingly.

**CTANGIO;**

Multi lobed Acom aneurysm was seen with size A2.neck of Acom aneurysm was 6mm which projecting posterior and superiorly



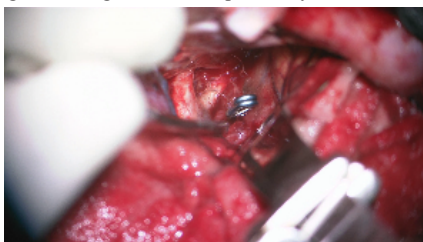
MULTI LOBED ACOM WITH SINGLE A2 NECK 6MM PROJ-POSTERIOR AND SUPERIORLY

**PLAN;**

Pterional craniotomy was planned under GA.

**INTRA OPERATIVE COMPLICATION;**

After initial arachnoid adhesion release, dome and neck was isolated. Dome projection was posterior and superiorly which was very difficult for clipping and managed well intraoperatively.



**POST OPERATIVE PERIOD**

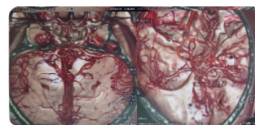
Even we managed well intra operatively due to age and admission clinical status patient GOS was 1.

**CASE-6**

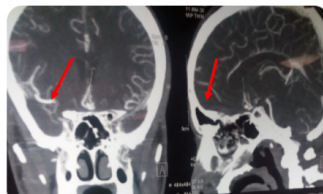
45 Male admitted with complaints of sudden onset of headache. Patient was admitted in medical ward who was referred from Virudunagar Govt hospital. At the time of admission patient clinical grading of Hunt and Hess was 2 and WFNS was- 1. Patient was not a known diabetic and hypertensive. His blood routine ,coagulation profile , electrolytes was with in normal limits. Patient was take over from medical ward after CT brain was taken which shows diffuse thick sub arachnoid hemorrhage but no Intraventricular hemorrhage with modified fisher scale was -3.patient was well managed in neuro intensive care unit with intravenous fluid ,nimodipine and stool softners.

**CTANGIO;**

Shows bi lobed secular aneurysm in Acom region with neck measuring about 3mm aneurysm was projected upwards anteriorly.



BILOBED SACULAR ANEURYSM NECK-3MM PROJ-UPWARDS ANTERIORLY



Project-upwards anteriorly

**PLAN;**

Through right pterional approach under GA craniotomy and clipping was planned

**INTRA OPERATIVE COMPLICATION;**

Well managed intra operatively after dome and neck was isolated clipping was done.

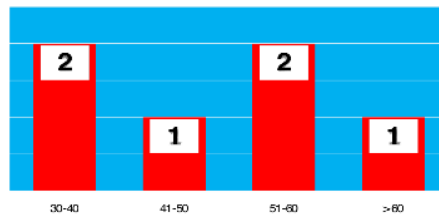
**POST OPERATIVE PERIOD ;**

His GOS was 4 and patient was discharged on 15 post operative day. Attenders was well educated regarding physiotherapy of limbs and day today supportive care.

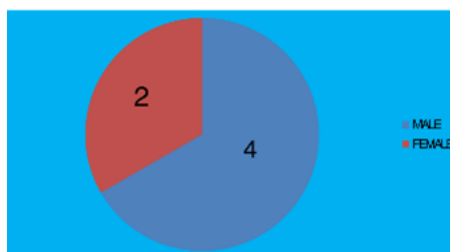
**Results**

Age	Sex	Complaints	Co-Morbidity	Grading Hunt And Hess	Grading Wfns	Modified Fisher Scale
38	F	HEADACHE ALTERED SENSORIUM	NIL	3	2	3
37	M	HEADACHE NECK STIFFNESS LOC	NIL	2	1	1
65	M	LOC VOMITING	HTN	4	4	3
50	F	HEADACHE VOMITING ALTERED SENSORIUM	NIL	4	4	1
60	M	LOC VOMITING	NIL	3	4	4
45	M	HEADACHE	NIL	2	1	3

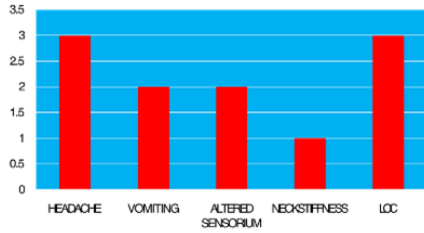
**AGECHART**



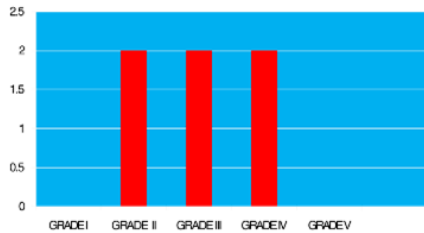
**SEX**



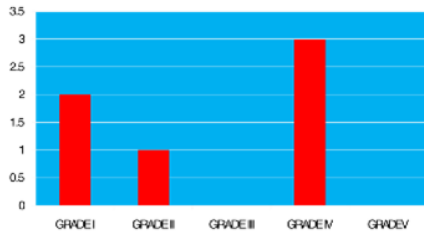
### CLINICAL PRESENTATION



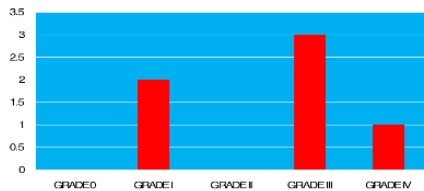
### HUNT AND HESS



### WFNS

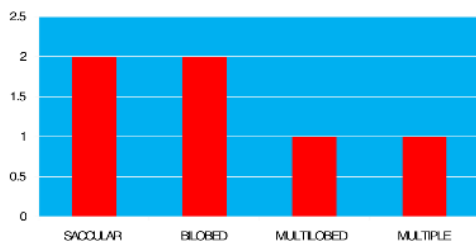


### MODIFIED FISCHER SCALE



Morpho Logy	Neck Size	Dome Projection	Surgery	Intra Op Complication	Gos Score
SACCULAR	2.5	ANTERIOR	LT PTERIONAL	NIL	5
BILOBED	2.5-3	LEFT/RIGHT	RT PTERIONAL	NIL	5
SACCULAR	50	ANTERIOR/SUPERIOR	RT PTERIONAL	NIL	2
MULTIPLE 1.ACOM 2.V4SEG	3	UPWARDS ANTERIORLY	LT PTERIONAL	NIL	5
MULTILOBED	6	POSTERIOR SUPERIORLY	LT PTERIONAL	NIL	1
BILOBED	3	UPWARDS ANTERIORLY	RT PTERIONAL	NIL	4

### TYPES OF ANEURYSM



### CONCLUSION

We are presenting Acom aneurysm an institutional experience in Government Rajaji Hospital, Madurai as we experienced with Poor HUNT and HESS; WFNS; MODIFIED FISHER SCALE associated with poor outcome.

Based on the age of clinical presentation younger age patients are survived with good GOS score older age patients are associated with poor GOS. Period of LOC also important predictor for outcome. We experienced one anatomical variations of solitary or azygos A2 in this case series

### DIFFICULTIES WE EXPERIENCED

- If reach dome first, difficult to clip neck.
- Difficult to dissect sylvian with diffuse SAH
- If dome buried into inter hemisphere region.
- While dissecting neck we not able to see opposite part of neck so we cannot conclude that perforators are included or not in the clip.
- While dissecting sylvian fissure if encounter large draining vein across the fissure. We have to dissect that vein otherwise very difficult to do sylvian dissection and reach the aneurysm and Acom complex.