



Complication Avoidance in Acom Aneurysm Surgery- An Early Experience of 16 Cases

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Abstract

Introduction: A lot of controversies are there in treating Acom aneurysm surgery. Proximal control, timing of surgery, Sylvian fissure dissection, approach and patient selection are few of those. Avoiding major disasters such as perforator injury is mandatory, proximal control of both A1 in intraoperative rupture is worth living. The technique of arachnoid dissection to prevent injury to AcoA complex and brain retraction facilitates surgery. In this series, complication avoidance of 16 cases has been discussed. In order to avoid a major disaster such as perforator injury, proximal control of both A1 in intraoperative rupture is deserving of life. The arachnoid dissection technique to prevent injury to the AcoA complex and brain retraction facilitates the surgery. In this series, Complication avoidance of 16 cases was discussed.

Material and Method: A retrospective study of 16 cases of which 9 were male and 7 were female was observed. Prevention of complications has been studied in Acom aneurysm surgery.

Results: Of 16 patients — 2 died 1 developed 3rd nerve paralysis which was recovered after 3 months, 1 developed hydrocephalus.

Conclusion: The complexity of the location means that complications in Acom neurysm surgery must be avoided. The learning curve to avoid complications is a step in the right direction. Collection of larger series will contribute further to society.

Keywords: Acom aneurysm surgery, Proximal control, AcoA complex.

Introduction

Acom Aneurysm (ACoA) is one of the most common sites for intracranial aneurysms, as between 30 and 37 percent occur at this site. Aneurysms of the ACoA account for the highest percentage of ruptured aneurysms (39%) and are associated with the worst surgical results of all anterior circulation aneurysms.^[1,2,3,4,5,6,7,8,9] The morbidity and mortality of ACoA aneurysms are

accounted for by initial SAH, vasospasm and surgical trauma.^[5,6,7] Consequently, targeted action on these variables should lead to improved results. Although little can be done to limit initial SAH damage and moderate progress in the treatment of vasospasm, surgical morbidity and mortality appear to be areas in which intervention could improve the results of patients.^[10,11,12,13,14,15,16,17,18,19,20,21,22,23]

There are many controversies in the treatment of Acom aneurysm surgery. Proximal control, surgery timing, dissection of the Sylvian fissure, approach and selection of patients are few. In order to avoid a major disaster such as perforator injury, proximal control of both A1 in intraoperative rupture is deserving of life. The arachnoid dissection technique to prevent injury to the AcoA complex and brain retraction facilitates the surgery. The arachnoid of the Sylvian cistern should be opened on the front of the Sylvian vein so that the Sylvian fissure is not crossed when the front lobe is pulled back. It should be noted that the exact location of the sylvian fissure is not always apparent in the medium and that the fissure is not always "open" in a clean arachnoidal

plane, as is often shown^[24]. Variations in the width of the Sylvian cistern and the middle cerebral artery position can be seen in some cases. The herniation of the lateral fronto-orbital gyrus into the temporal lobe and the herniation of the superior temporal gyrus into the lateral fronto-orbital gyrus can be seen in some cases. All of them are very important changes to be considered for the micro dissection plan. The coagulation of the dural fold in the upper orbital fissure is prevented because of the fear of a sixth nerve paralysis. The key to successful surgery through the pterial approach is maximum surface exposure and minimal brain retraction. In this series, Complication avoidance of 16 cases was discussed.

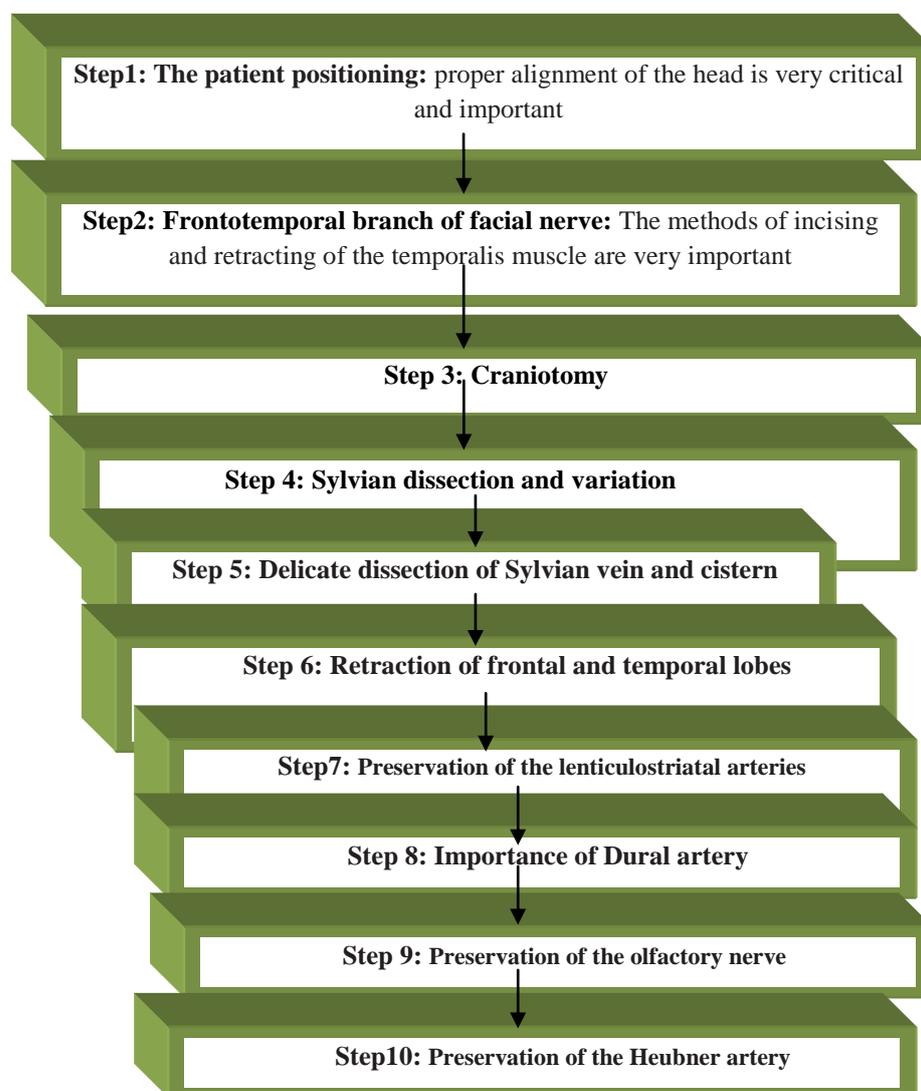


Figure 1: Complication Avoidance in Acom Aneurysm Surgery

Surgical Procedure

The surgical technique is based on neurosurgical expertise, training and observation. There is not necessarily one technique better than another. Regardless of the surgical techniques, the end results depend on a rigorous, methodical, systematic and step-by-step approach to the target, which ensures that the surrounding structures are minimally injured. Surgical steps in Yasargil Highway are usually followed 10 steps such as: the patient positioning, the preservation of the front temporal branch of the facial nerve, craniotomy, Sylvian dissection and variations, retraction of frontal and temporal lobes, preservation of the lenticulostriatal arteries, preservation of the dural artery, preservation of the olfactory nerve and preservation of the Heubnerartery.

Material and Method

A retrospective study was followed where 16 patients were included in a private medical college at Dhaka. Avoidance of complications in Acom aneurysm surgery was studied. Total duration of the study was 3 years.

Results

A total of 16 cases of which 9 were male and 7 were female were observed. Of the 16 patients who died, 1 developed 3rd nerve paralysis which was recovered after 3 months. 1 had a hydrocephalus developed.

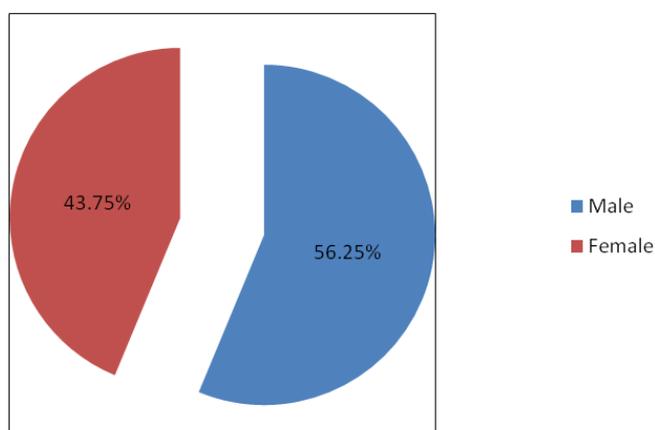


Figure 2: Sex of the Patients

Table 1: Surgical Outcome of Acom Aneurysm Surgery

Outcome	Frequency	Percent (%)
Without Complexity	11	68.75
3rd nerve palsy which was recovered after 3 months	01	6.25
Aneurysm rest	01	6.25
Hydrocephalus	01	6.25
Died	02	12.5
Total	16	100

Discussion

Andaluz et.al, 2008 showed that correlated laboratory data with a clinical series of 40 patients identified the advantages of the orbitopter approach in ACoA aneurysm surgery, including increased exposure and visualization of the ACoA complex, thus reducing the risk of intraoperative brain damage.^[25] The benefits of the orbitopterion approach versus the pterioneering approach in terms of exposure to the ACoA complex have recently been confirmed by Figueiredo et al.^[13] In this article, we discuss the potential impact of this approach on patient outcomes due to a potential reduction in surgical morbidity. In this study, we provided long-term follow-up data on our 16 successive patients with ACoA aneurysms using the technique of arachnoid dissection. Furthermore, we acknowledge that these data are not derived from a randomized clinical trial, and we included no control cases treated through the “gold standard” (i.e., the pterional approach). However, we firmly believe that this report could eventually serve as background data for further clinical studies comparing different surgical approaches.

Conclusion

The complexity of the location means that complications in Acom neurysm surgery must be avoided. The learning curve to avoid complications is a step in the right direction. Collection of larger series will contribute further to society.

References

1. Riina H A, Lemole M G, Spetzler R F. Anterior communicating aneurysms. *Neurosurgery*. 2002;51:993–996. [PubMed]
2. Solomon R A. Anterior communicating artery aneurysms. *Neurosurgery*. 2001;48:119–123. [PubMed]
3. Buchanan K M, Elias L J, Goplen G B. Differing perspectives on outcome after subarachnoid hemorrhage: the patient, the relative, the neurosurgeon. *Neurosurgery*. 2000;46:831–840. [PubMed]
4. DeLuca J. Cognitive dysfunction after aneurysm of the anterior communicating artery. *J Clin Exp Neuropsychol*. 1992;14:924–934. [PubMed]
5. Mavaddat N, Sahakian B J, Hutchinson P JA, Kirkpatrick P J. Cognition following subarachnoid hemorrhage from anterior communicating aneurysm: relation to timing of surgery. *J Neurosurg*. 1999;91:402–407. [PubMed]
6. Molyneux A, Kerr R, Stratton I, et al. International Subarachnoid Aneurysm Trial (ISAT) Collaborative Group International Subarachnoid Aneurysm Trial (ISAT) of neurosurgical clipping versus endovascular coiling in 2143 patients with ruptured intracranial aneurysms: a randomised trial. *Lancet*. 2002;360:1267–1274. [PubMed]
7. Molyneux A J, Kerr R S, Yu L M, et al. International Subarachnoid Aneurysm Trial (ISAT) Collaborative Group International subarachnoid aneurysm trial (ISAT) of neurosurgical clipping versus endovascular coiling in 2143 patients with ruptured intracranial aneurysms: a randomised comparison of effects on survival, dependency, seizures, rebleeding, subgroups, and aneurysm occlusion. *Lancet*. 2005;366:809–817. [PubMed]
8. Giannotta S L, Oppenheimer J H, Levy M L, Zelman V. Management of intraoperative rupture of aneurysm without hypotension. *Neurosurgery*. 1991;28:531–535. [PubMed]
9. Iwamoto H, Kiyohara Y, Fujishima M, et al. Prevalence of intracranial saccular aneurysms in a Japanese community based on a consecutive autopsy series during a 30-year observation period: the Hisayama study. *Stroke*. 1999;30:1390–1395. [PubMed]
10. Kamitani H, Masuzawa H, Kanazawa I, Kubo T. Saccular cerebral aneurysms in young adults. *Surg Neurol*. 2000;54:59–66. [PubMed]
11. Le Roux P D, Elliott J P, Downey L, et al. Improved outcome after rupture of anterior circulation aneurysms: a retrospective 10-year review of 224 good-grade patients. *J Neurosurg*. 1995;83:394–402. [PubMed]
12. Le Roux P D, Elliott J P, Newell D W, Grady M S, Winn H R. Predicting outcome in poor-grade patients with subarachnoid hemorrhage: a retrospective review of 159 aggressively managed cases. *J Neurosurg*. 1996;85:39–49. [PubMed]
13. Le Roux P D, Elliott J P, Newell D W, Grady M S, Winn H R. The incidence of surgical complications is similar in good and poor grade patients undergoing repair of ruptured anterior circulation aneurysms: a retrospective review of 355 patients. *Clinical study. Neurosurgery*. 1996;38:887–895. [PubMed]
14. Ljunggren B, Säveland H, Brandt L. Causes of unfavorable outcome after early aneurysm operation. *Neurosurgery*. 1983;13:629–633. [PubMed]
15. Røsenorn J, Eskesen V, Schmidt K, et al. Clinical features and outcome in 1076 patients with ruptured intracranial saccular aneurysms: a prospective consecutive study. *Br J Neurosurg*. 1987;1:33–45. [PubMed]
16. Sundt T M, Jr, Whisnant J P. Subarachnoid hemorrhage from

- intracranial aneurysms: surgical management and natural history of disease. *N Engl J Med.* 1978;299:116–122. [PubMed]
17. Alaywan M, Sindou M. Fronto-temporal approach with orbito-zygomatic removal: surgical anatomy. *Acta Neurochir (Wien)* 1990;104:79–83. [PubMed]
18. Al-Mefty O. Supraorbital-pterional approach to skull base lesions. *Neurosurgery.* 1987;21:474–477. [PubMed]
19. Czirják S, Szeifert G. Surgical experience with frontolateral keyhole craniotomy through a superciliary skin incision. *Neurosurgery.* 2001;48:145–150. [PubMed]
20. Dare A O, Landi M K, Lopes D K, Grand W. Eyebrow incision for combined orbital osteotomy and supraorbital minicraniotomy: application to aneurysms of the anterior circulation. *J Neurosurg.* 2001;95:714–718. [PubMed]
21. Figueiredo E G, Deshmukh P, Zabramski J M, et al. Quantitative anatomic study of three surgical approaches to the anterior communicating artery complex. *Neurosurgery.* 2005;56:397–405. [PubMed]
22. Fujitsu K, Kuwabara T. Orbitocraniobasal approach for anterior communicating artery aneurysms. *Neurosurgery.* 1986;18:367–369. [PubMed]
23. Jho H-D. Orbital roof craniotomy via an eyebrow incision: a simplified anterior skull base approach. *Minim Invasive Neurosurg.* 1997;40:91–97. [PubMed]
24. <http://www.ncbi.nlm.nih.gov/pubmed/8750656>
25. Andaluz N, Loveren H R van, Keller J T, Zuccarello M. Anatomic and clinical study of the orbitopterional approach to anterior communicating artery aneurysms. *Neurosurgery.* 2003;52:1140–1148. [PubMed]