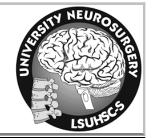


Superior Cerebellar Artery Aneurysms as Dissidents in Posterior Circulation; Role of Microsurgery in Endovascular Era With Comparative Outcome Analysis

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Introduction

Superior cerebellar artery (SCA) aneurysms are considered to be grueling surgical lesions owing to narrow operative corridors and proximity to critical cranial nerves. Accordingly, endovascular treatment has always been weighed as more safe and effective than microsurgical clipping. We retrospectively analyzed and compared the outcome of our patients with SCA aneurysms treated with endovascular coiling and microsurgical clipping.

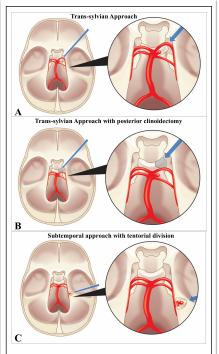
Methods

Between June 2000 and August 2015, 20 patients with SCA aneurysms underwent microsurgical (n = 12) or endovascular (n = 8)treatment. SCA aneurysms were classified into 3 types: arising from basilar artery near origin of SCA but not involving SCA (type-a); arising from SCA-BA junction with involvement of SCA (type -b); arising from distal segment of SCA (type-c). Types-a and b were collectively called as proximal SCA aneurysms involving BA-SCA(S1) segment and type-c was called distal SCA aneurysms involving S2-S4 segments. The decision of surgery versus endovascular

treatment was based on the aneurysm morphology and clinical grade etc. The Glasgow outcome scale (GOS) and the modified Rankin's scale (mRS) were used to grade their postoperative neurological status at discharge and at follow up, respectively. A literature review was performed for clinical series on SCA aneurysms from 1991 to 2015 describing more than 10 patients for pooled analysis.

Results

Majority (70%) of patients were in good grade (WFNS 1&2) at presentation. Sixty six percent from microsurgery and 75% from endovascular arm had good outcomes (GOS score >3 and mRS score <3) (p=0.54). Microsurgery had 88.8% complete occlusion rate as compared to 75% in endovascular treatment (p=0.45). Pooled analysis of 12 studies showed endovascular coiling is significantly associated with good clinical outcome (88.1% vs 76.9%; p = 0.003). Microsurgery provides better radiological outcome in terms of complete occlusion rate (90.1% vs 67.4%; p=0.0001)and lower recurrence rate (0% vs 11.8%; p=0.005).



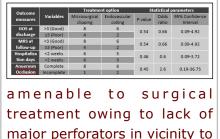
A. Type-a or Type-b aneurysms can easily be approached through transsylvian approach.

Note the wide angle between SCA and PCA which gives easy access to the neck of the aneurysm. B. SCA aneurysm from a low riding basilar artery complex which needs additional posterior clinoidecotmy for optimal visualization of the neck.

C. Type-c aneurysms can be approached through subtemporal approach with or without tentorial division.

Conclusions

SCA aneurysms are rare and unlike other posterior circulation aneurysms are



major perforators in vicinity to the aneurysm neck. Microsurgery a n d endovascular coiling both are viable primary treatment options with comparable clinical as well as radiological outcomes. Individual series on SCA aneurysms have not proven any outcome benefit of either treatment modality over the other. However, pooled analysis suggests that microsurgery provides complete and sustainable aneurysm occlusion, though with an inferior clinical outcome.

Author; Year	No of patients	Location	Ruptured cases	Treatment	Complete occlusion rate	Recurrence	Good outcome rate (GOS >3, MRS<3)
Peorless et al; 1996	58	NA	100 %	Microsurgery	NA	NA.	90%
Uda et al; 2001	13	Proximal	61.5%	Endovascular	38.4%	0%	92.3%
Ogilvy et al; 2002	32	NA.	NA	Microsurgery-26 Endovascular-6	77% 50%	0% 66.6%	73% 33%
Haw et al; 2004	12	NA	58.3%	Endovascular	50%	0%	83.3%
Poluso et al; 2007	33	Proximal 97% Distal 3%	65%	Endovascular	94%	2.9%	88.2%
Pandey et al; 2007	22	NA.	72.7%	Endovascular	81%	35.3%	76%
lizuka et al; 2008	58	Proximal 77% Distal 23%	59.6%	Microsurgery-10 Endovascular-48	75.4%	7%	70%
Sanal et al; 2008	22	NA	NA	Microsurgery	100%	NA.	68.1%
lin et al; 2012	33	Proximal 97% Distal 3%	66.6%	Microsurgery-12 Endovascular-21	75% 57%	0% 19%	75% 81%
Kim et al; 2014	53	Proximal 71.7% Distal 28.3%	17%	Endovascular	37.7%	10.9%	100% (46/46)
Velloglu et al; 2015	49	Proximal 85.7% Distal 14.3%	73.5%	Endovascular	93.8%	10%	96%
Nair et al; 2015	14	NA.	64.3	Microsurgery	100%	NA.	71%
Present study	20	Proximal 75% Distal 25%	65%	Microsurgery-12 Endoversular-8	91.6%	16.6%(1/6)	66.6% 75%

Learning Objectives

1. SCAs are considered as the most constant artery of the posterior circulation that arises from the distal part of the basilar trunk. In contrast to basilar tip aneurysms, both type-a and b SCA aneurysms are relatively safe to approach surgically from

a transsylvian route because of the lateral and off-midline orientation of the aneurysms. These aneurysms tend to increase the angle of ipsilateral SCA and PCA from acute to more obtuse, which is a favorable orientation for visualization of the neck. Type-c aneurysms are safer to approach by a subtemporal route with division of the tentorium 2. SCA aneurysms are rare and

unlike other posterior circulation aneurysms are amenable to surgical treatment owing to lack of major perforators in vicinity to the aneurysm neck. Good collateral circulation along with mild nature of the deficits caused by the occlusion of the parent artery makes surgery less menacing.

3. Microsurgery and endovascular coiling both are viable primary treatment options with comparable clinical as well as radiological outcomes.

References

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