

Endovascular management of ruptured intracranial vertebral artery dissection aneurysms

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Learning Objectives

By the conclusion of this session, participants should be able to: 1) Recognize the clinical presentation and radiographic findings associated with VADA, 2) Educate patients regarding the common risk factors associated VADA, 3) Identify the endovascular options for treating VADA, 4) Discuss the outcomes and complications related to endovascular treatment of VADA.

Case Example



32 yo F h/o HTN/tobacco p/w HA/neck pain and acute clinical deterioration s/p PBD 0 endovascular trapping of R ris-VADa

Introduction

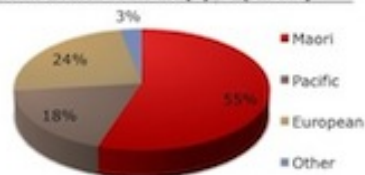
Spontaneous vertebral artery dissections account for 10% to 25% of strokes in those aged 25 to 45 years and intradural vertebral artery dissection aneurysms (VADA) are responsible for 5% of subarachnoid hemorrhages. Treating ruptured VADA is essential as these lesions have a high-risk of rebleeding with unfavorable outcomes. The purpose of this study was to report the clinical characteristics, radiologic findings, efficacy of endovascular treatment, and the predictors of outcome for patients with ruptured VADA.

Methods

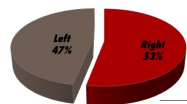
Thirty-four consecutive patients with ruptured intracranial VADA treated via endovascular techniques at Auckland City Hospital between 1997 and 2013 were retrospectively reviewed from a prospectively maintained database.

Clinical Characteristics & Ethnicity

Clinical Characteristic	Value (n=34)
Age (yr)	48 (18-70)*
Sex	Male 53% Female 47%
Hunt & Hess Grade	3 (1-5)*
Time to Treatment (d)	3 (0-262)*

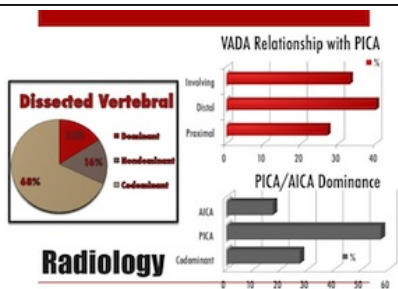


ris-VADA



Angiographic Features	Value (n=34)
Fusiform	22%
Pearl-and-String	73%
String	5%

Radiology

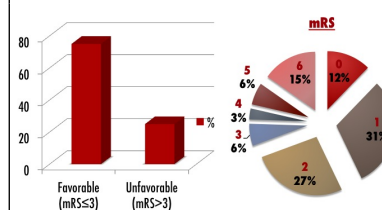


Radiology

Results

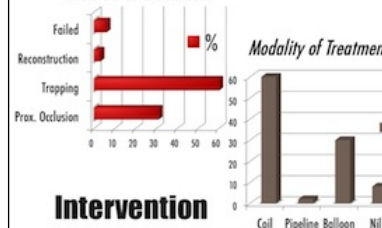
Of the 34 patients (mean age 48 years) treated, with a median Hunt and Hess Grade of 3 and median time to treatment of 3 days, hypertension and smoking were the most common risk factors associated with VADA; 59% and 47% respectively. Fifty-three percent of VADA occurred on the right with the pearl-and-string angiographic conformation in 73%. Methods of endovascular treatment included trapping (N=21), proximal occlusion (N=10), and reconstructive (N=1). Post-procedural VADA occlusion rate was 88% with a retreatment rate of 9%. Median follow-up was 29 months with a favorable modified Rankin scale (mRS) of less than or equal to 3 in 75%. Twenty-five percent of patients undergoing intervention had mRS greater than 3 at last follow-up with Hunt and Hess grade and major procedural complication demonstrating a correlation with unfavorable outcome; p=0.05 and p=0.01 respectively. Major complications included 4 failed interventions with infarction or increase in VADA size, 1 post-procedure clinically relevant embolic infarct, 1 post-procedure anterior spinal infarction, 1 peri-procedural death, and 1 iatrogenic dissection of contralateral vertebral artery.

Clinical Outcomes



Median Follow-up: 29 mo,
Median mRS: 2

Method of Treatment



Intervention

Post-Procedure Occlusion	Value (n=34)
Complete	70%
Incomplete	30%
Delayed	18%
Overall	88%
Retreatment rate	9%

Intervention

Predictors of Unfavorable Outcomes in ris-VADs

Characteristic	P value	Univariate analysis
Age	0.06	
Sex	0.77	
Hunt and Hess Grade	0.04	0.050
WFNS Grade	0.05	0.069
Rebleeding	0.81	
Vasospasm	0.06	
Hydrocephalus	0.24	
Dominant Vertebral artery	0.33	
Aneurysmal Occlusion	0.97	
Time to Treatment	0.89	
Major Procedural Complication	0.006	0.009
Minor Procedural Complication	0.19	

Note: Unfavorable outcome defined as mRS>3

Outcomes

Major 26% Minor 9%

- (4x) Failed interventions with new infarction or increase in ris-VADA size
- (1x) Post-procedure clinically relevant embolic infarction
- (1x) Post-procedure anterior spinal infarction
- (1x) Peri-procedural death
- (1x) Iatrogenic dissection of contralateral vertebral artery requiring reconstructive intervention
- (1x) Clinically silent intraoperative rupture
- (2x) Clinically silent new embolic infarctions

Complications

Conclusions

Ruptured VADA are high-risk lesions that present with stereotypic characteristics. VADA can be managed safely and effectively by multimodal endovascular techniques with favorable outcomes.