

Intracranial Bypass of Posterior Inferior Cerebellar Artery Aneurysms: Indications, Technical aspects, and Clinical Outcomes

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Learning Objectives

By the conclusion of the segment, participants should be able to: 1) identify appropriate circumstances for intracranial PICA bypass for aneurysm occlusion and 2) understand bypass graft options for PICA bypass

Introduction

For some Posterior Inferior Cerebellar Artery (PICA) aneurysms, there is no constructive endovascular or direct surgical clipping option. Intracranial bypass in those situations is an alternative to a deconstructive technique. We evaluate the clinical features, surgical technique and outcome of PICA aneurysms treated by bypass and obliteration of the diseased segment.

References

1. Abia AA, McDougall CM, Breshears JD, Lawton MT: Intracranial-to-intracranial bypass for posterior inferior cerebellar artery aneurysms: options, technical challenges, and results in 35 patients. Journal of neurosurgery:1-12, 2015
2. Eric C. Chang BLH, Christopher S. Ogilvy: Microsurgery of Vertebral Artery, Posterior Inferior Cerebellar Artery, and Vertebrobasilar Junction Aneurysms, in Winn HR (ed): Youmans Neurological Surgery: Elsevier, 2011, pp 3871-3885

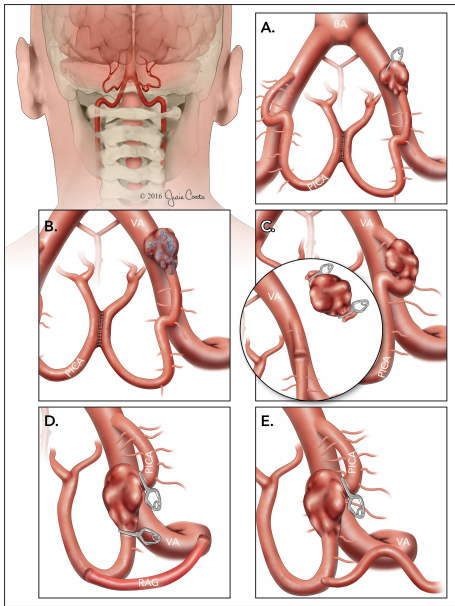
Methods

We conducted a retrospective review of all PICA aneurysms treated over the past five years at our institution. For patients treating using constructive bypass techniques, clinical outcome measurements, such as post-operative stroke, cranial nerve deficits, gastrostomy/tracheostomy requirement, bypass patency, modified Rankin scale (mRS) at discharge and followup, were characterized.

Results

Six patients with PICA aneurysms treated with intracranial bypass were identified. Four had fusiform aneurysms, one had a giant partially thrombosed saccular aneurysm, and one had a dissecting traumatic aneurysm. Three bypasses were PICA-PICA side-to-side, one was PICA-PICA end-to-end, one was VA-PICA, and one was OA-PICA bypass. Five aneurysms were obliterated surgically and one required additional endovascular occlusion. All bypasses were patent intraoperatively, although two were later demonstrated to be occluded with no radiological signs or symptoms of stroke. With the exception of one death due to pulmonary emboli three months postoperatively, all other patients remain at a mRS <2

Microsurgical PICA Bypass Techniques



A. PICA side-to-side anastamosis; B. endovascular coiling following side-to-side bypass; C. PICA end-to-end anastamosis; D. RAG interposition graft; E. OA-PICA bypass

Bypass Techniques and Patient Outcomes		
	Number	Percentage
Bypass Type		
PICA End-to-End	1	16.7
PICA Side-to-Side	3	50.0
OA to PICA	1	16.7
VA to PICA	1	16.7
Bypass Patency		
Intraop	6	100.0
At discharge	6	100.0
At followup	4	66.7
Postoperative CN Deficits	0	0.0
Postoperative mRS		
0	2	33.3
1	2	33.3
2	1	16.7
3	0	0.0
4	0	0.0
5	0	0.0
6	1	16.7
Tracheostomy	1	16.7
Gastrostomy	0	0.0
Deaths	1	16.7

Conclusions

Intracranial bypass for PICA aneurysms remains an effective means of PICA preservation and aneurysm occlusion. Considering the risk of major stroke and neurological morbidity associated with sacrifice of the first three segments of PICA, a constructive alternative by bypass and aneurysm obliteration should remain a viable alternative for treatment of PICA aneurysms not amenable to direct surgical clipping or to vessel preserving endovascular treatment.