

Treatment of posterior circulation aneurysms: Clipping vs. coiling?

Surgical treatment of the posterior circulation aneurysms are, without doubt, the most complex of neurosurgical challenges. The onus on neurosurgeons is further enhanced in the light of development of modern techniques of interventional treatment of these aneurysms. The fact is that complex cerebrovascular aneurysms should be treated at the centers where multimodality expertise is available to manage them, will remove the physician's bias to treat these patients with a single approach, and will result in tailoring the best approach to the patient's aneurysms. The postulation that surgery for posterior circulation aneurysms will become obsolete as endovascular technologies evolve is being made quite frequently. However, endovascular techniques have been associated with their own insurmountable limitations and surgical techniques will be essential for managing a subset of patients with complex aneurysms that cannot be treated with endovascular obliteration or recur after coiling. Hence, there will be a continuing need to maintain neurosurgical expertise to treat these aneurysms. The three vascular territories of the posterior fossa are the basilar apex, basilar trunk, and vertebral trunk. Within each category, surgical technical differences can be reduced to variations in the "outer" cranial exposure and the "inner" skull base exposure.^[1,2] The outer cranial exposure brings the aneurysm within reach, but variations in vertebral and basilar artery anatomy often draw parts of the skull base (e.g. posterior clinoid process, dorsum sellae, clivus, petrous pyramid, occipital condyle) into the surgeon's view. Neurovascular structures such as the ICA, optic nerve and oculomotor nerve, trigeminal nerve, facial/cochlear nerve, and lower cranial nerves can block access to the neck of the aneurysm. Ultimately, the success or failure of an operation can be determined by the manner in which these small inner obstacles are conquered.^[1] Exposure is everything! This statement captures the essence of successful aneurysm surgery. Only with adequate

exposure can neurosurgeons directly visualize vascular anatomy, obtain proximal and distal control of afferent and efferent arteries, apply meticulous microsurgical technique, and maneuver a clip to occlude an aneurysm successfully with good outcome by maintaining flow in all branches and perforators and minimizing brain damage. Modern cranial base techniques are minimally invasive because the amount of bone removal facilitates minimal brain retraction, and their secondary benefit is achieved with a wide exposure of the aneurysm.^[3]

Conventional coil embolization techniques with stent assistance are associated with higher recurrence rates and complication rates, especially in the basilar apex aneurysms by nature of the hemodynamic problem.^[3]

Flow diverters have been increasingly used for treatment of complex aneurysms. Concerns like perforator blockage, early and late target aneurysm rupture, aneurysm recurrence, branch occlusion in bifurcation aneurysms, higher complication rates for fusiform posterior circulation aneurysms, difficulty in using after acute SAH as pretreatment with antiplatelet agents, stent thrombosis and thromboembolism, and intracranial hemorrhage remain. Hence, the safety and long-term reliability for flow diverting stents need to be established.^[4]

At this point, it suffices to maintain that neurosurgical clipping and interventional obliteration of posterior circulation aneurysms remain complementary to each other. Patient, aneurysm, economic and skill factors have to be taken into account while recommending treatment of posterior circulation aneurysms. It is imperative that neurosurgeons retain and hone their skills in treating these difficult aneurysms.

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