

Wide-Necked Intracranial Bifurcation Aneurysm

A wide-neck [bifurcation aneurysm](#) refers to a type of cerebral or intracranial aneurysm that occurs at the point where a blood vessel in the brain divides into two branches (bifurcation) and has a wide opening or neck. An aneurysm is a weakened or bulging area in the wall of a blood vessel, and if left untreated, it can rupture and cause a potentially life-threatening hemorrhage.

The term “wide-neck” refers to the fact that the base or neck of the aneurysm is broader than usual. The neck is the connection between the normal blood vessel and the ballooned out or dilated portion of the vessel, which is the aneurysm sac. The wide-neck characteristic can make the treatment of these aneurysms more challenging compared to aneurysms with a narrow neck.

Treating wide-neck bifurcation aneurysms often involves the use of endovascular techniques, such as coil embolization or stent-assisted coiling. In coil embolization, tiny platinum coils are placed within the aneurysm to induce blood clotting and prevent rupture. Stent-assisted coiling involves the placement of a stent to support the coils and enhance their stability within the aneurysm.

Neurosurgeons and interventional neuroradiologists carefully assess the characteristics of wide-neck bifurcation aneurysms and choose the most appropriate treatment strategy based on factors such as the aneurysm's size, location, shape, and the patient's overall health.

The management of wide-neck bifurcation aneurysms is a complex and evolving field, and the choice of treatment may depend on the specific circumstances of each case. Advances in medical imaging and endovascular techniques continue to improve the outcomes and options available for patients with such aneurysms.

[Endovascular treatment](#) is the first-line [intracranial aneurysm treatment](#), but [wide-neck aneurysms](#) are often difficult to treat due to the difficulty in stabilizing the [coils](#) inside the [aneurysm](#). It is singularly true for wide-neck [bifurcation aneurysms](#) (WNBA) as bifurcation branches often arise from the [aneurysm neck](#). To overcome these difficulties, several approaches are available to treat both ruptured and [unruptured aneurysms](#) ([balloon-assisted coiling](#) and intra-aneurysmal [flow disruption](#)), while some techniques are essentially restricted to [unruptured aneurysms](#) due to the need of concomitant use of [antiplatelet](#) medications (stent-assisted coiling and [flow diversion](#)). Several ways of performing balloon-assisted coiling have been proposed for WNBA. Two stent-assisted techniques are available for WNBA (Y-stenting and the waffle-cone technique), but these techniques have yet to be evaluated in large, prospective series. Off-label use of flow diverters in WNBA has been proposed but efficacy has still to be established, and the technique presents unique potential safety issues (the potential modifications of bifurcation branches covered by the flow diverter) that has to be assessed. Intracranial flow disruption devices are promising tools for the endovascular treatment of WNBA. The WEB device has been extensively evaluated with prospective, multicenter studies showing high safety and good efficacy ¹.

[Wide-necked bifurcation aneurysms](#) remain a challenge for endovascular surgeons. [Dual stent-assisted coil embolization](#) techniques have been defined to treat bifurcation aneurysms with a

complex neck morphology. However, there are still concerns about the safety of dual-stenting procedures. Stent plus **balloon-assisted coiling** is a recently described endovascular technique that enables the coiling of wide-necked complex bifurcation aneurysms by implanting only a single stent.

Objective: To investigate the feasibility, efficacy, safety, and durability of this technique for the treatment of wide-necked bifurcation aneurysms.

Methods: A retrospective review was performed of patients with wide-necked intracranial bifurcation aneurysms treated with stent plus balloon-assisted coiling. The initial and follow-up clinical and angiographic outcomes were assessed. Preprocedural and follow-up clinical statuses were assessed using the modified Rankin scale.

Results: A total of 61 patients (mean age: 54.6 ± 10.4 yr) were included in the study. The immediate postprocedural digital subtraction angiography revealed complete aneurysm occlusion in 86.9% of the cases. A periprocedural complication developed in 11.5% of the cases. We observed a delayed ischemic complication in 4.9%. There was no mortality in this study. The permanent morbidity rate was 3.3%. The follow-up angiography was performed in 55 of 61 patients (90.1%) (the mean follow-up period was 25.5 ± 27.3 mo). The rate of complete aneurysm occlusion at the final angiographic follow-up was 89.1%. The retreatment rate was 1.8%.

Conclusion: The results of this study showed that stent plus balloon-assisted coiling is a feasible, effective, and relatively safe endovascular technique for the treatment of wide-necked bifurcation aneurysms located in the posterior and anterior circulation ²⁾.

1)

Pierot L, Biondi A. Endovascular techniques for the management of wide-neck intracranial bifurcation aneurysms: A critical review of the literature. J Neuroradiol. 2016 Jun;43(3):167-75. doi: 10.1016/j.neurad.2016.02.001. Epub 2016 Mar 11. PMID: 26976346.

2)

Aydin K, Stracke P, Berdikhojayev M, Barburoglu M, Mosimann PJ, Suleimankulov N, Sarshayev M, Sencer S, Chapot R. Safety, Efficacy, and Durability of Stent Plus Balloon-Assisted Coiling for the Treatment of Wide-Necked Intracranial Bifurcation Aneurysms. Neurosurgery. 2021 Apr 15;88(5):1028-1037. doi: 10.1093/neuros/nyaa590. Erratum in: Neurosurgery. 2021 May 13;88(6):1147. PMID: 33575798.

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