Intracranial Arteriovenous Malformation Embolization

The first case of AVM embolization was described by Luessenhop and Spence in 1960 by injecting indiscriminately silicone microspheres directly into the carotid artery. Later on, with the advent of digital subtraction angiography, microcatheters, and microguidewires, different embolic agents were used such as balloons, silk suture fragments, and polyvinyl alcohol (PVA) particles producing permanent or temporary occlusion with subsequent recanalization.

see Preoperative Embolization for Brain Arteriovenous Malformation

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More permanent liquid polymers have been used such as n-butyl cyanoacrilate (n-BCA) (Codman and Shurtleff, Inc., Raynham, MA) and Onyx (ev3 Inc., Irvine, CA) [1].

The double arterial catheterization technique (DACT) in multifeeder AVMs may lead to a higher occlusion rate of the nidus for small AVMs and reduce the number of procedures, ensuring a higher standard of safety because of the possibility of managing the progression of Onyx into venous drainage [2].

Recurrent feeder vessel may preclude a successful arterial catheterization of arteriovenous malformations (AVMs).

Mendes et al. report their experience with the use of a compliant balloon to assist the microcatheter navigation in arteriovenous malformation (AVMs) supplied by feeders with recurrent configuration. Eight patients with AVMs supplied by recurrent feeders had unsuccessful microcatheter navigation after multiple attempts to catheterize the pedicle. A compliant balloon was inflated in the parent artery immediately after the origin of the feeder. The microcatheter was then advanced over the wire while the balloon provided support for the navigation. Distal access close to the nidus was achieved in all cases. Anatomical cure was documented in 75% cases. There were no arterial perforations or thromboembolic events. The described technique is a straightforward method for providing support to microcatheter navigation in certain cases of cerebral AVMs supplied by recurrent arterial feeders. This simple yet effective maneuver may enhance outcomes of AVM embolization by eliminating the need for excessive attempts of catheterization [3].

1)
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2)
Renieri L, Consoli A, Scarpini G, Grazzini G, Nappini S, Mangiafico S. Double arterial catheterization technique for embolization of brain arteriovenous malformations with onyx. Neurosurgery. 2013 Jan;72(1):92-8; discussion 98. doi: 10.1227/NEU.0b013e318276b2c0. PubMed PMID: 23096412.
3)
Mendes GA, Silveira EP, Saleme S, Iosif C, Ponomarjova S, Caire F, Mounayer C. Balloon-assisted microcatheter navigation for AVM embolization: technical note. J Neurosurg. 2015 Apr 17:1-5. [Epub ahead of print] PubMed PMID: 25884264.