Onyx for carotid cavernous fistula embolization

In case of a high flow fistula, prior to Onyx deposition, it may be advisable to initially deposit coils into the cavernous sinus (CS) to slow the blood flow. This will prevent the inadvertent embolization of Onyx into the draining veins and sinuses. A balloon can be inflated within the parent ICA in order to protect it as Onyx is being injected into the cavernous sinus.

Case series

Between April 2009 and July 2014, 16 patients with 17 traumatic CCFs were embolized with the so-called 'armored concrete' treatment modality using coils, Onyx-18, and a non-detachable balloon via the transarterial approach. The outcomes were assessed both clinically and radiologically. Digital subtraction angiography (DSA) follow-up was performed 3 or 6 months after endovascular treatment while clinical follow-up was continued until December 2014.

Obliteration of the CCFs was obtained with patency of the parent artery in all 16 cases. Follow-up DSA demonstrated stable occlusion of all the fistulas. Symptoms related to the CCFs were either resolved immediately or gradually over 2 months. No worsening of the cranial neuropathies was observed during the follow-up period which averaged 32.6 months.

The 'armored concrete' treatment modality using coils, Onyx, and a non-detachable balloon promises to be a safe, economical, and effective alternative in the management of traumatic CCFs [1)].

From the 36 type A CCFs treated between September 2005 and March 2011, a total of 23 posttraumatic direct CCFs were treated by using Onyx only via transarterial approach.

Immediate postprocedural angiograms demonstrated complete occlusion in all patients. All the patients underwent a single procedure except 1 with bilateral TCCFs. Up to 24-month clinical and 3-month angiographic follow-ups revealed an ongoing complete occlusion without any complications.

In this series, the use of Onyx for the transarterial embolization of TCCFs was feasible and effective. Associated adverse events were rare [2)].

Five patients were treated between July 2009 and July 2011 at the authors' institution. A balloon helped to identify the fistulous point, served as a buttress for coils, protected from inadvertent arterial embolizations, and prevented Onyx and coils from obscuring the ICA during the course of embolization. No balloon-related complications were noted in any of the 5 cases. All 5 fistulas were completely obliterated at the end of the procedure. Four patients had available clinical follow-ups, and all 4 showed reversal of nerve palsies.

Balloon-assisted Onyx embolization of CCFs offers a powerful combination that prevents inadvertent migration of the embolic material into the arterial system, facilitates visualization of the ICA, and

serves as a buttress for coils deployed in the cavernous sinus through the fistulous point. Despite adding another layer of technical complexity, an intraarterial balloon can provide valuable assistance in the treatment of CCFs [3].

Case reports

A case of an indirect CCF that could not be treated endovascularly due to inability to access the cavernous sinus via a transfemoral transvenous approach. Angiography revealed a small, deeply located superior ophthalmic vein that was thought to be suboptimal for a direct cutdown. The cavernous sinus was cannulated directly via a transorbital approach using fluoroscopic guidance with a 3D skull reconstruction overlay. The fistula was subsequently obliterated using ethylene vinyl alcohol copolymer (Onyx) [4].

References

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