Support Balloon as Assistance for Detachable Balloon Technique in Carotid Cavernous Fistula

A. CASASCO, N. SOUROUR, E. VIVAS, A. BIONDI, C. MARSAULT

Neuroradiologie Interventionnelle, Groupe Hospitalier Pitié - Salpêtrière; Paris

Key words: CCF, endovascular treatment, embolisation

The effectiveness of the treatment of the post-traumatic carotid cavernous fistula (CCF) by detachable balloons is well-established^{1,2,3,4}.

Recently, other techniques like GDC have been used to treat this pathology^{5,6}. However, these procedures may be ineffective, long and very expensive in cases of high flow fistulae with large ectasic pouches or large hole CCF. The ideal treatment remains the selective occlusion of the fistula by detachable balloons. However, this technique requires special accu-

racy to detach the balloon at the site of the fistula.

At present, most balloon detachments are done by traction of a microcatheter over a valved balloon. This traction over a balloon against the traumatic hole of the carotid artery (CA) may be responsible for an enlargement of this hole or a retrograde migration of the balloon within the CA lumen.

The coaxial systems of microcatheters can avoid these problems but unfortunately their

Figure 1 High flow post traumatic CCF with reflux into the ophthalmic vein, the superficial sylvian vein (arrowhead) and the perimesencephalic veins via the superior petrosal sinus (arrowhead).

Figure 2 A 9 gold valve detachable balloon (Nycomed) over a Prowler 10 microcatheter (Cordis) is inflated into the dilated cavernous sinus. The reduction of flow into the cavernous sinus allows a good visualisation of the communication between the ICA and the cavernous sinus (arrow). The balloon was then deflated and replaced in front of the fistula.

Figure 3 Final result after detachment of the balloon. Good filling of the ICA.

Figure 4 Detachment of the gold valve balloon supported by a non detachable balloon (Bal 2) (arrow) over a Magic 1.5 microcatheter (Balt).

precision is not constant and there is currently no reliable coaxial system.

Another solution to avoid these complications is to use a non detachable balloon (NDB) which after inflation remains at its site as long as there is no traction over it. This technique entails leaving the microcatheter inside the arterial lumen and is seldom used nowadays.

To avoid all these disadvantages, during the detachment of the intracavernous balloon we use a second non detachable balloon which is

inflated within the CA lumen in front of the detachable balloon (DB). The NDB avoids retrograde migration of the DB and enlargement of the traumatic hole during traction.

Once the DB is detached the NDB is deflated and retrieved.

This "assisted support" to traction detachment allows us to use small armed microcatheters associated with valved detachable balloons. We consider this combination more reliable than other systems in this type of pathology.

References

- 1 Serbinenko FA: Balloon catheterisation and occlusion of major cerebral vassels. *J Neurosurgery* 41: 125-145, 1974.
- 2 Debrun G, Lacour P, Caron JP: New achievements in the treatment of carotid cavernous fistulae with a detachable balloon. *Neuroradiology* 15: 52-53, 1978.
- 3 Berenstein A, Scott J et Al: Percutaneous embolisation of the arteriovenous fistulas of the external carotid artery. *Am J Neuroradiology* 7: 937-942, 1986.
- 4 Halbach VV, Higashida RT et Al: Transvenous embolisation of direct carotid cavernous fistula. *Am J Neuroradiology* 9: 741-747, 1988.
- 5 Guglielmi G, Viñuela F et Al: High flow, small hole arteriovenous fistulas: treatment with electrodetachable coils.
- 6 Siniluoto T, Seppanen S et Al: Transarterial embolisation of a direct carotid cavernous fistula with Guglielmi detachable coils. *Am J Neuroradiology* 18: 519-523, 1997.

Prof. Alfredo Casasco
Groupe Hospitalier Pitié-Salpêtrière
Neuroradiologie Interventionnelle
47-83, Boulevard de l'Hôpital
F-75651 Paris, Cédex 13
France