



Detachable coils to treat intracranial aneurysms

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Technology: Guglielmi detachable coil for intracranial aneurysms

Use: With an annual incidence of 10–12 cases per 100 000, aneurysmal subarachnoid hemorrhage is a major cause of death or disability.¹ Over 30% of patients die within 24 hours of a hemorrhage, and if not treated a further 25–30% will succumb within 4 weeks from rebleeding, vasospasm or hydrocephalus.² In an international study on the timing of aneurysm surgery 58% of patients presenting with aneurysms exhibited a complete recovery, 16% were disabled and 26% died.³

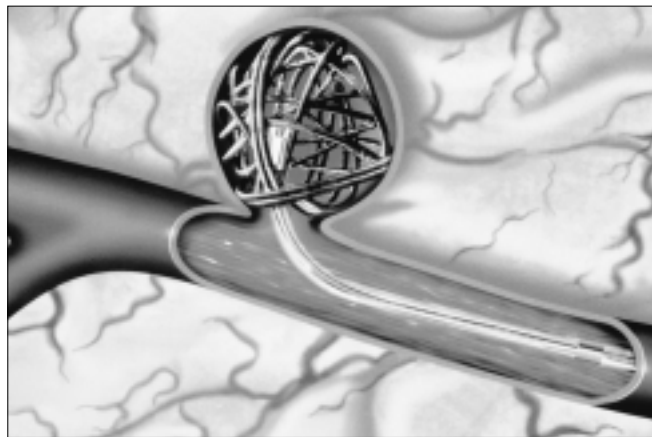
The Guglielmi detachable coil (GDC; Target Therapeutics [Boston Scientific], Fremont Calif.) is a soft platinum helical coil that is soldered to a stainless steel delivery guidewire. It can be deposited through a microcatheter into an intracranial aneurysm where it promotes thrombosis and thus prevents rebleeding. Unlike previous coils, the GDC can be repositioned if necessary or detached with the passage of an electric current. The GDC has typically been used in patients where aneurysms are difficult to approach surgically or in older patients who are either of poor grade or have concurrent medical problems.

History: Dr. Guido Guglielmi developed the GDC in 1989 as an alternative to surgery. Its efficacy was demonstrated first in the animal laboratory and then in clinical trials.⁴ The favourable outcomes in a multicentre trial following its use in 403 patients with intracranial aneurysms who were considered high risk for surgery⁵ led to Food and Drug Association approval in the United States in 1995 and Health Protection Branch approval in Canada in 1996. Worldwide, approximately 12 000 patients were treated with GDC in 1998 (unpublished data, Target Therapeutics).

Promise: Endovascular treatment with GDC is less invasive than surgery because brain retraction and cranial nerve manipulation are avoided. Rebleeding is rare (< 1% per year),

and procedural complication rates range from 2% to 6%.^{5,6} Complete occlusion of the aneurysm can be achieved in 70%–80% of small- and medium-sized aneurysms with a relatively small neck.^{5,7}

Problems: Not all aneurysms are suitable for GDC, however.



Schematic diagram of a microcatheter and GDC within an aneurysm.

Significant coil compaction has been noted in giant aneurysms or large aneurysms containing clot, and many wide-neck aneurysms cannot be treated because the coil will not be retained. The long-term efficacy of incompletely occluded aneurysms is unknown.

Prospects: Technical advances will continue to improve the safety and efficacy of GDCs to treat cerebral aneurysms. Devices to ensure optimal placement of the coils are under development, new softer coils expedite tighter packing of the

aneurysm, and biplane angiography with 3-dimensional reconstruction will allow for optimal treatment planning.

Competing interests: None declared.

References

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