# Extrusion of a coil from the internal carotid artery through the middle ear

In August 2002, we were consulted about a case in which a 70-year-old man found a long wire coming out of his left ear (Fig 1). He had a history of nasopharyngeal carcinoma, which had been treated with radiotherapy 7 years previously. Although radiotherapy had eliminated the carcinoma, it caused left temporal bone radionecrosis and temporal lobe necrosis. The patient had presented to ear, nose, and throat surgeons with profuse left ear bleeding 7 months before the wire extrusion. Digital subtraction carotid angiography revealed that a large pseudo-aneurysm had arisen from the proximal petrous part of the left internal carotid artery (ICA) [Fig 2]; contrast agent was also actively extravasated. The haemorrhage was controlled by embolising the pseudo-aneurysm with 16 Guglielmi detachable coils (GDC). The patency of the left ICA was preserved with the use of stent-assisted coiling and two metallic stents. Post-embolisation angiography confirmed complete occlusion of the pseudo-aneurysm and preservation of left ICA flow. There was no further bleeding from the left ear and the patient was discharged home 1 week later.

At the consultation visit, the patient complained of a foreign body sensation in his left ear that had lasted for 1 day. His wife had noticed a slender wire coming out of the ear and had attempted to pull it out (Fig 1). Examination with an otoscope (Fig 3) revealed that the wire had come

**Fig 1. Slender wire coming out of the left ear**

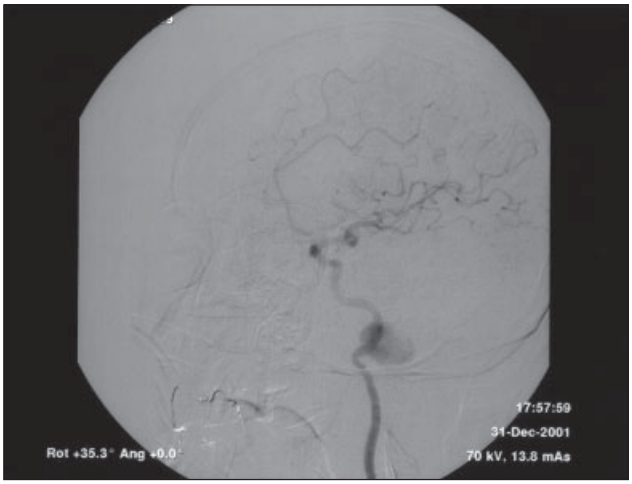


**Fig 2. Carotid angiogram showing a 19 mm x 11 mm x 18 mm pseudo-aneurysm arising from the proximal petrous part of the left internal carotid artery**

**Fig 3. Otoscope view of the tympanic membrane, which is oedematous and has a metallic wire protruding through the superior aspect; a piece of cerumen covering the attic region and the external auditory canal is normal**

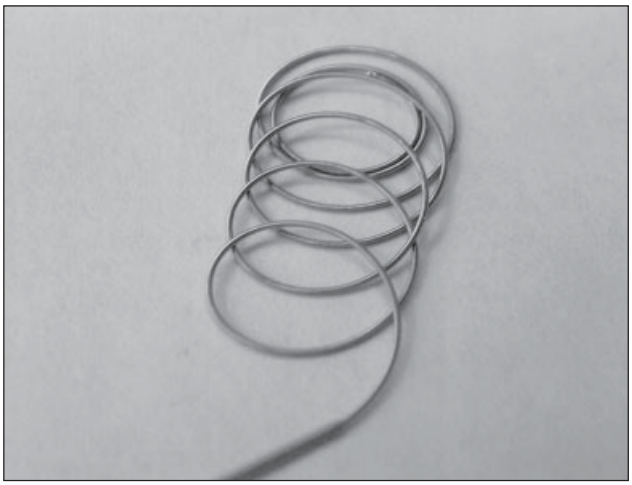

**Fig 4. A Guglielmi detachable coil at deployment**

through the perforated tympanic membrane and was the original embolisation coil (Fig 4). Computed tomography of the ear showed the close anatomical relation between the coils and the middle ear. The coils from the embolised pseudo-aneurysm sac had eroded and extruded into the middle ear and auditory canal.[1] The patient did not show any signs of systemic or local inflammation because of epithelialisation of the pseudo-aneurysm sac in the middle and outer ear. The wire (approximately 25 cm) was cut flush to the tympanic membrane and the patient was discharged home. He remained well without further bleeding during the latest follow-up visit at 18 months.

Nasopharyngeal carcinoma is a common disease in Hong Kong, and radiotherapy is the mainstay of treatment. Radiation-induced aneurysm in carotid branches is one of the known treatment complications.[2] Profuse nasal haemorrhage from a ruptured aneurysm of the maxillary branches of the external carotid artery is managed with endovascular embolisation or surgical ligation of the parent trunk. However, aneurysm arising from the ICA poses a major problem. The treatment goal is to stop the bleeding and prevent rebleeding by occlusion of the aneurysm, while preserving distal ICA flow for brain perfusion. Main trunk occlusion of the ICA using the 'balloon test' is still not completely reliable: having passed the test, the patient will still bear a 10% to 15% risk of major stroke.[3,4] Stent-assisted coiling for this type of aneurysm is the current treatment policy.[5,6] Stent-assisted embolisation is superior to embolisation alone: the stent will guard the neck of the aneurysm to prevent coil extrusion into the parent artery, and it also protects the patient from rebleeding in the case of extrusion into the middle or outer ear. Fibred steel coils, used before the GDC era, carry a very low uncoiling rate because steel has a strong coiling 'memory'. In addition, the fibres promote thrombus formation. In contrast, a GDC has a much finer calibre and is softer; it is made of platinum and has a relatively poor coiling memory. It also lacks fibres and is less thrombogenic. These properties of GDCs probably can account for the uncoiling in this patient. Moreover, the extruded coil was probably the first deployed coil during the embolisation procedure and was hence lying at the outermost shell of coils, which allowed it to be uncoiled easily without disturbing the rest of the coil mass.

This technique of stent-assisted coiling is feasible for treating aneurysm from the petrous part of the ICA. However, negotiation and deployment of the stent can be a major technical obstacle in managing aneurysm across the cavernous segment of the ICA. Future development resulting in a more flexible, covered stent is expected.

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