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## Subjective pulsatile tinnitus cured by carotid endarterectomy

### A case report

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**A 70-year-old woman with unilateral pulsatile tinnitus was relieved of the complaint after carotid endarterectomy. Internal carotid artery stenosis presenting with pulsatile tinnitus is rare. Endarterectomy can relieve symptoms if the correct diagnosis is made.**

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### Case report

An otherwise healthy 70-year-old woman with unilateral tinnitus was referred to Tygerberg Hospital by her general practitioner. The tinnitus, confined to the left ear, was accentuated by bending forward and by reclining at night. In the absence of environmental noise, the 'bicycle pumping' in the left ear was more troublesome. The patient volunteered that the noise was synchronous with her heartbeat.

On examination a loud systolic murmur, localised to the left carotid bifurcation, was detectable. Duplex Doppler examination confirmed the presence of a type D2 stenosis of the left

internal carotid artery (80 - 99%) and a D1 stenosis of the right internal carotid artery (50 - 79%). However, no murmur was detectable over the right carotid bifurcation. The ultrasonographic findings on the Doppler scan were confirmed by carotid angiography (Fig. 1).

The diagnosis of pulsatile tinnitus was one of exclusion of other causes made by the Department of Otorhinolaryngology.

Endarterectomy of the left internal carotid artery completely relieved the patient's symptoms, which have not recurred.

### Discussion

Pulsatile tinnitus, a rare symptom of carotid artery stenosis, is the perception of sounds synchronous with the heartbeat. Accurate diagnosis of pulsatile tinnitus is important since it is usually amenable to therapy and progression of the underlying disease can be detrimental to health.<sup>1</sup> Except for intraluminal arterial irregularities, other arterial causes of tinnitus include arteriovenous shunts and arterio-arterial shunts of various sorts. Non-arterial causes are: cervical venous hum; elevated cardiac output; heart murmurs; abnormalities of the jugular bulb; elevated intracranial pressure; vascular neoplasms of the internal ear; and primary intratemporal bone meningiomas.

Careful assessment of the patient is mandatory before carotid endarterectomy can be considered. One approach<sup>1</sup> to a definite diagnosis by way of exclusion of other possible causes might consist of otoscopic examination and audiological assessment followed by computed tomography of the head. Should these tests prove negative and papilloedema is present, a lumbar puncture should be performed carefully to exclude raised intracranial pressure. Finally, an arteriogram will confirm the

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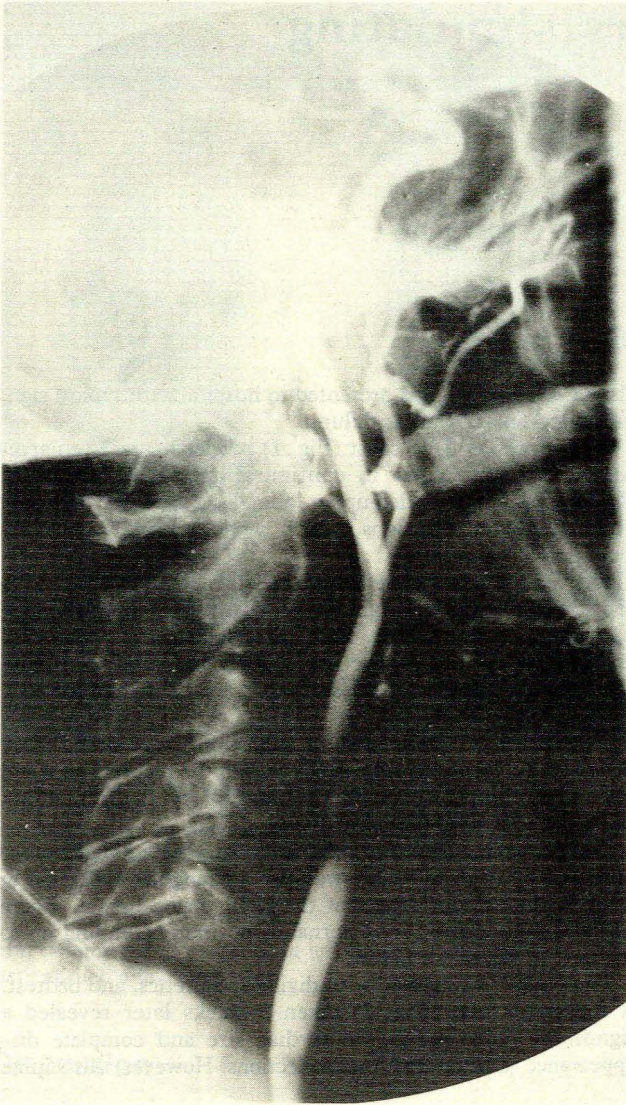


Fig. 1. Right carotid system.

presumed diagnosis and exclude other arterial and non-arterial causes.

The actual reduction in surface diameter necessary to produce a bruit varies greatly and depends on the character of the plaque, which in turn determines the amount of turbulent flow present. In our patient significant stenoses were present in both internal carotid arteries but there was bruit and tinnitus only on the left.

The probable mechanism which caused pulsatile tinnitus in this patient was the conduction of sound energy by the skull.<sup>2</sup> Since the source of energy generation was in close proximity to the skull, the physiological mechanisms responsible for the attenuation of normal body sounds were inadequate to cope with this abnormal body sound. Consequently, the murmur was perceived as pulsatile tinnitus especially in the absence of ambient noise.

After endarterectomy, both bruit and symptoms disappeared simultaneously.

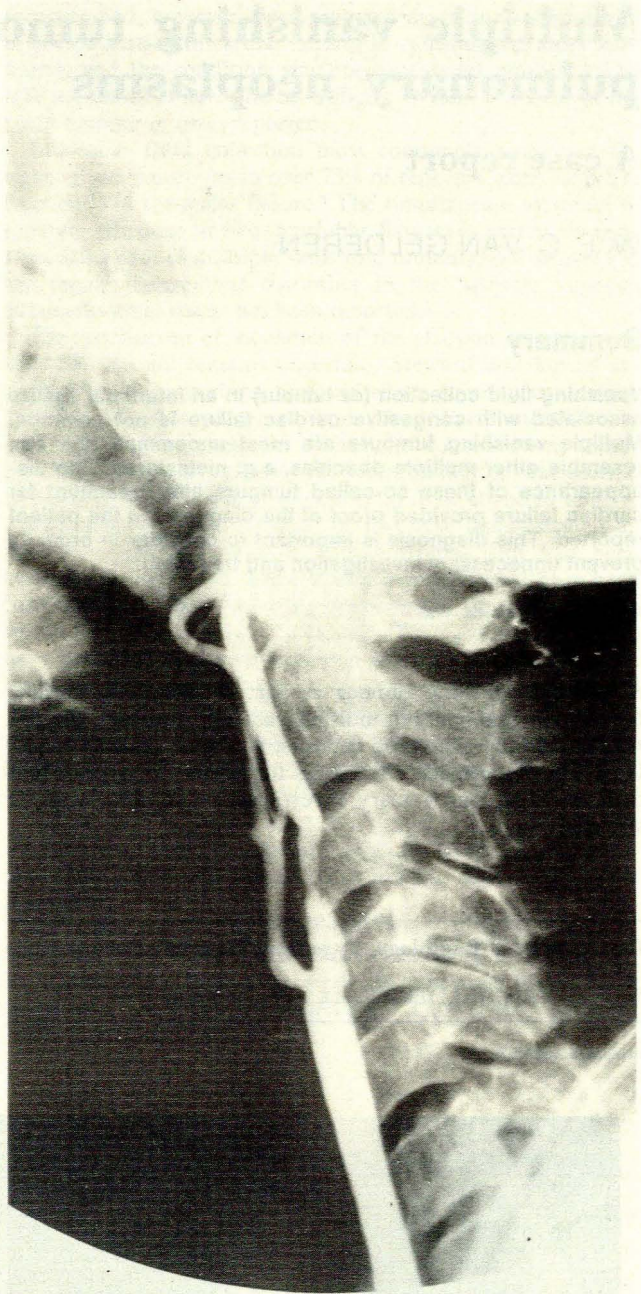


Fig. 2. Left carotid system.

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