Spontaneous Disappearance of Arteriovenous Fistula Between the Vertebral Artery and Deep Cervical Vein
—Case Report—

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Abstract

A 58-year-old female was readmitted with pulsatile tinnitus in the right ear 8 months after subtemporo-occipital transtentorial clipping of a peripheral superior cerebellar artery aneurysm. On examination, she was normal except for pulsatile bruit over the right mastoid region. Angiography showed a fistulous communication between the muscular branches of the right vertebral artery and the deep cervical vein. The incision of the aneurysm surgery was supratentorial, so the only possible cause of the upper cervical arteriovenous (AV) fistula was fine gold acupuncture needles implanted for bronchial asthma 18 years before. The AV fistula disappeared spontaneously after 1 month, possibly because of thrombosis of the affected veins.

Key words: tinnitus, arteriovenous fistula, vertebral artery, acupuncture, spontaneous regression

Introduction

Cervical vertebral arteriovenous (AV) fistulas are mainly caused by trauma. We report a case of deep upper cervical AV fistula, probably caused by fine gold acupuncture needles, which disappeared spontaneously after 1 month. The causes of this fistula and its spontaneous disappearance are discussed.

Case Report

A 58-year-old female was readmitted with pulsatile tinnitus in the right ear which developed 8 months after aneurysm surgery. The aneurysm was located in the distal branch of the left superior cerebellar artery (Fig. 1). It was clipped through a left temporo-occipital craniotomy and subtemporo-occipital transtentorial approach. Postoperative angiograms demonstrated good clipping. She made a complete recovery.

On readmission, a high-pitched murmur was audible over the right mastoid region (Fig. 2). Otherwise, she was completely normal. Right brachial retrograde vertebral angiograms revealed an AV fistula between the muscular branches of the right

Fig. 1 Left vertebral angiograms, Town's (left) and lateral views (right), taken on August 7, 1985, showing a saccular aneurysm (arrow) on the cortical branch of the left superior cerebellar artery.
vertebral artery and the deep cervical vein (Fig. 3). This fistula was not visualized by left vertebral angiography. Review of the previous postoperative vertebral angiography did not show this fistula. Plain skull and chest x-rays showed fine metallic foreign bodies in the upper thoracic, bilateral temple, and high cervical regions (Fig. 4). Her past history revealed fine gold needle implantation in these regions by an acupuncture technique at the age of 40 years as a treatment for bronchial asthma. No other trauma to the cervical region had occurred.

She was discharged, but 1 month later the pulsatile tinnitus became intolerable. She was again admitted for definitive treatment. However, the tinnitus faded spontaneously over 1 week. Follow-up angiograms revealed that the fistula had disappeared (Fig. 5). She has been asymptomatic for the last 4 years.

Fig. 2 Retromastoid phonogram on readmission (April 14, 1986), showing the high-pitched projectile murmur. EKG: electrocardiogram.

Fig. 3 Right brachial retrograde vertebral angiogram on readmission, showing fistulous communication (arrowheads) between the muscular branch of the artery and deep cervical vein.

Fig. 4 Plain chest (left) and skull x-ray films (right) on readmission, showing numerous fine needles (arrowheads) in the presternal, cervical, and temporal regions. Serial x-ray films revealed migration of the needles in the cervical region.

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Table 1 classifies AV fistulas of the cervical vertebral artery. The total exceeds one hundred, and the majority were caused by penetrating injuries such as stabbing and high velocity missile wounds. There were also iatrogenic cases due to direct puncture vertebral angiography and cervical surgery. These AV fistulas resulted from the anatomy of the vertebral artery confined to a bony canal, which prevented complete hemostasis after removal of the puncture needle, and the abundant surrounding venous plexuses. A small number of blunt injuries such as cervical contusions were also causative due to fractured bones damaging the artery. Berguer et al. reported a 5-year-old girl who was accidentally suspended by the neck and developed vertebrobasilar insufficiency 2 months later, caused by an AV fistula.

The non-traumatic origins of AV fistulas are not yet clearly understood, but are generally classified into congenital and idiopathic types in adults. Congenital cases are rather rare, with only about 10 reported. Symptoms such as cervical bruit, thrill, and pulsatile masses in the neck appeared early in childhood, developing into symptoms due to vertebrobasilar insufficiency, even resulting in heart failure. Hirata et al. reported 17 idiopathic cases frequently occurring in the fifth to sixth decades of life. Four cases were associated with fibromuscular dysplasia (FMD), which is well known to be complicated with aneurysms and/or intramural dissection, which may rupture into the surrounding venous plexus to develop AV fistulas.

In the present case, the previously treated ruptured aneurysm was saccular in type and not associated with FMD or other known congenital disease affecting the vascular wall. The location of the aneurysm was rather unusual, in the peripheral part of the superior cerebellar artery, which suggests the possible congenital nature of the lesion. However, a traumatic origin is more likely. She received a craniotomy as described above, but the incision was supratentorial and did not extend to the nuchal region. The most likely cause is the acupuncture therapy for bronchial asthma which implanted fine gold needles in the upper thoracic and upper cervical regions, which appeared on plain x-ray films as numerous fine foreign bodies. Interestingly, review of serial films showed some cervical needles apparently changed position gradually, perhaps due to neck movement. This suggests a possible vascular injury caused by migrating fine needles.

Treatment of this lesion includes proximal ligation of the affected artery, or more recently the endovascular balloon occlusion technique. Fortunately, the AV fistula in the present case disappeared spontaneously after 1 month, possibly because of thrombosis of the affected veins as suggested by other authors. No recurrence has occurred for 4 years.

### References


![Fig. 5 Selective right vertebral angiogram taken on May 13, 1986, revealing no evidence of the fistulous communication.](image-url)


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