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Radiology in Focus

Spontaneous arteriovenous malformation of the external auditory meatus

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Abstract
Arteriovenous malformations (AVM) of the head and neck are rare. They usually occur intracranially and derive their vascular supply from the intracranial vessels. In the English literature there has not been any documented case of AVMs in and around the external auditory meatus (EAM). The authors present the first case, a spontaneous AVM deriving its vascular supply from the posterior auricular artery. The diagnostic difficulties and management strategies of spontaneous AVMs are discussed.

Key words: Ateriovenous Malformations; Ear Canal

Case report

A 28-year-old female presented to the Otolaryngology department at Addenbrookes Hospital, Cambridge with a two-month history of left-sided pulsatile tinnitus and deafness. At the time of her initial visit she was 24 weeks pregnant.

On examination there was a smooth swelling in the anterior wall of the left EAM, which was covered by skin. The swelling was non-tender, soft and pulsatile. The lesion occupied the cartilaginous part of the EAM, whilst the tympanic membrane and middle ear were normal. The pure tone audiogram demonstrated a mild conductive loss of 35 dB. A computerized tomography (CT) scan of the temporal bone demonstrated a soft tissue mass narrowing the EAM without any bony erosion. (Figure 1) An external carotid angiogram was performed which showed a vascular blush with arteriovenous shunting just inferior to the left EAM (Figure 2). The arterial supply was mainly from the posterior auricular artery and feeders also arose from the maxillary artery. A diagnosis of AVM was made. In view of her pregnancy and the benign nature of the condition the patient was managed conservatively.

She was reviewed after the birth of her child by which time the tinnitus had improved but the mild conductive hearing loss persisted. The patient elected for a conservative watch, wait and rescan policy and has clinically remained the same for the last two years. The swelling in her left EAM has not increased in size and she remains on regular follow up.

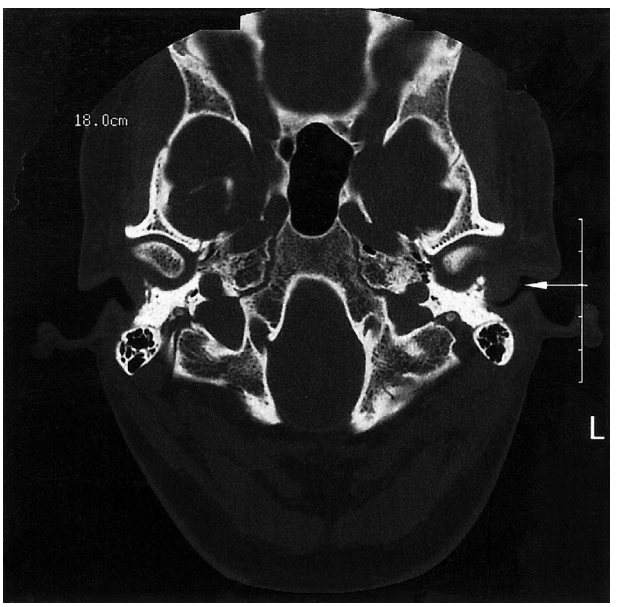

Fig. 1
Axial CT scan of the head with the arrow pointing at the soft tissue lesion in the anterior wall of the external auditory meatus.

Discussion

According to the classification of Mulliken and Glowacki, vascular anomalies are divided into two main categories: haemangiomata and vascular malformation. Histologically, AVMs may have arteriovenous shunts with reactive, hypertrophic, thick-walled arteries and veins because of the increased blood flow.[1]

A vascular malformation that exhibits slow flow is either a capillary, venous, lymphatic, or combined

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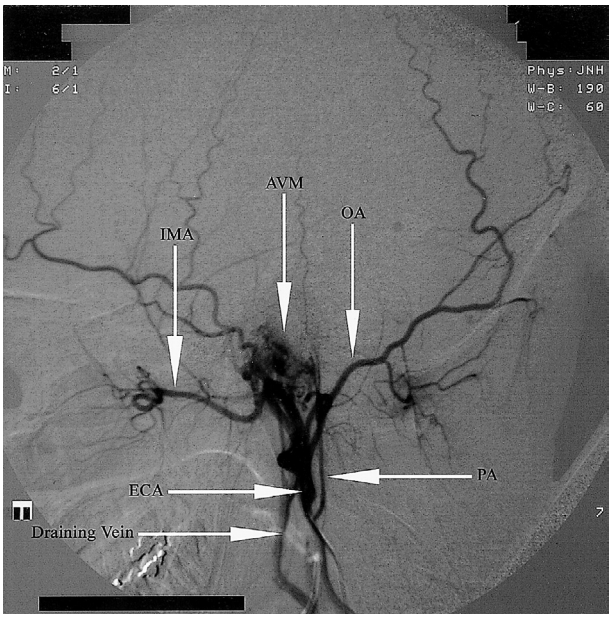

FIG. 2

External carotid angiogram showing the catheter in the external carotid artery. AVM = Arteriovenous malformation; ECA = External carotid artery; PA = Posterior auricular artery; IMA = Internal maxillary artery; OA = Occipital artery.

malformation, whereas a fast-flow vascular malformation is predominately an AVM or a fistula.[1] It is thought that arteriovenous malformations are present at birth but may not be clinically evident and the increase in size is due to increased blood flow.[2] Most vascular malformations present clinically during childhood and grow commensurately with the child. However, some malformations, especially an AVM, may remain quiescent until adolescence and in rare cases into adulthood. Enlargement of the AVM may be triggered by trauma, infection, or hormonal influences such as pregnancy. In the head and neck region most are located intracranially, followed by perioral, parotid, and neck regions in order of frequency.[1,3]

The history and physical examination are often indicative of a clinical diagnosis of AVM, especially in cases that involve the superficial tissues of the head and neck region. However, the diagnosis can be made by magnetic resonance angiography and this provides information about the vascular supply of the AVM without injection of contrast media.[4] Diagnosis is also possible by angiography, which demonstrates the feeding vessel as well as providing information on anastamoses with other extra cranial or intracranial vessels.[1,5] Selective angiography is very useful for the investigation of AVMs, to identify the specific arterial supply, and can be performed in conjunction with superselective embolization of the AVM. If the AVM is small and asymptomatic, treatment is unnecessary.[1] This is more so for lesions in children and for those that are small and discreet.[2] For symptomatic AVM, treatment is often difficult. Optimal treatment is based on a combined approach of superselective embolization and a complete surgical excision. Partial excision is not curative and should be avoided.[1,5]

Conclusion

Congenital AVM typically present during childhood and rarely manifest during adulthood in the head and neck region.

- **This is a case report of a spontaneous arteriovenous malformation of the external auditory meatus**
- **The diagnostic difficulty and management strategy of spontaneous arteriovenous malformation are discussed**

The authors present a case of an AVM of the external auditory meatus and it is the first reported case in the English literature. Treatment is tailored to the individual needs of the patient. In their patient the hearing loss was mild and the tinnitus had significantly improved following the birth of her child. This is probably due to the decrease in the blood pressure, blood volume and the level of circulating hormones associated with pregnancy.

The confounding factor in the authors' patient is that she is young and there is the likelihood of future pregnancies, which can cause the AVM to enlarge and hence worsen the symptoms. When the risk for treatment is evaluated against chances of the AVM growing, adopting a conservative watch, wait and rescan policy is an appropriate option in this patient.

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