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SHORT REPORT

# Arterio-venous Fistulae of the Superficial Temporal Artery: a Case Report and Literature Review

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## Introduction

Arterio-venous fistulae (AVF) of the scalp are surprisingly rare given the superficial nature of the scalp vessels and the frequent presentation of both blunt and penetrating head trauma to hospital. This article presents a case of an AVF affecting the superficial temporal vessels in a young man following blunt head trauma and reviews the presentation and management of such scalp lesions.

## Case Report

A 18-year-old man presented to our unit via his General Practitioner and the ENT department, complaining of a swelling in the right temporal region and an ever present audible buzzing sound, mainly in the right ear. Further questioning revealed these symptoms to be present for the preceding 6 months, following a fight outside a public house during which he sustained a blow to the right temporal region. There was no history of a laceration and he was not admitted to hospital. The pulsatile tinnitus was exacerbated by physical exertion. He was a semi-professional rugby player who was otherwise fit and well. Physical examination revealed a small 2.5 cm diameter swelling in the right temporal region, which was pulsatile and had several prominent vessels radiating from it. Palpation of the vessels revealed a thrill, whilst compression of the right superficial temporal artery collapsed the mass. Auscultation over the mass revealed a loud bruit. A clinical diagnosis of a high flow AVF affecting the right superficial temporal vessels was made clinically and confirmed using intra-arterial digital subtraction angiography (IADSA) including selected views of the external carotid circulation (Fig. 1). The internal carotid circulation was normal on the IADSA and skull X-ray examination was unremarkable. After consultation with the Radiologists, we elected to treat the AVF by surgical excision. Under general anaesthetic, with the patient in supine position, the operative field was prepped and draped with the head tilted to the left side. The right superficial temporal artery and AVF were carefully dissected and isolated prior to ligation of the superficial temporal artery (STA) and the venous outflow tracts


**Fig. 1.** Selected right external carotid IADSA demonstrating the superficial temporal artery (dotted black arrow) supplying the AVF (white arrow), which drains by the prominent superficial temporal veins (solid black arrow).

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**Fig. 2.** The AVF (white arrow) is excised following dissection and ligation of the feeding superficial temporal artery (dotted black arrow) and of the draining superficial temporal veins (solid black arrow).

(Fig. 2). The fistula was then excised. The wound was closed with non-absorbable interrupted sutures. The patient made an uneventful post-operative recovery and was discharged home the next day. Six weeks post operatively the wound had healed well and there had been complete resolution of the pulsatile tinnitus.

## Discussion

Reports of scalp AVF are surprisingly scarce. An extensive literature review[1–20] uncovered only 34 examples, which were virtually exclusively presented as individual case reports or very small case series. These lesions are 5 times more common in men than women and can affect patients of any age, but most frequently affect patients aged 20–40 years. Trauma is virtually the only important aetiological factor, with penetrating trauma being approximately twice as frequently reported as blunt trauma. Hair transplantation deserves individual attention being the sole identifiable cause in six separate case reports. Other important causes of penetrating trauma include road traffic accidents, stab and gunshot wounds. Sporting injuries and assaults are common causes of blunt head injury. Frequently a latent period is described between the head trauma and the presentation of symptoms. This latent period commonly ranges from 6–24 months but can vary from 1 week to 15 years. Presenting symptoms commonly include a prominent, pulsating mass that is frequently enlarging. Other relative common symptoms include pulsatile tinnitus and headaches. Superficial temporal vessels are involved in approximately two thirds of cases, with the occipital vessels being the next most frequently affected scalp vessels. In the vast majority of reports these lesions have been managed by surgical excision under general anaesthetic. In two cases, surgical excision was preceded by endovascular embolisation to reduce vascularity, and in three cases embolisation was the sole treatment. We elected for simple surgical excision given the relatively large size of the lesion, its prominent subcutaneous position and the potential cosmetic appearance and tenderness following embolisation.

In summary then, scalp arteriovenous fistulae are surprisingly rare lesions that mainly, due to their traumatic aetiology, tend to affect young men. Following a variable latent period, patients generally present with a pulsatile mass most commonly affecting the superficial temporal artery, which can be safely managed by surgical ligation and excision under general anaesthetic.

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