**ABSTRACT**

A case report describing a combined endovascular and surgical approach for the treatment of a periorbital arteriovenous malformation.

**INTRODUCTION**

Arteriovenous malformations (AVMs) are uncommon vascular lesions formed by direct communications between arteries and veins that bypass normal capillary beds. Diagnosis is based on findings from imaging studies and angiography. Surgical treatment is often challenging and requires multidisciplinary team management. A detailed preoperative evaluation and endovascular embolization in some cases are required to achieve treatment success. Complete eradication of lesion may not be possible and recurrences are common.

**CASE REPORT**

A 21-year-old female presented with a forehead lump of one-year duration which grew slowly in size especially during pregnancy. Patient was otherwise asymptomatic. Patient consulted a plastic surgeon for treatment as she found it cosmetically unacceptable.

Clinically, the lesion measured 1 cm in diameter and was reddish and pulsatile. Computed Tomography-Angiogram showed an AVM located at the left supraorbital area. Angiography of internal and external carotid arteries demonstrated feeder vessels from the left ophthalmic artery and superficial branches of the superior temporal artery and drainage via the ophthalmic, facial and superficial temporal veins. Pre-operative embolization followed by surgical excision was planned. The risks and benefits of treatment were explained, and patient consented to treatment.

Direct puncture of the AVF using a 19G butterfly needle were performed under general anesthesia. The venous pouch was injected with a mixture of N-Butyl cyanoacrylate (NBCA) and lipiodol (1:1.5) with simultaneous compression of venous outflow to prevent retrograde flow into the ophthalmic veins under CT guidance. Post embolization angiogram confirmed >90% occlusion of the fistula. Patient however refused excision and absconded.

She returned 4 months later complaining of increasing pain and swelling of the lump and requested surgery. Clinical examination found a 3.5 cm x 3.2 cm pulsatile and tender mass below her left brow medially. The overlying skin was erythematous and blanched on compression. Diagnosis was a residual AVM with foreign body reaction to the injected glue. Patient was referred to our institution for further management. Repeat angiogram found feeder vessel from the left supra-trochlear artery and a cast filled lesion located anteriorly. Surgical excision via direct approach without repeat embolization was scheduled. Using a supra-brow incision, the lesion was exposed and supra-trochlear vessels identified, clipped and cauterized. Moderate oozing was encountered during surgery. A dilated venous pouch filled with cast was freed from deeper tissue and resected.

Histological examination of the resected specimen (3.3x1.8x0.7 cm) reported chronic inflammation and granulomatous foreign body giant cell reaction confirming pre-operative diagnosis.

Patient recovered well with 6/6 vision in both eyes after operation and an acceptable cosmetic outcome.

**DISCUSSION**

Surgical intervention is required for periorbital and facial AVMs when vision is threatened or patient experiences recurrent haemorrhage, increasing pain or cosmetic disfigurement. Pre-operative embolization minimizes intraoperative haemorrhage and is an important adjunct to surgery. Although there were reports of radiological embolization alone being effective in the treatment of these lesions, complete eradication of lesion may not be possible. Thorough evaluation of regional vascular anatomy and anastomoses with intracranial vasculatures is crucial as serious complications such as cerebral stroke, cranial palsies or blindness could result when embolization material inadvertently refluxes into adjacent vessels supplying normal tissues. Either transarterial or transvenous route can be employed depending on the anatomy of the lesion. As collaterals often develop when primary blood supply is reduced, surgical excision should be performed within 24-48 hours post embolization as excision can become difficult when vascular collaterals develop. The choice of embolization material depends on the regional vascular structure and goal of treatment. NBCA is frequently used as it is stable and effective. This material solidifies by polymerization when come in contact with blood and form a cast when mixed with lipiodol at various concentrations within one minute. However, NBCA had also been reported to induce inflammation of the surrounding tissue which is evident in our patient.

In the management of AVMs, a well-organized multidisciplinary team approach involving interventional radiologists and plastic surgeons is optimal, to ensure favourable outcome.

**REFERENCES**