Case Report

Compartmentalisation: A method of managing a large AVM of the scalp

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Introduction

Arterio-Venous Malformations (AVMs) are direct communications between the artery and veins bypassing the capillary beds. They are usually present at birth but manifest at a later age and do not resolve spontaneously. High-flow craniofacial AVMs, involving vital structures, make them difficult to excise completely. These AVMs grow over-time involving adjacent normal vessels and present with significant symptoms like pain, swelling, bleeding, and disfigurement. They can also be the cause of morbidity due to haemorrhage.

Case report

A 28-year-old female presented to our institution with a swelling present since birth, which had shown signs of increasing size for the past 2 years. Figures 1 and 2 show the left temporo-parieto-occipital region with palpable thrill and audible bruit. CT angiography showed high-flow AVM with multiple feeders from preauricular and superficial temporal branches from the left external carotid and occipital artery. It also had feeders from the right superficial temporal artery along with a single branch from the left middle meningeal artery; an extension from its intracranial supply. Interventional radiology ruled out the possibility of embolisation, due to the high risk of ischemic complications.

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Intraoperatively superficial temporal artery was ligated and compartmentalisation was done using No. 1 Ethilon followed by a sclerosant (Sodium Tetradecyl Sulphate) injection in each of the compartments separately [Figure 3]. The procedure of compartmentalisation involves passing a No. 1 Ethilon suture through all the layers of the scalp in the region of the AVM like a simple suture. After compartmentalisation there was a complete absence of palpable thrill and audible bruit. The patient underwent a second surgery one week later with complete excision of the AVM with the scalp tissue in subgaleal plane followed by split thickness skin graft [Figure 4]. Intraoperatively there was no significant bleeding noted.

One year post-operatively the patient had complete resolution of the lesion with no complication and no recurrences [Figures 5 and 6].

Figure 1. Frontal view.

Figure 2. Lateral view.
Craniofacial high-flow AVMs have to receive their blood supply from external carotid artery, the ophthalmic artery and from the branches of internal carotid artery in rare situations. Huge AVMs are resistant to conservative management\(^2\) and require a multi-team approach to choose the best modality of treatment.\(^3\)

High-flow AVMs pose a major challenge for complete excision. These are best managed by temporary embolisation and complete excision 24 to 48 h later.\(^4,5\) Microshunts not demonstrated on CT angiography can open-up after incomplete embolisation making it difficult to excise due to uncontrolled bleeding. Hence embolisation and resection can be difficult in certain cases where there are microshunts and feeders from internal carotid artery. Compartmentalisation allows sclerosant to be deposited in each compartment without the threat of being embolised systemically or being washed

**Discussion**

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out as all the channels are blocked due to compartmentalisation. It also provides a greater amount of contact between the sclerosing agent and the vessel endothelium leading to severe inflammatory response with a greater amount of fibrosis and a collapse of vascular channels allowing complete surgical excision of high-flow AVMs.\textsuperscript{6–8}
Conclusion

Embolisation followed by complete excision is the standard therapy for high-flow AVMs but in cases with branches from the internal carotid artery and microshunts, compartmentalisation can provide an effective modality of therapy.

Conflict of interest

The authors declare that there are no conflicts of interest.

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