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Case Report

Surgical feed ligation performed in 22 year old female with scalp arteriovenous malformation

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ABSTRACT

Scalp arteriovenous malformation (AVM) are rare conditions that usually need surgical treatment. Its management is difficult because of its high shunt flow, complex vascular anatomy, and possible cosmetic complication. The etiology of scalp AVM may be spontaneous or traumatic. This vascular lesion present as scalp lump or a mass, grotesque, pulsatile mass with a propensity to massive haemorrhage. Various treatment option that have been adopted to treat these lesions include surgical excision, ligation of feeding vessel, trans arterial and transvenous embolization, injection of sclerosant into the nidus and electro thrombosis. A 22-years-old-female referred to cardiothoracic division with a 10 years history of a large fronto-parietal pulsatile reddish soft mass, progressively increasing in size, measuring about 15x6x2 cm, ulcerated area; without any symptoms and history of trauma. Three-dimensional CT angiography demonstrated a mass that was completely within the scalp and prominent vascular that was completely within the scalp and was not associated with bone or periosteum. The feeding arteries were originated from angular artery, supratrochlear artery, left and right superficial temporal artery. Surgical excision and ligation of feeding vessel was performed without complication. With pre-operative appropriate surgical planning, scalp AVM can be excised safely without any major complication. Though some cases may be treated with percutaneous or endovascular embolization, surgery remains the treatment of choice. In the event of scalp ulceration and haemorrhage, total excision is the only option.

Keywords: Scalp arteriovenous malformation, Scalp reconstruction, Vascular ligation

INTRODUCTION

Extracranial arteriovenous malformation (AVM) in the scalp is relative rare, accounting for only 8.1% cases of AVMs; when compared with other subcutaneous or cervicofacial vascular anomalies such as haemangioma or venous malformation. It is an abnormal fistulous connection between the feeding arteries and draining veins, without an intervening capillary bed within the subcutaneous layer. With later progression, the AVM destroys normal tissue and leads to complications such as severe disfigurement, uncontrollable bleeding, ulceration, pain and cardiac volume overload.[1-3]

The etiology of this scalp AVM is still controversial, however it is generally accepted that is may be either of congenital or traumatic origin. in 1940, Watson and McCarthy found arteriovenous fistulas more common in the scalp than in any other part of the body. From 158 cases, 50% occurred in the head region, 80% of those occurred in the scalp. Scalp lesions occurred commonly in the frontal, temporal, and occipital regions, but they

were less common in the post auricular and parietal areas. Scalp AVM are normally noticed in late childhood, adolescent or early adulthood, when substantial esthetic and social disturbance entailed, or due to various stimuli such as trauma, pregnancy or puberty.[2,4]

Management of scalp AVM is difficult for several reasons because of its high shunt flow with complex complicated vascular anatomic connection and also involves cosmetic problems. Clinical signs are dependent on the size of the lesion, but haemorrhage is generally uncommon. The diagnosis is usually made by direct physical observation, because these lesions are quite noticeable in the most cases. Several imaging modalities can be used to map the vascular malformation and to help plan management, and angiography is especially useful for diagnosis.[5,6]

There has been no consensus on the treatment of craniofacial AVM but there are various techniques and methods of treatment for scalp AVM. In this report, we hereby present an adult patient with 10 years history of scalp arteriovenous malformation (AVM), specifically at her forehead, seeking medical treatment into our hospital. Surgical excision and ligation of feeding vessels were done as primary treatment.

CASE REPORT

A 22-years-old-female referred form East Timor to cardiothoracic division with scalp tumor on forehead. Patient complain lump on her head for 10 years ago and progressively enlarge, there had been no history of trauma, throbbing headache or tinnitus. There had been no previous surgical or treatment for the lesions. The lesion bled once following trauma about a year prior to admission. The haemorrhage was secure at that time without any definitive treatment. Insidiously the forehead lesion grew in size and causing aesthetic problem to her.

On examination we found a large fronto-parietal pulsatile reddish soft mass, progressively increasing in size, measuring about 15x6x2 cm, ulcerated area (Figure 1).

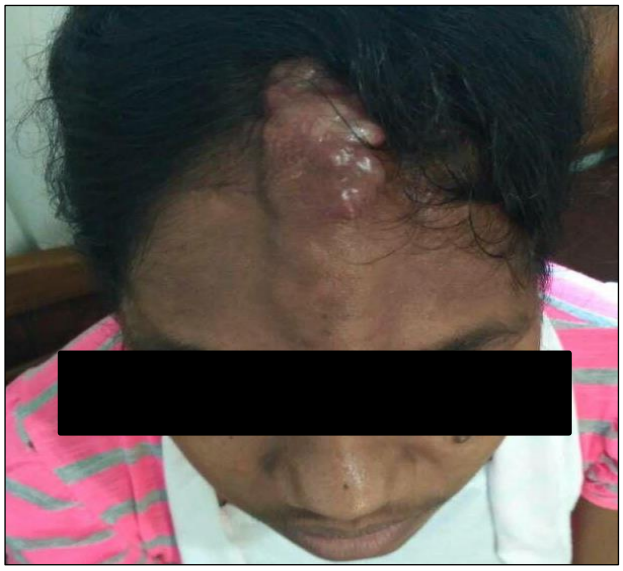

Figure 1: A pre-operative picture of large fronto-parietal reddish soft mass, pulsatile without symptoms and history of trauma.

The overlying skin is coarse and dry; however, there was no active haemorrhage present. Bruit was heard on auscultation and the vital sign are stable an all other system was normal. Three-dimensional CT angiography (3D-CTA) suggested a soft tissue swelling and prominent vascular that was completely within the scalp and was not associated with intracranial circulation, bone or periosteum (Figure 2). The feeding arteries were originated from angular artery, supratrochlear artery, left and right superficial temporal artery.

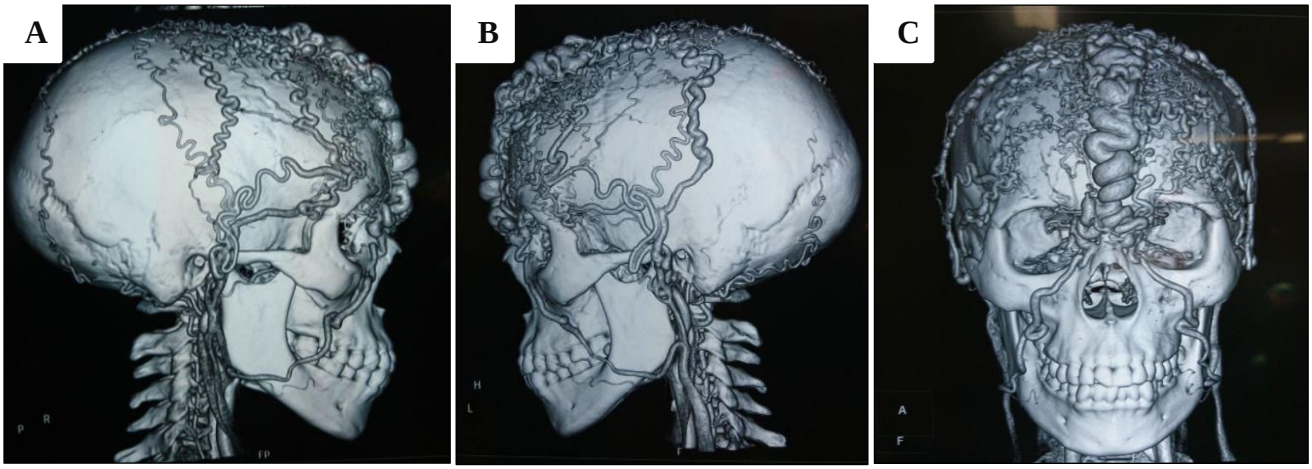

Figure 2: Three-dimensional CT angiography (3D-CTA) showed prominent vessel. (A): angular artery, (B): Supratrochlear artery, (C): Left and right superficial temporal artery.

Surgical excision and ligation of feeding vessel was performed in central operating theatre. The initial incision was planned to expose the major vascular supply to the malformation-the angular artery, supratrochlear artery, left and right superficial temporal artery. The loss of large amount of blood during excision is an inevitable event. Postoperatively, there were slight edema both of upper eyelid and slight decreased of hemoglobin. She was discharge from hospital after 3 days of treatment without complication (Figure 3).

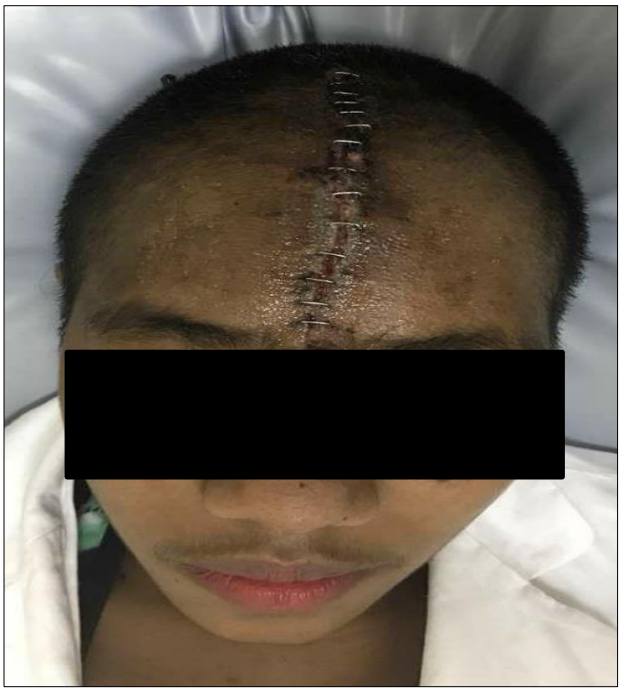

Figure 3: Post-operative excision and ligation of feeding vessel without complication.

DISCUSSION

AVM of the scalp is a rare lesion; whose managements are difficult because of its highly complex vascular anatomy and the possible cosmetic complication of surgery. Clinical signs are dependent on the size of the lesion, history of trauma and the origin of the lesion. The diagnosis is made by direct physical observation, because these lesions are quite noticeable in most cases. Several imaging modalities can be used to map the vascular malformation and help to plan management.

As mentioned above, there were still limited approaches treatment of craniofacial AVM but there are various techniques and methods of treatment done before in treating scalp AVM. Among the treatment options include surgical excision, ligation of feeding vessels, trans arterial and transvenous embolization, injection of sclerosant into the nidus and electro thrombosis. In the past, the treatment of choice for scalp AVM was surgical excision or ligation of the feeding arteries. However, with progress in endovascular surgical technique, embolization has become an integral part of the treatment of these malformations. Cure of the lesions may be attained by embolization alone in some patients, or by embolization followed by surgical removal.[6-7]

A lot of treatment options were done by other clinicians. One of the practices most done by other surgeons is endovascular treatment and continued by vessel surgical repair. Sousa and associates delivered platinum coils via direct puncture, followed by cyanoacrylate injection by microcatheterization in both external carotid arteries. The results are satisfactory with reduced mass size, disappearance of pulsation, thrillers or bruits in the mass. Afterwards, the patient was submitted to a total resection and reconstruction in operating theatre.[8] Similar approaches were also done by Dance and associates in 2012, Hussain in 2017 and Karsy in 2016.[9-11] Other treatments which can be done in scalp AVM include conservative treatment or excision with Thunderbeat, which was done by Kumar and associates in 2012.[12]

One case series regarding scalp AVM was published by Chowdhury and associates in 2013, whose treatment approaches are similar with ours. There are 11 patients with scalp AVM, three of them located in forehead. The patient's ages were 19, 8 and 39 years old. All patient's vessels were ligated prior to excision and wounds were closed with rotational skin flaps. Infections were the main outcome, counting for 3 cases in 11 scalp AVM cases total. None of these infections came from patients with forehead AVM.[13]

CONCLUSION

With pre-operative appropriate surgical planning, scalp AVM can be excised safely without any major complication. Though some cases may be treated with percutaneous or endovascular embolization, surgery remains the treatment of choice. In the event of scalp ulceration and haemorrhage, total excision is the only option.

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