

Scalp Arteriovenous Malformation: Unique Reconstruction

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1. Abstract

We present a case report of 21-year-old male patient with Arteriovenous malformation (AVM) of the scalp, presented as post-traumatic painless right forehead swelling. Brain MRI suggestive of Arteriovenous malformation in the right frontal region without any intracranial extension. In our case report, we surgically excised the lesion. The skin overlying the diseased part was used for coverage of the defect as full thickness skin graft, after making it disease free. The Specimen was removed with the overlying skin and it was noticed intra-operatively that the Arteriovenous malformation was involving the subdermal part of the skin. Skin was freed from the disease and defatting was done, used as a full thickness skin graft for the coverage of defect created.

2. Introduction

Arteriovenous malformation (AVM) is a vascular anomaly in which there is abnormal communication between the arterial vasculature and venous vasculature without capillary connections. It can be present in childhood, adolescence and early adulthood. Scalp AVM is relatively rare. Brain AVM is twenty times more common as compared to Extracranial AVM [1]. Most commonly involved Extracranial head neck AVM is cheek, ear, nose [2].

Traumatic AVM usually arises from a single vessel rather than multiple vessels as in congenital diseases. Various treatment modalities have been described in the literature for AVM, like surgical excision, sclerosant injection, ligation of the feeding vessel

and embolization by various substances like metal coils, glues and plugs [3-5]. It is challenging to cover the defect created by surgical excision. Here, in our case report, we present a unique way of coverage of scalp defect post AVM excision.

3. Case Report

We report the case of a 21-year-old male referred to us with a 6-year history of right frontal scalp swelling. The swelling had been gradually increasing in size and was pulsatile in nature. There was a previous history of blunt head trauma 6 years back. First, he found a small mass in his right forehead that gradually increased to its present size. There was no history of visual disturbances or seizures.

On examination, there was a pulsatile soft tissue swelling with purplish discoloration over the swelling on the right frontal scalp which was freely mobile over the underlying bone. The mass was 6 cm horizontally and 6 cm vertically in diameter. A bruit was also demonstrated over the swelling.

Examination of the cardiovascular system was essentially within normal limits. Hematological and biochemical parameters were also normal. The chest X-ray and electrocardiography showed no abnormality. Magnetic resonance imaging and Computed tomography (CT) scan with intravenous (IV) contrast of Brain and neck vessels showed well-defined soft tissue lesion in a subcutaneous plane showing nidus with a tangle of multiple vessels. The nidus is possibly supplied by the frontal branch of the right superficial

temporal artery and drainage by the facial vein, the possibility of Arteriovenous malformation in the scalp on the right frontal region with no evidence of any underlying bony changes. There was no intracranial extension of the lesion and intracranial AVM.

The patient initially visited the neurosurgery department and then referred to the plastic surgery department for coverage of defect after excision of swelling. The swelling along with the overlying skin was excised after ligating feeding vessels, leaving the periosteum intact. Intraoperatively, after resection of the disease with the overlying skin, it was noticed that the disease was involving the subdermal part of the skin. Decision was taken not to use the diseased skin portion as a flap, as it would be thin. Diseased part from the subdermal skin was removed and defatting was done. Full thickness skin graft was prepared from the diseased skin and after freeing it from the disease macroscopically, it was sutured to the defect using an ethilon 3-0. Soft tissue was sent to the department of pathology for histopathological examination. Histopathological data confirmed the diagnosis as arteriovenous malformation.

First dressing was done on post-operative day 5 under all aseptic precautions and dermal graft take was 100 %

The patient was discharged with advice of follow up twice-weekly in OPD for 2 weeks. The patient was followed for 1 month. Clinically, the patient was relieved of symptoms and graft take is 100% with no recurrence till date (Figure 1-9).



Figure 1: Preoperative Picture



Figure 2: Preoperative Picture



Figure 3: Intraoperative Picture defect After Excision Of Swelling

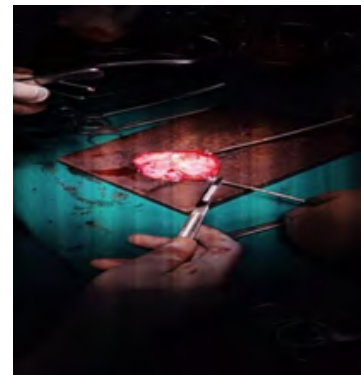


Figure 4: Intraoperative Picture Trimming Of Fat From Skin Of Excised Swelling

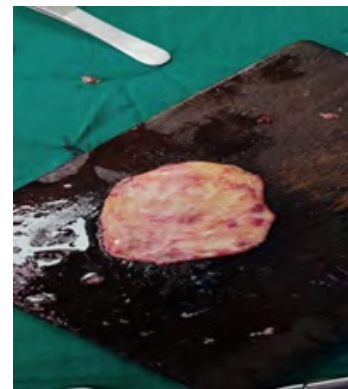


Figure 5: Intraoperative Picture full Thickness Skin Graft From Excised Swelling Skin



Figure 6: Intraoperative Picture graft Over Defect



Figure 7: Intraoperative Picture Over Defect



Figure 8: Postoperative Picture Postoperative Day 21



Figure 9: Postoperative Picture Postoperative Day 21

4. Discussion

Scalp AVM has been divided into two groups by Shenoy et al . Group 1 includes primary scalp vascular malformation, Group 2 includes scalp venous dilation [6]. Our patient belongs to the group one category.

Another classification by Shobinger includes various stages. Stage 1: blushing and warm cutaneous lesion. Stage 2: bruit, audible pulsation, expanding lesion. Stage 3, pain ulceration, bleeding and infection and Stage 4, Cardiac failure [7]. This patient belongs to stage 2.

Scalp AVM is commonly treated by surgical excision [1]. While reconstructing scalp defects, various things have to be kept in mind. Maintaining the anterior hairline and replacement with a similar type of tissue [8,9]. In our case, we surgically removed the forehead AVM along with the overlying skin. The skin tissue overlying the diseased portion was examined intraoperatively and it was found disease was involving the subdermal skin. The skin

overlying the diseased part was completely freed from the disease and defatting was done. After freeing it from the disease, it was used as a full thickness skin graft for the coverage of the scalp defect created. Intraoperatively, decision was taken not to use the portion of the skin overlying the disease as a flap, as it would be too thin. Hence, a simpler method was used for the coverage of the defect.

This technique of using the portion of skin overlying the diseased part avoid the need for using the full /split thickness skin graft from any other part of the body, thus avoiding new donor site . It also obviates the need of using any local, distant or free flap for reconstruction.

This unique way of coverage of the scalp defects served both our purposes along with no donor site complications. Even after complete resection, recurrence has been reported as late as 18 years [10].

5. Conclusion

Reconstructive ladder is an integral part, which every plastic surgeon is familiar with. Various treatment modalities and reconstructive strategies have been described in literature for Scalp AVM. We used full thickness skin graft from the skin overlying the arteriovenous malformation for the defect coverage avoiding the need for any other local or free flaps, thus avoiding the distortion of other tissues in body. It also avoids the other donor sites of graft.

Keeping in mind the principles of reconstruction, we have used a simple method for coverage of defect with no recurrence till date.

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