



Case Report

Traumatic scalp arteriovenous fistula post capillary implantation successfully treated using PHIL embolic agent

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ABSTRACT

Background: A traumatic arteriovenous fistula of the scalp due to hair transplantation (AVFHT) is a rare fistulous communication between branches of the arteries and draining veins in the scalp's subcutaneous tissue. Its incidence is unknown and its clinical manifestations may range from a pulsatile mass to seldom epilepsy. Surgery and interventional approaches (percutaneous and endovascular embolization) using coils and embolic agents such as Onyx have been used as treatment options. The authors report a rare case of an AVFHT successfully treated through percutaneous and endovascular embolization using coils and precipitating hydrophobic injectable liquid (PHIL) embolic agent. This is possibly the first reported case using PHIL embolic agent to treat an AVFHT.

Case Description: The patient presented with a painful and disabling scalp swelling in the right parieto-occipital region 2 years after a hair transplant in 2011. A computed tomography angiography showed an arteriovenous fistula between branches of the right superficial temporal artery and branches of the right occipital artery to the right superficial temporal vein that was successfully embolized using coils and PHIL. The patient was discharged after a smooth recovery and 1 month later remained healthy.

Conclusion: Percutaneous and endovascular embolization using PHIL embolic agent can be an alternative treatment for AVFHT.

Keywords: Angiography, Arteriovenous fistula, Intervention, Liquid embolic material, Precipitating hydrophobic injectable liquid

INTRODUCTION

An arteriovenous fistula of the scalp (misnomered cirroid aneurysm) is a rare fistulous communication between branches of the external carotid artery and draining veins in the scalp's subcutaneous tissue.

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Its clinical manifestations range from a painful deforming pulsatile mass (94%), headaches (25%), and tinnitus (20%) to even seldom epilepsy.^[6]

They account for 8.1% of all arteriovenous malformations; nevertheless, their exact incidence is unknown. Although predominantly spontaneous (60.2%), they also may occur secondary to trauma or iatrogeny, like secondary to hair transplantation procedures.^[1,6]

Traumatic arteriovenous fistulas of the scalp due to hair transplantation (AVFHT) are extremely rare; by 2019, only 15 cases were reported in the literature, of which only five were treated exclusively with vascular or direct puncture embolization using coils and onyx; however, no case reported the usage of precipitating hydrophobic injectable liquid (PHIL) embolic agent.^[3]

PHIL is a new embolic agent approved by the Food and Drug Administration for treating arteriovenous malformations and hypervascular lesions. Its use for AVFHT has not been well established.

Hereby, we report a case of an AVFHT successfully treated using coils and PHIL embolic agent.

CASE DESCRIPTION

A 50-year-old male presented scalp swelling in the right parieto-occipital region 2 years after a hair transplant in 2011 that was initially conservatively treated. The swelling progressively enlarged and became painful and disabling. In 2021, a computed tomography angiography showed subcutaneous right parieto-occipital dilated vessels representing an arteriovenous fistula between parietal branches of the right superficial temporal artery and branches of the right occipital artery to the right superficial temporal vein [Figure 1]. Due to the diagnostic imaging findings and clinical course of the disease, the patient was diagnosed with AVFHT.

The fistula was embolized using coils and PHIL liquid embolic fluid through micro-catheter direct percutaneous puncture; additionally, proximal right superficial temporal and occipital arteries selective embolizations with coils were carried out, achieving occlusion of the fistula and afferent arteries [Figure 2]. One month later, the patient remains healthy.

DISCUSSION

Although hair transplantation using the punch-graft technique is considered safe and effective, remaining a popular cosmetic treatment, as more than 1.2 billion people suffer from baldness, AVFHT can be a rare complication of this procedure when both an artery and vein are damaged.^[2]

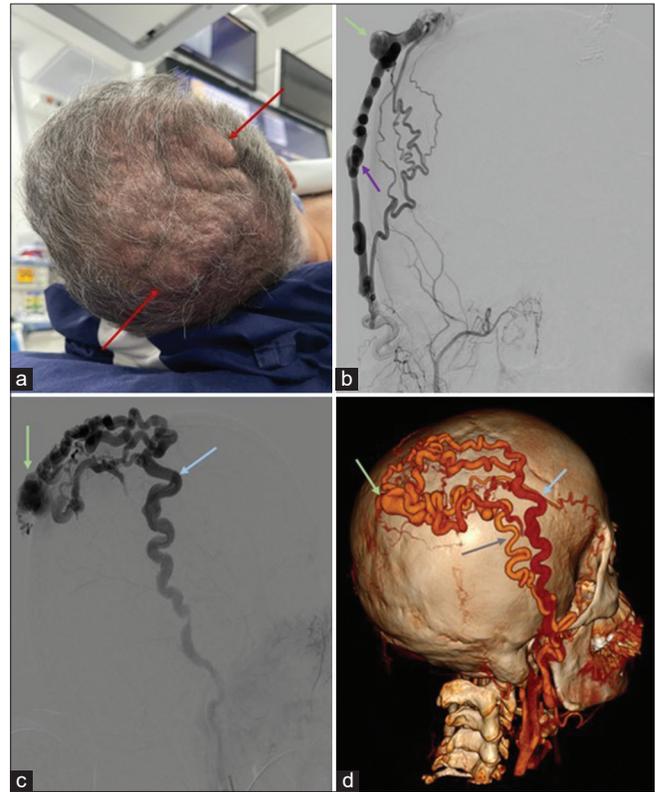


Figure 1: (a) Multiple subcutaneous right parieto-occipital dilated vessels (red arrows). (b) Arterial phase angiography showing feeders from the right occipital artery (purple arrow) to the arteriovenous fistula (green arrow). (c) Venous phase angiography showing the arteriovenous fistula (green arrow) and dilated right superficial temporal vein (blue arrow). (d) Volume rendering reconstruction showing the arteriovenous fistula (green arrow), superficial temporal artery (grey arrow), and dilated superficial temporal vein (blue arrow).

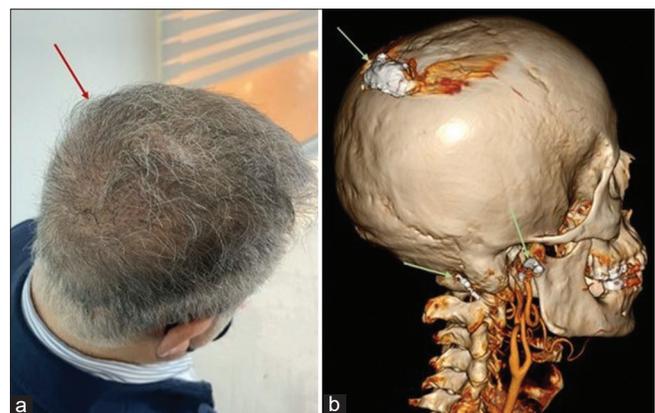


Figure 2: (a) Resolution of dilated vessels on physical examination (red arrow). (b) Volume rendering reconstruction showing the embolization materials in the fistula, right occipital, and right superficial temporal arteries (green arrows).

Most AVFHT reported cases show the malformation originating from the superficial temporal artery, less commonly from the occipital artery or both, as in our case.^[3]

Surgery has been the mainstay of treatment for AVFHT, with low recurrence; nevertheless, endovascular approaches using several embolic agents such as Onyx embolic fluid and coils have also been used as an alternative single treatment option or associated with surgical treatment.^[2,4] Surgical resection of large lesions can be complicated with considerable bleeding and require reconstructive skin procedures; therefore, endovascular embolization is becoming increasingly popular.^[2,4]

PHIL has advantages over other embolic agents used to treat AVFHT. It is delivered in pre-filled syringes that do not require shaking before its use, making its administration faster. It is also pale in color, reducing the risk of skin staining, characteristic of Onyx; moreover, iodine is covalently bonded in PHIL, leading to less glare artifact on computed tomography. In superficial arteriovenous malformations, PHIL also has deeper penetration with its different concentrations, achieving embolization of the nidus and arterial feeders when approaching from the venous side, making it a potentially safe and helpful embolic agent when treating AVFHTs, like in our case.^[5]

We used endovascular approaches (percutaneous puncture and transarterial approaches), utilizing PHIL and coils to treat our patient. No procedure-related complications and no symptoms recurred during follow-up. We strongly encourage reporting more cases like ours to strengthen the available evidence in the literature on the use of PHIL as an embolizing agent to treat AVFHTs.

CONCLUSION

Percutaneous and endovascular embolization using PHIL embolic agent can be an alternative treatment for AVFHT.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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