



# Superficial temporal artery pseudoaneurysm after head injury in a teenager

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## 1. Introduction

Superficial temporal artery (STA) pseudoaneurysm is a rare complication after a minor head trauma. It appears progressively within two to six weeks. It is usually painless, soft and pulsatile. Ultrasound can help confirm the diagnosis. The treatment of choice is surgical excision under local or general anesthesia.

## 2. Case report

We report the case of a 13 year old boy who presents at our hospital with a lump in the right temporal region. The lesion appeared progressively some weeks after a head trauma. He lost consciousness while standing and fell on his head. A vasovagal syncope was diagnosed. After the resolution of the initial frontal hematoma, a 1 cm lump appeared.

Physical examination revealed a 1 cm, soft, pulsatile, painless frontotemporal mass (Fig. 1a, Fig. 1b). An echography shows a vascular structure with pulsatile flow (Fig. 2). Cerebral MRI excluded an arteriovenous malformation and a pericarnii sinus, but confirmed the diagnosis of a pseudoaneurysm of the frontal branch of the superficial temporal artery (Fig. 3).

The lesion was excised under general anesthesia. We carefully exposed the pseudoaneurysm and tied off the proximal and distal artery to decrease the risk of emboli (Fig. 4). Histopathology confirmed the diagnosis (Fig. 5 and Fig. 6). The patient has no post-operative complication. The follow-up at one month showed a good healing of the suture.

## 3. Discussion

Traumatic pseudoaneurysm of the superficial temporal artery (STA) is a rare complication of minor head trauma [1]. The frontal branch of STA is particularly vulnerable and more commonly affected because of its superficial course and less protected by surrounding tissue [2–4].

Injury can cause partial transection or severe contusion that can

result in necrosis of the arterial wall [2]. Blood extravasates from the damaged artery and forms an intramural hematoma [5]. Subsequently, a fibrous capsule forms around the hematoma, which is responsible for its pulsatile property [5]. Pseudoaneurysm or false aneurysm is a collection of blood between the tunica media and the external advential layer of the artery. Pseudoaneurysm are likely to rupture [1].

The interval appearance of pseudoaneurysm is typically within 2–6 weeks [3]. Auscultation may reveal a murmur and digital compression of the STA proximal to the aneurysm may cause cessation of the pulsation [6].

Young men and older people who are prone to fall are mostly affected [2,7]. Patients may complain of headache, and rarely earache or palsy of the forehead [2].

The differential diagnosis should include hematoma, lipoma, epidermoid cyst, abscess, arteriovenous malformation and arteriovenous fistula [3].

To confirm the diagnosis of STA pseudoaneurysm, ultrasound may be useful [3]. CT-scan, MRI and angiography is helpful in confirming the vascular origin [2,4]. Angiography can exclude intracranial extension [4] or communication (sinus precarnii).

Arterial anastomoses exist between the internal carotid artery and the external carotid artery [8]. The frontal branch of the STA is a continuation of the external carotid. The ophthalmic artery originates from the internal carotid [9]. The frontal branch of the superficial temporal artery and the ophthalmic artery connect through the supra-orbital or the supratrochlear arteries [9]. This provides an alternative route to the retina in case of occlusion of the ophthalmic artery or internal carotid [8], but also presents an opportunity for emboli passing across the anastomosis to the ophthalmic artery when the frontal branch of the STA is accidentally cannulated [8].

The frontal branch of the superficial temporal artery possesses anastomoses with the forehead branches of the ophthalmic artery, which can lead to ocular complications in case of lesion. This is described in esthetic procedures such as cosmetic soft tissue augmentation of the face by filler injection [9].

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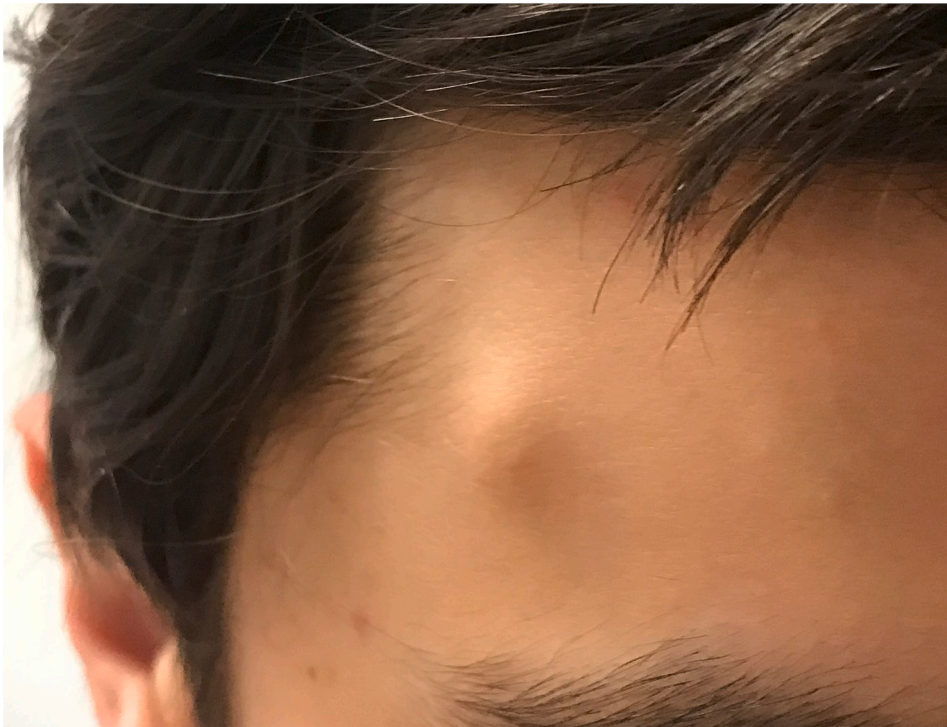
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**Fig. 1a.** Soft, pulsatile, painless frontotemporal lesion.



**Fig. 1b.** Soft, pulsatile, painless frontotemporal lesion.

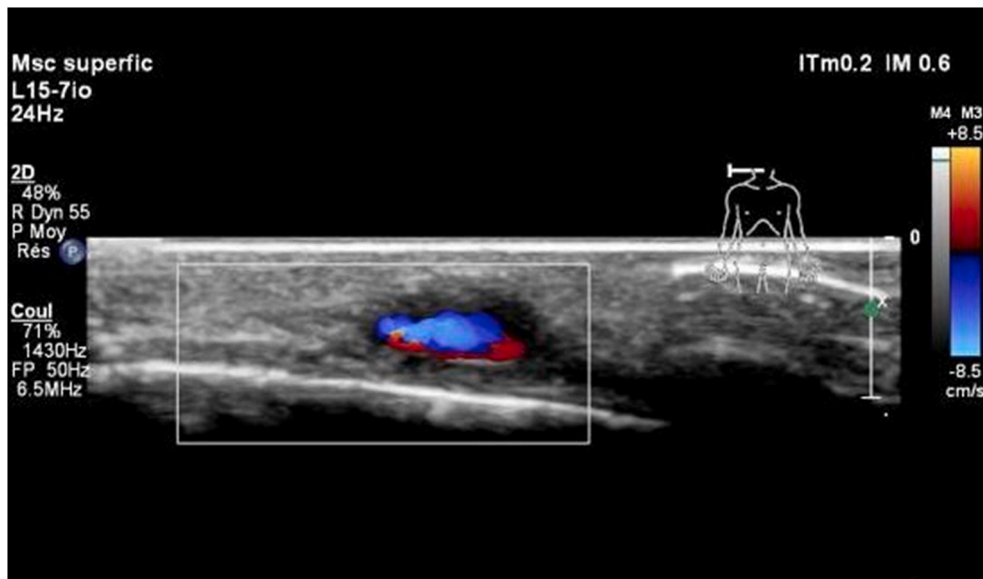


Fig. 2. Ultrasound demonstrating blood flow in the lesion.

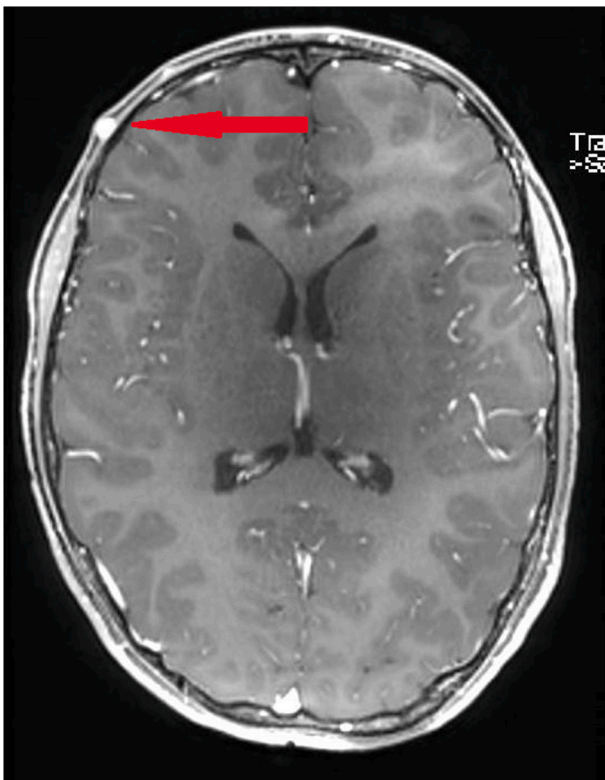


Fig. 3. MRI showing the superficial temporal artery aneurysm.

There are also right-to-left-anastomoses between the terminal branches of both ophthalmic arteries, which represents a danger of bilateral ocular complications in case of accidental cannulation [8].

Indications for treatment are hemorrhage prevention, relief of symptoms and improvement of esthetic appearance [3].

Therapeutic options include surgery, which is the treatment of choice [7], endovascular embolization or intralésional injection [3]. Surgery consists of ligating the afferent and the efferent artery [4] under local or general anesthesia [2]. In our case, we carefully exposed the pseudoaneurysm and tied off the proximal and distal artery to minimize the risk of embolization.

Surgical complications are facial nerve palsy (lesion of the frontozygomatic branch of the facial nerve) [2], skin defects due to dissection too close to the skin, excessive bleeding, and cosmetic problems due to scarring from surgery [3].

#### 4. Conclusion

A painless, pulsatile mass in a temporal location after a blunt head trauma is suspicious of STA pseudoaneurysm. Ultrasonography can confirm the vascular injury. Surgery is the treatment of choice. To avoid complications from emboli, one should be aware of the presence of anastomoses between the external and the internal carotid through the frontal branch of the temporal artery and the ophthalmic artery.

#### Patient consent

Consent to publish the case report was obtained.

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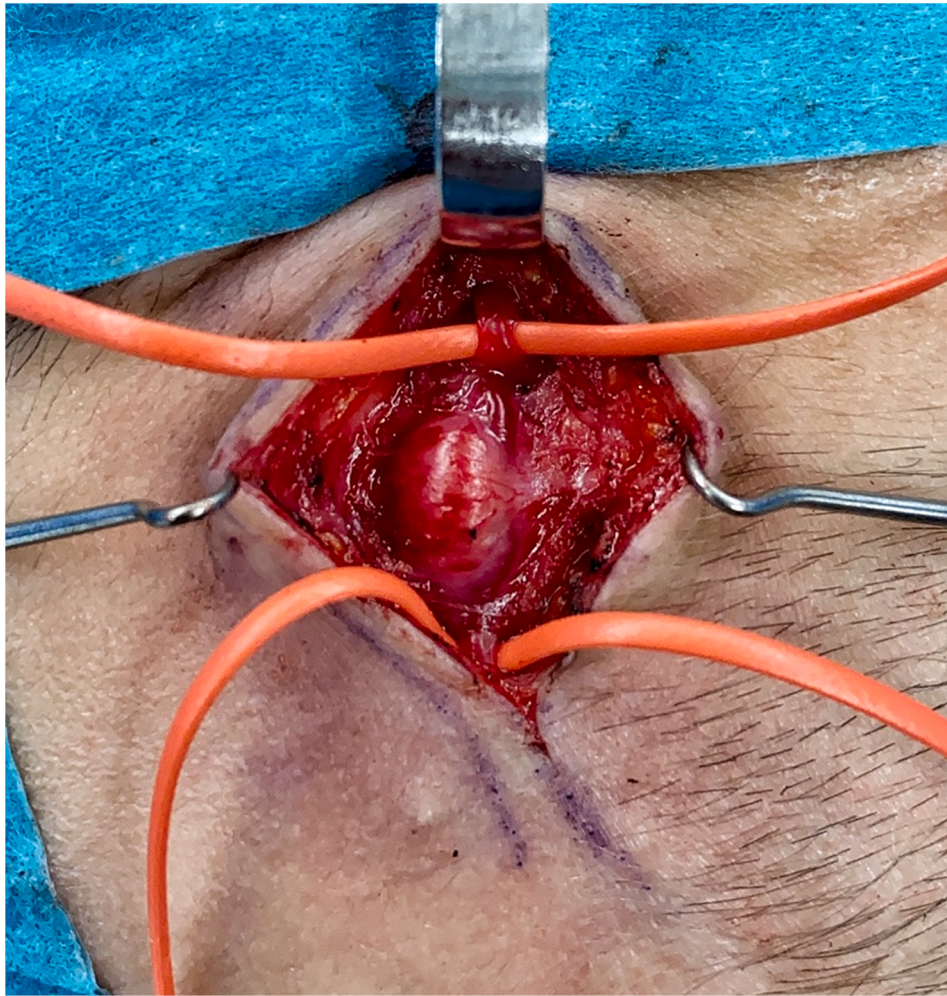


Fig. 4. Perioperative excision of the pseudoaneurysm.

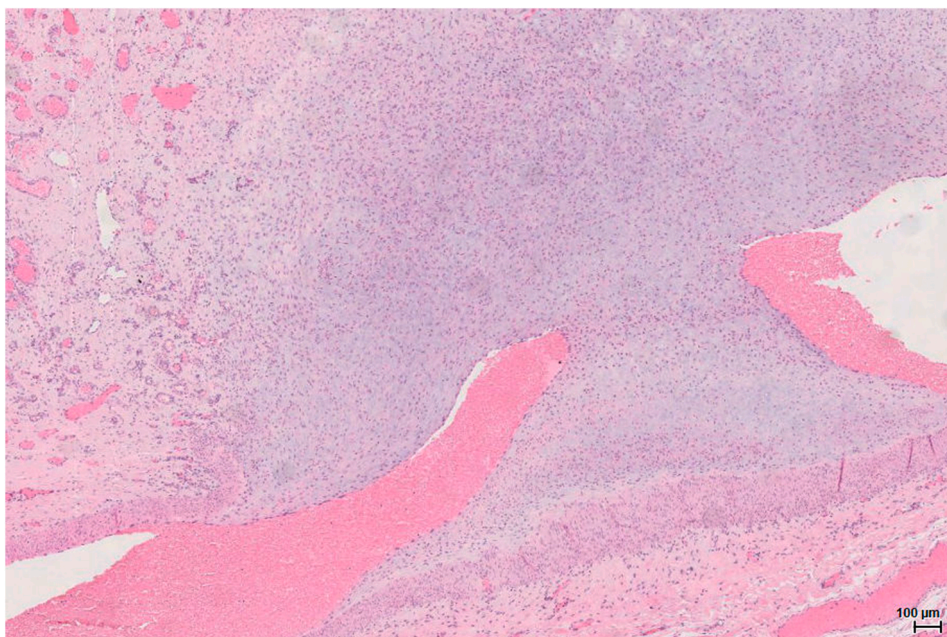
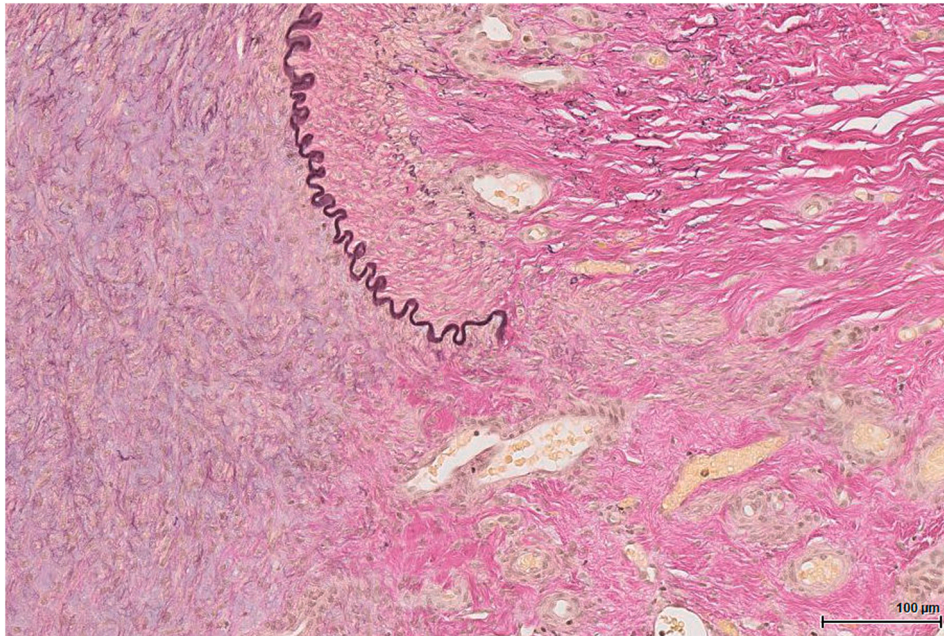


Fig. 5. Arterial branch with a wall's rupture, fulfilled by organized thrombus (H&E  $\times$  20).



**Fig. 6.** Van Gieson elastin (VGEL) staining shows a disruption of the internal elastic lamina of the artery's wall associated with granulation tissue and fibrotic tissue (VGEL  $\times$  100).

#### Authorship

All authors attest that they meet the current ICMJE criteria for Authorship.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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