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Endovascular Treatment of A Superficial Temporal Artery Pseudoaneurysm After Penetrating Trauma: A Case Report

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ABSTRACT

A 19-year-old man presented with a right temporal pulsatile mass that developed after penetrating trauma. The stab wound trauma occurred approximately 10 months ago, resulting in profuse bleeding at the site of the trauma and a loss of consciousness for several hours. The patient was monitored for several hours in the outpatient emergency room and was discharged after stabilization and suturing of the trauma site. The day after discharge, the patient started to hear a bruit on the right side, and 10 days after that, the trauma site developed progressive swelling. Ten months later, the patient was referred to the medical center for an increased hearing bruit following sleeping on the right side. Based on history and evidence, CT angiography was performed. The patient's CTA result showed a round swelling in the right superficial temporal artery, which, given the etiology, indicated diagnosed as a pseudoaneurysm of the right superficial temporal artery. Digital subtraction angiography (DSA) was performed on the patient and underwent endovascular treatment with Coil and Onyx. The treatment of choice is excision, although endovascular intervention is a potential treatment option. However, when a pseudoaneurysm is small, conservative treatment can be used.

Keywords: Angiography, Pseudoaneurysm, Temporal Arteries, Trauma, Endovascular Treatment

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1. Introduction

The development of a hematoma in the temporal region is relatively common after blunt facial trauma. Most hematomas in the facial region respond to conservative treatment or needle aspiration with compressive dressing. However, in rare cases, the mass continues to grow with repeated recurrence even after aspiration, and such cases should be considered for the possibility of a pseudoaneurysm. Pseudoaneurysm of the superficial temporal artery is usually caused by trauma and is rarely reported. These pseudoaneurysms exhibit progressive growth, and when left untreated, they can eventually lead to severe bleeding, which can be life threatening. Here, we report a case of pseudoaneurysm of the right superficial temporal artery after penetrating facial trauma that was treated endovascularly.

2. Case Report

A 19-year-old young man with no history of specific illness presented to our clinic with complaints of swelling in the right temporal region that had developed progressively following penetrating trauma 10 months previously. The patient had a stabbing wound to the right temporal region 10 months ago, resulting in a spurt of

bleeding at the site of the injury and a decreased level of consciousness for several hours. Then he had been conscious and showed no other symptoms.

Informed consent was obtained from the patient before the procedure. The patient was monitored in the outpatient emergency department and discharged after bleeding was controlled and the wound was sutured. Therefore, he had not sought medical evaluation. One day after discharge, the patient mentioned that he heard a sound in his right ear, like ocean waves or movement of the car, which is an explanation for the patient's hearing of a bruit sound. After 10 days, he developed progressive swelling in the injured area, and while sleeping towards the swollen area, he developed an increased hearing bruit in the right ear. In fact, the only reason the patient visited the clinic was a unilateral, round mass in the right temporal region and a bruit. In these ten months, the patient has not had any other symptoms that would lead to a visit to the clinic or emergency room, and as a result, no examination or paraclinical procedure has been performed on the patient. He did not have other symptoms such as hearing loss, increased pressure in the eye, impaired sensation, and facial movement on the affected side.

Based on the patient's history of penetrating trauma, CT angiography was performed, which revealed a round swelling in the right superficial temporal artery (Figure 1). Based on the etiology, the patient was diagnosed with a pseudoaneurysm of the STA.

The patient was admitted for pre-procedural evaluation following a recommendation for Digital Subtraction Angiography (DSA). The consent was obtained after discussing the procedure and its potential complications such as, stroke, blindness, bleeding, allergic reaction, renal impairment, and on rare occasions, death. Afterwards, the right external carotid artery was selected using a standard technique with multiple angiographic projections. Comprehensive laboratory investigations and relevant paraclinical assessments were conducted to evaluate the patient's eligibility and risk profile for undergoing DSA. The pre-procedural laboratory evaluation included Complete blood count (CBC), platelet count, prothrombin time (PT), partial thromboplastin time (PTT), international normalized ratio (INR), and renal function tests (Urea and Creatinine), all of which were within normal limits. A thorough review of the patient's past medical history revealed no underlying chronic illnesses or significant comorbidities. Previous laboratory investigations were also within normal range. There was no reported family history of vascular or systemic diseases.

The patient was prepared for the procedure by the neurointerventionist and was placed under general anesthesia. DSA was initiated to assess the feasibility of performing an endovascular intervention on the superficial temporal artery (Figure 2). Embolization was successfully carried out using a combined therapeutic approach involving coil deployment and Onyx liquid embolic agent. The procedure was completed without complications, and technical success was achieved (Figure 3).

The patient exhibited an immediate, uneventful recovery post-procedure, regaining full consciousness without complications. He was subsequently admitted to the intensive care unit for close observation. By the following day, a significant reduction in unilateral temporal pulsation was noted. After the administration of 8 mg intravenous dexamethasone, the patient's clinical status remained stable, and he continued to show no signs of acute distress. As the endovascular method is a less invasive way than surgery, this method was used.

2.1 Outcome and Follow-up

Post-embolization, the patient tolerated the procedure well with no complications. The patient was discharged with regular clinical follow-up at the Neurosurgery clinic. The right temporal swelling disappeared. Subsequent management included reassurance and observation with periodic clinical assessments. Due to pain associated with the Onyx embolization, the patient was prescribed Naproxen 500 mg orally as needed (PRN) for pain management.

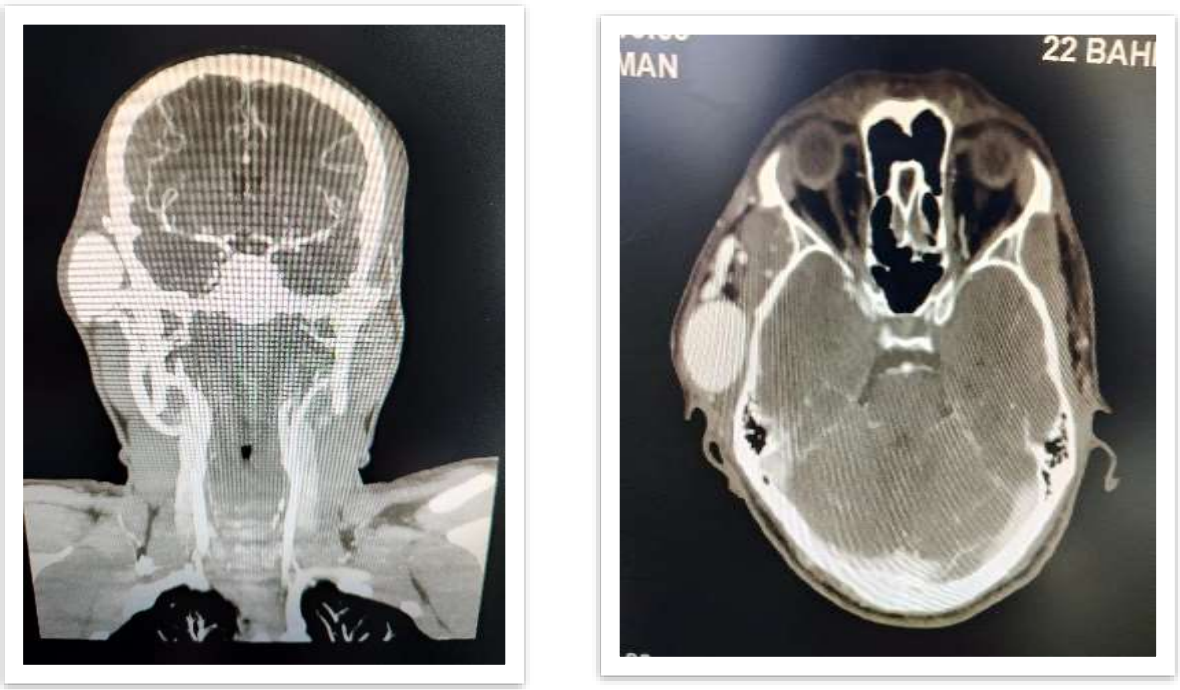


Figure 1. Coronal and axial computed CT angiography showing approximately. Sized round mass in right temporal region (**Prepared by Authors, 2026**).



Figure 2. Pre-embolization angiographic view of the pseudoaneurysm in the superficial temporal artery (**Prepared by Authors, 2026**).

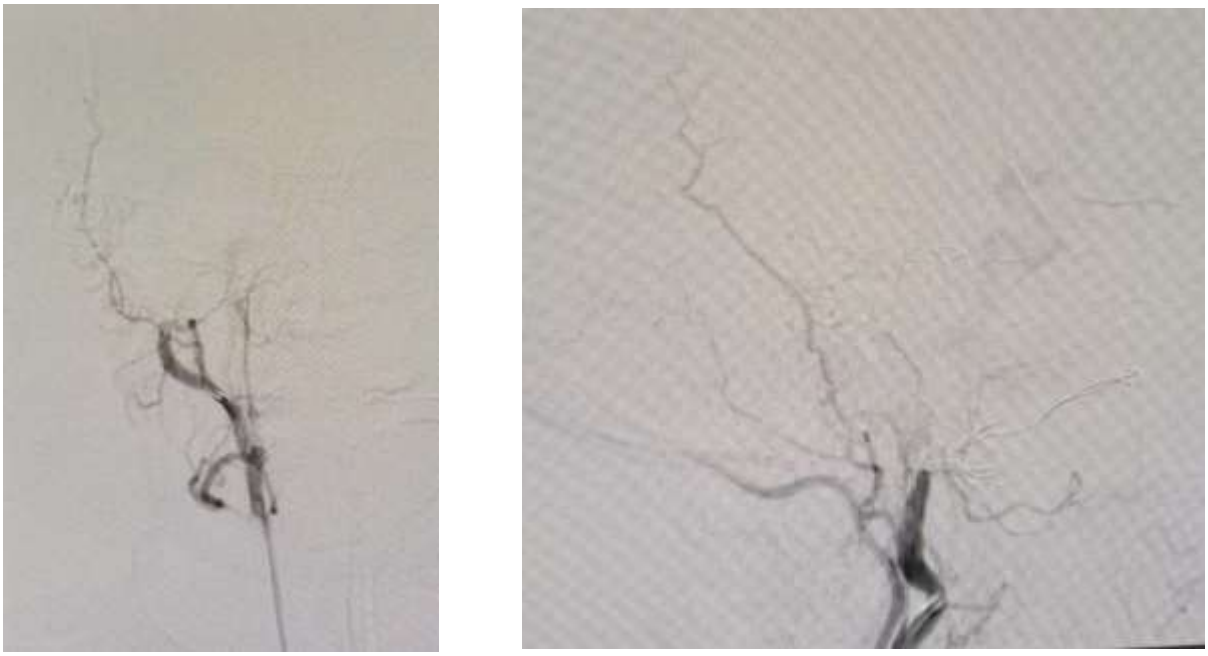


Figure 3. Post-embolization DSA of the STA demonstrating successful occlusion following combined coil and Onyx treatment (**Prepared by Authors, 2026**).

3. Discussion

The terms pseudoaneurysm, false aneurysm, and pulsatile hematoma or communicating hematoma are synonymous **(1)**. In true aneurysms, the vessel wall is dilated to full thickness (Figure 4, in part a), whereas in pseudoaneurysms, the blood vessels are dilated due to damage to one or more layers of the artery wall (Figure 4, in part b). Hematoma development indicates damage to the blood vessel wall at full thickness and, there are several blood clots outside the vessel (Figure 4, in part c). Superficial temporal artery pseudoaneurysms are uncommon but can be potentially life-threatening **(2)**. The most common etiology of superficial temporal artery pseudoaneurysm is blunt trauma **(3-8)**, accounting for 75% **(4)** to 95% **(8)** of the cases; penetrating injury or iatrogenic cases were responsible for the rest of the cases **(8)**. Briefly, Trauma damages a blood vessel and causes the rupture of the inner layer of the vessel wall. Blood pressure then causes the blood to fill this gap and form a cavity. Subsequently, a fibrous pseudo capsule is formed, which is known as a pseudoaneurysm **(9, 10)**. Given that the endovascular method is a less invasive than surgery and that complete treatment was possible, this method was used.

The typical history involves trauma or surgery to the temporal region [4, 6] and subsequent development of a pulsatile, indolent or expanding swelling which may be associated with headache **(4, 7)**. Other neurologic symptoms are not always present but may include facial pain, dizziness, ear discomfort, or facial droop due to cranial nerve VII compression **(3)**. The diagnosis is confirmed either with Duplex ultrasonography, computed tomographic angiography, or angiography **(2)**. Of note, the patient in the present case did not complain of pain. He reported an uncomfortable sensation due to the progressive increase of the right frontal swelling. The diagnosis was suspected after clinical examination of the patient. CT angiography can assess the patency and position of the main trunk and distal branches, including the transverse facial, frontal, and parietal branches of the superficial temporal artery **(11)**. Furthermore, CT angiography accurately depicts the actual size of pseudoaneurysms along with the degree of thrombosis versus the amount of luminal opacification **(11)**. Superficial temporal artery pseudoaneurysms can be complicated by rupture, thromboembolism, or skin necrosis if not diagnosed and treated promptly **(2)**. The treatment options include open surgical ligation, with or without resection, endovascular embolization with coils, or percutaneous ultrasound-guided thrombin injection **(12)**. Given that the endovascular method is a less invasive than surgery by Modugno et al **(13)** and that complete treatment was possible, this method was used. This approach effectively resolved the local and regional symptoms through a quick, safe, and minimally invasive procedure.

In the present case, we utilized a combined embolization approach with Coil and Onyx. Indications for surgery are cosmetic, to treat headaches, and to avoid pain and hemorrhage **(4, 9)**. Differential diagnoses for STA pseudoaneurysm include vascular tumor, arteriovenous fistula, and meningeal artery aneurysm with bony erosion, subcutaneous lipoma, abscess, and localized hematoma.

4. Conclusion

Superficial temporal artery pseudoaneurysm commonly presents with a painless pulsatile mass in the temporal region, often following a blunt head trauma. An unusual presentation requires clinicians to have thorough knowledge of the clinical presentation, proper steps in diagnosis, and the most effective approach in management. Endovascular embolization of superficial temporal artery pseudoaneurysms remains a valid approach to achieve successful occlusion of the lesion.

5. Declarations

5.1 Acknowledgments

None.

5.2 Ethical Considerations

Not applicable.

5.3 Authors' Contributions

All authors reviewed, edited, and approved the final version of the manuscript.

5.4 Conflict of Interest

The authors declare that they have no conflict of interest.

5.5 Fund or Financial Support

This research received no external funding.

5.6 Using Artificial Intelligence Tools (AI Tools)

The authors were not utilized AI Tools.

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