

## Case Report

## A giant pseudoaneurysm of the occipital artery

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**Abstract****Background:** Pseudoaneurysms of the occipital artery (OA) are extremely rare and can occur following head trauma or iatrogenic injury; OA anatomy seems to play a crucial role in their pathogenesis.**Case Description:** This report describes the case of a 76-year-old patient with a giant OA pseudoaneurysm secondary to a head injury the patient had sustained 1 month earlier. After radiological confirmation via ultrasonography (US) and computed tomography angiography (CTA), the patient underwent surgery for resection of the lesion. An uneventful postoperative course with no recurrence was confirmed at 1 and 2-month follow-up visits.**Conclusions:** Despite their rarity, pseudoaneurysms of the OA should be considered in the differential diagnosis of patients presenting with an occipital pulsatile mass. Prompt management reduces the risk of a serious hemorrhage. In our case, considering the size of the lesion, surgical resection seemed to be the only reasonable option.**Key Words:** Giant pseudoaneurysm, head injury, occipital artery false aneurysm, occipital artery pseudoaneurysm, trauma**Access this article online****Website:**[www.surgicalneurologyint.com](http://www.surgicalneurologyint.com)**DOI:**

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**Quick Response Code:****INTRODUCTION**

Occipital artery (OA) pseudoaneurysms are extremely rare entities and can occur after blunt or penetrating trauma or iatrogenic injury. Clinical presentation may vary; however, the most typical is an enlarging, tender, pulsatile mass on the occipital region accompanied by ipsilateral occipital headache.<sup>[3]</sup> Diagnosis is routinely based on computed tomography angiography (CTA) or digital subtraction angiography (DSA), however, magnetic resonance imaging (MRI), magnetic resonance angiography (MRA), and Doppler sonography have also been utilized and complement each other.<sup>[3]</sup> OA pseudoaneurysms may rupture and cause a serious hemorrhage; therefore, prompt management by endovascular means or surgical excision is very important.<sup>[4]</sup>

**CASE REPORT**

A 76-year-old male presented to the Emergency Department with a laceration on his left occipital region after a fall from standing height. The CT scan was negative for traumatic brain injury; the patient was sutured and discharged. One

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month later he presented again complaining of a constantly enlarging mass in his left occiput. Physical examination revealed a tender, pulsatile mass with central necrosis of the epidermis. The pulsation of the mass seized subsequent to compression of the OA proximal to the lesion. Neurological examination was normal.

Doppler ultrasound was performed to confirm the presence of a pseudoaneurysm, demonstrating a subcutaneous anechoic mass to the left lateral border of the occipital bone with a high intrinsic arterial flow. Subsequently, the patient underwent CTA, which demonstrated the anatomic continuity of the mass with the left OA. Furthermore, a large isodense mass around the hyperdense enhancement was revealed, indicating the surrounding thrombus [Figure 1]. A three-dimensional reconstruction of the CTA better delineating the pseudoaneurysm anatomy was performed [Figure 2]. The patient was taken to the operating room for resection of the lesion under general anesthesia through a wedge-shaped skin incision encircling the skin ulceration [Figure 3]. After careful circumferential dissection of the lesion, the OA was identified [Figure 4]. The lesion was mobilized and the parent OA was ligated and divided both proximally and distally to the lesion. The lesion was then resected along with the necrotic skin. Finally, the mass lesion was dissected away from the overlying skin revealing a “necrotic” component of the lesion underneath the skin ulceration [Figure 5].

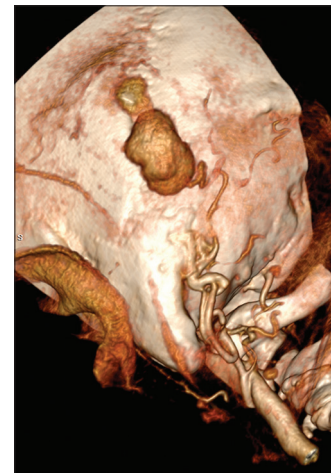
The pathological examination revealed hyalinization of the arterial wall and a focally disrupted intima and media, which were consistent with the diagnosis of a pseudoaneurysm. The patient was discharged the next

day. An uneventful wound healing with no recurrence were confirmed at 1 and 2-month follow-up visits. An informed consent for publication of this case report was obtained from the patient.

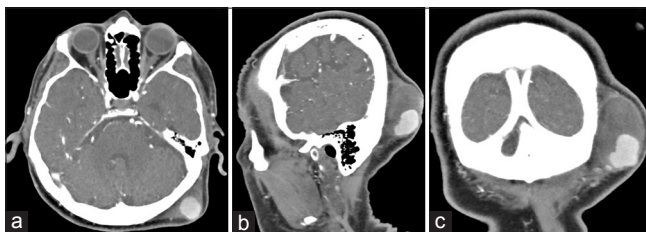
## DISCUSSION

Pseudoaneurysms are characterized by a defect of the blood vessel wall and by direct communication with the endovascular blood flow. Their wall is formed by adventitia or perivascular tissue or a thrombus.<sup>[5]</sup> Pseudoaneurysms are mostly attributed to trauma, inflammation, iatrogenic injury, or tumor invasion.<sup>[6]</sup>

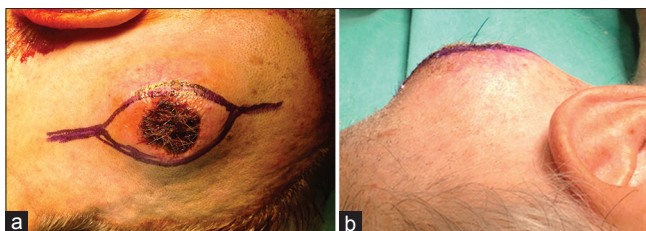
Most OA pseudoaneurysms are diagnosed in patients with a history of head trauma.<sup>[3]</sup> Interestingly, two previously reported cases were associated with a surgical procedure involving the occipital area.<sup>[7,8]</sup> More specifically, the first case was of a 68-year-old woman who underwent surgery for deep brain stimulation (DBS). Two weeks



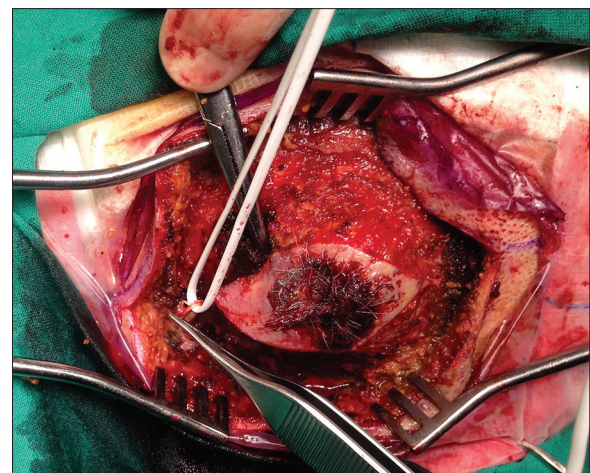
**Figure 2:** A three-dimensional reconstruction of the CTA better delineating the pseudoaneurysm anatomy



**Figure 1:** Brain computerized tomographic angiography (CTA) in axial, sagittal and coronal planes, respectively (a-c). A large isodense mass around the intense enhancement (pseudoaneurysm) indicating a surrounding thrombus, was evident



**Figure 3:** Intraoperative photograph displaying the left occipital region mass along with its central ulceration. The surgical planning of the wedge-shaped skin incision is demonstrated (a) posterior view (b) lateral view



**Figure 4:** Identification of the left OA after circumferential dissection of the lesion. OA was ligated and divided both proximally and distally to the lesion



**Figure 5: Pathology Specimen.** A “necrotic” component of the lesion underneath the skin ulceration is evident

after the surgical procedure, the patient developed an enlarging tender occipital mass that was diagnosed as an OA pseudoaneurysm.<sup>[8]</sup> The second iatrogenic OA pseudoaneurysm was diagnosed 1 month after craniotomy for a vestibular schwannoma resection.<sup>[7]</sup> Interestingly, the anatomy of the OA can explain part of their pathogenesis. Although the OA is covered by muscle throughout most of its course thus being relatively protected by blunt or penetrating injuries, the subgaleal part of the OA courses superficially and is only protected by galea posteriorly.<sup>[1]</sup> Consequently, the occipital muscle is the only cushion between the OA and bone, rendering that part of the OA most vulnerable to trauma. In fact, most of the reported pseudoaneurysms, including the present case, were formed above the level of the superior nuchal line (subgaleal part) [Figure 2]. OA pseudoaneurysms emerged 2–4 weeks after the head injury in nearly all traumatic cases, including our own case. Still, there was one case where the OA pseudoaneurysm developed 3 days after the initial trauma<sup>[6]</sup> and one in which the patient presented 6 months after the trauma.<sup>[3]</sup> The size of the lesions varied from 1 cm × 1 cm to 3 cm × 3 cm in the previously published cases; the presented pseudoaneurysm is the largest measuring 71 mm × 61 mm × 43 mm.

Regarding treatment, surgical or endovascular means are advocated.<sup>[4]</sup> Prompt management of such lesions reduces the risk of hemorrhage while alleviating pain. In the present case, due to the size of the lesion and the skin ulceration [Figure 3], surgical resection was the only reasonable choice. Few reported cases were managed by endovascular means,<sup>[3]</sup> whereas two cases were left untreated.<sup>[2,6]</sup> The authors of the first case reported regression of the mass after 6 months of follow-up,<sup>[6]</sup> whereas in the other case the pseudoaneurysm seemed to remain stable on a 2-year follow-up.<sup>[2]</sup> The rarity of OA pseudoaneurysms renders the assessment of each treatment efficiency and any suggestions regarding the dilemma of to

treat or not to treat rather difficult. Nonetheless, the risk of hemorrhage should always be considered; thus, very careful and close observation of future patients harboring a pseudoaneurysm of the OA is obligatory.

## CONCLUSION

This manuscript presents the successful surgical resection of the largest (71 × 61 × 43 mm) OA pseudoaneurysm published in the literature highlighting the importance of the diagnosis and surgical treatment. The etiology of the OA pseudoaneurysm development among published cases is also discussed, stressing the role of OA anatomy on their pathogenesis as the subgaleal part of the occipital artery, located above the level of the superior nuchal line, is the most vulnerable to injury. OA pseudoaneurysms are extremely rare and data comparing the optimal diagnostic and treatment modalities are lacking. Nevertheless, pseudoaneurysms of the OA should always be considered in the differential diagnosis of pulsatile masses of the occipital region and should promptly be managed to reduce the risk of hemorrhage while alleviating pain.

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## Conflicts of interest

All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

**Ethical approval:** For this type of study informed consent was signed and obtained from the patient.

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