

# Fatal Cataclysmic Otorrhagia and Epistaxis Due to a Ruptured Aneurysm of the Petrous Internal Carotid Artery: A Case Report

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**How to cite this paper:** Sy, A., Diallo, M.D., Diouf, K., Ndiaye, P.I. and Diallo, B.M. (2023) Fatal Cataclysmic Otorrhagia and Epistaxis Due to a Ruptured Aneurysm of the Petrous Internal Carotid Artery: A Case Report. *International Journal of Otolaryngology and Head & Neck Surgery*, 12, 341-346.

<https://doi.org/10.4236/ijohns.2023.125036>

**Received:** July 26, 2023

**Accepted:** September 19, 2023

**Published:** September 22, 2023

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## Abstract

**Background:** Aneurysms of the internal carotid artery within the petrous temporal bone are extremely rare; their true incidence is unknown. The exact cause is unclear: they may be congenital or result from trauma, infection, or radiation. **Aim:** We report a case of massive otorrhagia and epistaxis from a ruptured aneurysm of the petrous internal carotid artery. **Case Presentation:** A 34-year-old man presented to our department for the first time with repeated left otorrhagia ongoing for 5 years, left sided pulsatile tinnitus and left conductive hearing loss. In his history, we noted a right hemi-corporeal deficit of sudden onset one month ago and the head-CT showed a left frontoparietal subarachnoid hemorrhage without any visualised vascular malformation. Otomicroscopy showed a pulsatile mass visible at the posterior part of the hypotympanum. There was a right-sided hemiparesis estimated at 2/5 with no disorder of the sensitivity. After hemodynamic stabilization, the patient was discharged from the hospital and treatment was scheduled in interventional radiology and neurosurgery unit. Unfortunately the patient presented at home with a cataclysmic hemorrhage by massive otorrhagia and epistaxis and arrived dead at the emergency unit. **Conclusion:** The treatment of a petrous carotid aneurysm must be carried out quickly considering the risk of rupture leading to a cataclysmic hemorrhage that can be rapidly life threatening.

## Keywords

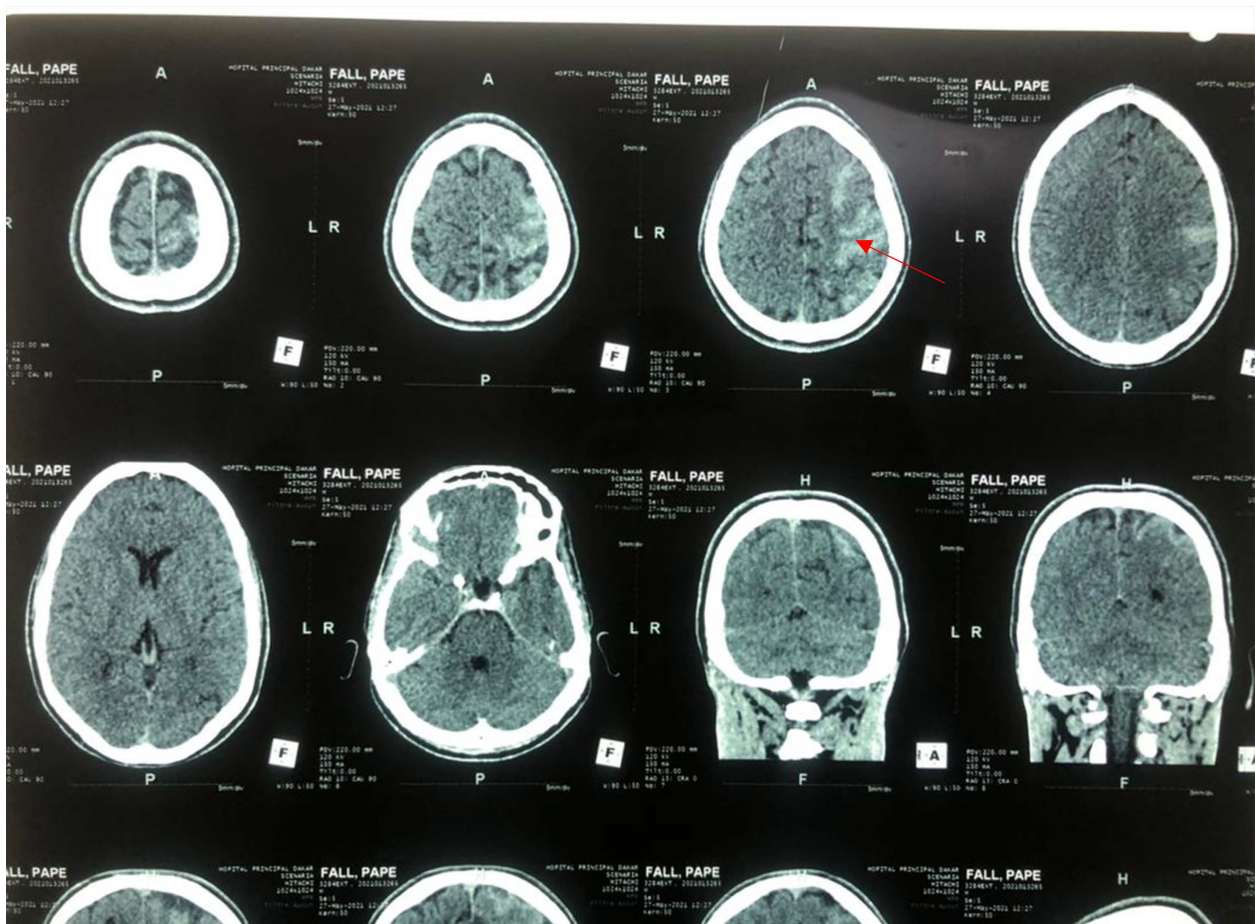
Aneurysms, Petrous Internal Carotid Artery, Otorrhagia, Pulsatile Tinnitus

## 1. Introduction

Aneurysms of the internal carotid artery within the petrous temporal bone are extremely rare; their true incidence is unknown. The exact cause is unclear: they may be congenital or result from trauma, infection, or radiation [1]. Many are discovered incidentally in patients who require CT scans for other reasons [2]. They may increase in size and lead to thromboembolic complications and or rupture which could be fatal [3]. Treatment requires multidisciplinary collaboration (ENT, neurosurgery, radiology, vascular surgery). It can be performed either with a surgical or endovascular approach. We report a case giving rise to repeated otorrhagia episodes, and ending fatally.

## 2. Observation

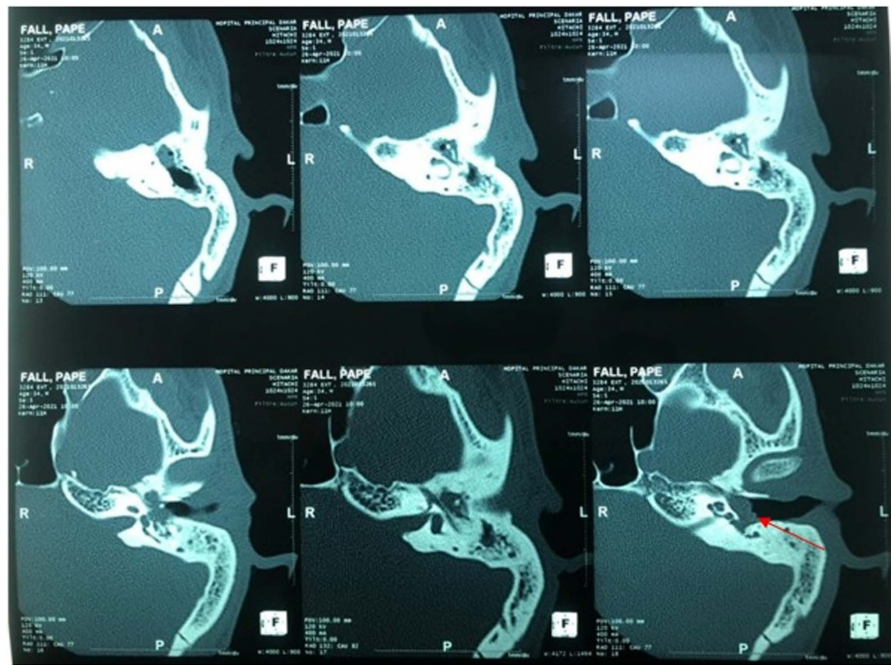
A 34-year-old man presented to our department for the first time, with repeated left otorrhagia ongoing for 5 years, left sided pulsatile tinnitus and left conductive hearing loss. In his history, we noted a right hemi-corporeal motor deficit of sudden onset one month prior to presentation and the head-CT showed a left frontoparietal subarachnoid hemorrhage without any visualised vascular malformation (Figure 1).



**Figure 1.** Brain CT axial section showing left parieto-frontal hyperdensity (red arrow).

Otomicroscopy, after gentle aspiration, showed a pulsatile mass visible at the posterior part of the hypotympanum, from which moderate bleeding originated. There was a right-sided hemiparesis estimated at 2/5 with no hemi-anesthesia.

The laboratory tests revealed a microcytic, hypochromic anemia with haemoglobin at 8.3 g/dl. The CT scan of the temporal bones coupled with arteriography showed an aneurysm at the origin of the left internal carotid artery on its intra petrous portion with protrusion at the level of the hypotympanum and partially of the mesotympanum (**Figure 2** and **Figure 3**).



**Figure 2.** CT scan of the petrous bones, axial section: filling of the tympanic cavity and mastoid (left), demonstration of an aberrant course of the ICA in the left middle ear coming into contact with the eardrum (red arrow).



**Figure 3.** Arteriogram showing false aneurysm of left internal carotid artery (red arrow).

We performed blood transfusions and packing of the external auditory canal to provide haemostasis. After hemodynamic stabilization, the patient was discharged from the hospital and treatment was scheduled in interventional radiology and neurosurgery unit. Unfortunately the patient presented at home with a cataclysmic hemorrhage by massive otorrhagia and epistaxis and arrived dead at the emergency unit.

### 3. Discussion

Aneurysms of the petrous internal carotid artery (ICA) are rare and may occur as a result of infection, penetrating trauma, radiation therapy, arterial dissection, fibromuscular disease [4] or, they may be congenital.

Petrous ICA aneurysms can produce a wide range of clinical signs and symptoms, depending on the aneurysm's size, direction of growth, and location within the carotid canal [1]. Lateral extension of the lesion into the middle ear cavity may lead to pulsatile tinnitus, progressive hearing loss, and vertigo [5]. Petrous ICA aneurysm should be considered in the differential diagnosis of pulsatile tinnitus [6].

Petrous ICA aneurysm may grow and rupture or become a potential source of thrombo-embolic complications (ischaemic stroke of thrombo-embolic origin) [3]. Rupture of the aneurysms may occur spontaneously, presenting with profuse epistaxis via the eustachian tube and or with massive otorrhagia [7] which can be rapidly fatal by exsanguination [8]. This was the case in our patient. This presentation is thought to occur in 25% of patients with petrous aneurysms, but the true incidence is not known [3].

Massive otorrhagia has limited differential diagnoses, such as glomus tumors and vascular lesions, including uncovered high jugular bulbs, ICA aneurysmal lesions, hemangioma, arteriovenous malformations [9], and persistent stapedia artery [10].

CT angiography of the head and neck can provide a definite diagnosis and give the following information: an estimate of aneurysmal size, the location of the aneurysm, identification of associated arterial abnormalities, differentiate other vascular lesions of the temporal bone, and a qualitative assessment of the patency of the circle of Willis [11].

Treatment depends on the size of the aneurysm, its location, and the patient's clinical condition [12]. It requires multidisciplinary collaboration (ENT, neurosurgery, radiology, vascular surgery). It can be performed either with a surgical or endovascular approach. However, since access to the petrous segment of the ICA is challenging, open surgery is not the primary intervention. Today, minimally invasive endovascular techniques, such as coil embolization and stenting, have replaced open surgery [9].

### 4. Conclusions

Although a petrous carotid aneurysm is extremely rare, it should be considered

in the differential diagnosis of otorrhagia and pulsatile tinnitus. The treatment must be carried out quickly considering the risk of rupture leading to a cataclysmic hemorrhage that can be rapidly life threatening.

### Informed Consent

Informed consent was obtained from the patient's family to report this case.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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