

# A Rare and Fatal Complication of Ear Syringing: Rupture of Pseudoaneurysm at Petrous Internal Carotid Artery

Santosh Kumar Swain, Satya Sundar Gajendra Mohapatra<sup>1</sup>

Departments of Otorhinolaryngology and <sup>1</sup>Radiodiagnosis, IMS and SUM Hospital, Siksha "O" Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India

ORCID:

Santosh Kumar Swain: <https://orcid.org/0000-0001-7933-4414>

Satya Sundar Gajendra Mohapatra: <https://orcid.org/0000-0003-3729-886X>

## Abstract

Ear syringing is a common procedure done for cleaning wax from the ear canal. Rupture of the pseudoaneurysm at the petrous part of the internal carotid artery (ICA) due to ear syringing is an extremely rare incidence in clinical practice. Sudden and profuse bleeding from the ear is the clinical presentation in case of ruptured pseudoaneurysm of ICA at the petrous part. Presence of the cholesteatoma at the middle ear cleft may be an etiology causing rupture of the pseudoaneurysm at the petrous part of the ICA, but the forceful ear syringing is an uncommon cause for the rupture of pseudoaneurysm. Radiological imaging is an important tool for the diagnosis. Endovascular technique is often used for the treatment of pseudoaneurysm of the ICA. Here, we are reporting an uncommon complication of forceful ear syringing making rupture of the pseudoaneurysm of petrous ICA leading to fatal spontaneous and profuse bleeding from the ear.

**Keywords:** Ear syringing, endovascular coil embolization, internal carotid artery, pseudoaneurysm

## INTRODUCTION

Pseudoaneurysm at the petrous part of the internal carotid artery (ICA) is an extremely uncommon clinical incidence. Most of the petrous ICA pseudoaneurysm is larger in size and fusiform and thought to be congenital.<sup>[1]</sup> Head injury, tumor invasion, radiation therapy, fibromuscular disease, complications of surgery, and chronic otitis media are some reported causes of pseudoaneurysm of the petrous ICA.<sup>[2]</sup> They are often clinically asymptomatic. The clinical presentation of ICA pseudoaneurysm depends on its site, direction, and size of the growth. In case of patients with pseudoaneurysm, there is a risk for rupture and severe bleeding by slight trauma leading to life-threatening situation. Nevertheless, rupture of pseudoaneurysm of petrous ICA due to forceful ear syringing is extremely rare. Here, we are reporting a case of ruptured pseudoaneurysm of petrous ICA which is an extremely rare and fatal complication of ear syringing and was successfully treated by endovascular coil embolization for controlling bleeding.

## CASE REPORT

A 42-year-old male attended at the emergency department with sudden onset of profuse and projectile bleeding from the

right ear. Immediately, the bleeding was controlled by tight packing of the ear canal. He had no previous history of any head trauma. In his previous history, he had no ear discharge but only had a history of forceful ear syringing few hours back by his local physician for removal of the wax. As per patient history, the ear syringing was forceful and painful. He had also a history of two episodes forceful ear syringing in the last month for cleaning ear canal but was unsuccessful. Immediately, otoscopic examination was not possible for anticipating profuse bleeding from the ear after pack removal. Computed tomography (CT) scan was done and showed a mass in the middle ear with destruction of the tegmen tympani superiorly and proximal petrous part of the carotid canal anteriorly [Figure 1]. The middle ear mass was also extending medially to the petrous apex. Magnetic resonance imaging (MRI) with contrast showed a heterogeneous and

**Address for correspondence:** Dr. Santosh Kumar Swain, Department of Otorhinolaryngology, IMS and SUM Hospital, Siksha "O" Anusandhan (Deemed to be University), Bhubaneswar, Odisha, India. E-mail: [santoshvoltage@yahoo.co.in](mailto:santoshvoltage@yahoo.co.in)

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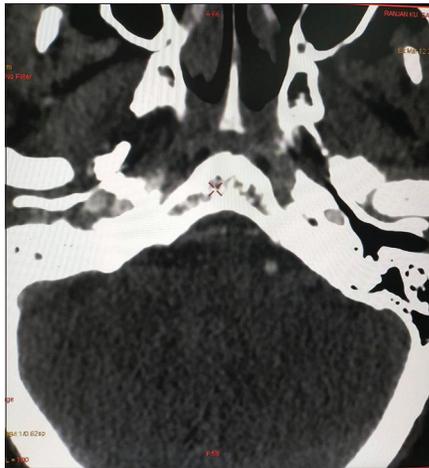
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hypodense lesion in the middle ear [Figure 2]. A CT and MRI angiography of bilateral ICA revealed a pseudoaneurysm of the ICA on the right with a tear but no evidence on the left side [Figure 3]. The patient was sent to the interventional radiologist for endovascular coil embolization. Emergency coil embolization [Figure 4] of the petrous part of the ICA was done. He did not experience any bleeding or complications following embolization. He remains symptoms free for 6 months of follow-up.

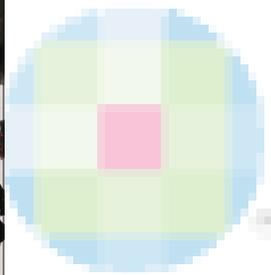
## DISCUSSION

Pseudoaneurysm of the extracranial ICA is an uncommon finding. The ruptured pseudoaneurysm of the petrous ICA is even an extremely rare incidence and uncommonly found in clinical practice.<sup>[3]</sup> There are different mechanisms for etiology for formation of aneurysms of the petrous ICA which are congenital, traumatic, and mycotic. Infections at the middle ear cleft may lead to bone erosion and involve the adventitia of the ICA, which may lead to weakening and aneurismal

dilation of the vessels.<sup>[4]</sup> The blunt or penetrating head trauma and infections such as osteomyelitis, mycotic, or arteritis may lead to arterial degeneration. Iatrogenic cause such as surgical or endovascular treatment or neoplastic lesions involving skull base area may cause the ICA aneurysm. The genetic causes like Marfan syndrome and degenerative lesions like fibromuscular dysplasia or arteriosclerosis are some documented etiologies for extracranial aneurysm.<sup>[5]</sup> In our case, the cause for formation of pseudoaneurysm is may be congenital, as there was no relevant history for acquired cause found. Ruptured pseudoaneurysm of petrous ICA is mainly suspected here due to forceful and traumatic ear syringing. The petrous segment of the ICA starts from the carotid's entrance to the cranium through carotid channel which presents anterior to the jugular foramen and medial to the styloid process till their exit through the cavernous sinus. The petrous part of the ICA has two important components: horizontal and vertical with knee in between them. There are two arteries originating from the petrous part of ICA which are vidian and caroticotympanic arteries. The vidian branch goes anteriorly and inferiorly through the foramen



**Figure 1:** Computed tomography temporal bone shows mass in the middle ear



**Figure 2:** Magnetic resonance imaging shows heterogeneous and hypodense mass in the middle ear



**Figure 3:** Magnetic resonance angiography shows petrous internal carotid artery pseudoaneurysm



**Figure 4:** Endovascular embolization by coiling of ruptured petrous internal carotid artery pseudoaneurysm

lacerum and anastomosis with the branches of the external carotid artery. The caroticotympanic artery is an embryologically vestige originating from the hyoid artery and arises from the petrous carotid knee and goes superiorly through the stapedius muscle and provides blood supply to the middle ear cavity.<sup>[6]</sup> The cervical petrous part of the ICA prone to stretch forces and lead to dissection and formation of pseudoaneurysm at the cervical part which is often mobile than petrous portion.<sup>[7]</sup> The fibromuscular dysplasia is explained for etiology of congenital aneurysms at the petrous carotid artery. The muscular defect may be seen at the acute angulation of the ICA branches emerging points. The aneurysms of this segment of ICA are often caroticotympanic segment. The clinical presentations depend on the direction of its expansion. The clinical presentations include headache, cranial nerve palsies (third to sixth), hearing loss, tinnitus, and bleeding from the nose and ear. However, few patients may remain asymptomatic in petrous ICA pseudoaneurysm, whereas massive bleeding from the ear was the only symptom in our case. The petrous ICA aneurysm is often diagnosed radiologically by CT-plus MRI and magnetic resonance angiography which confirms the vascular nature of the lesions. The differential diagnoses of the petrous ICA aneurysm are cholesterol granuloma, high jugular bulb, jugulotympanic glomus tumor, and aberrant carotid artery. The bony plate dividing the vertical segment of the petrous part of internal auditory canal from the eustachian tube is extremely thin and often dehiscent in 4 out of the 10 cadaveric demonstrations.<sup>[8]</sup> The treatment of petrous carotid pseudoaneurysm is often individualized. The treatment in the petrous pseudoaneurysm has two options, which include surgical clipping of the arterial aneurysm and endovascular technique such as coiling, stent-assisted coiling, and flow diversion stents. The treatment modality depends on the patient's factor and surgical accessibility to the aneurysm site.<sup>[9]</sup> The treatment needs multidisciplinary team approach. The presence of petrous carotid aneurysm is at inaccessible location need endovascular occlusion or ligation of ICA. The present-day treatment of ICA aneurysm is balloon occlusion with or without a bypass by external carotid artery, embolization by coils, remodeling by stents, or conservative management through serial imaging.<sup>[10]</sup> Endovascular repair with coil was successful in our case. The ligation of ICA is not a good option for extracranial ICA lesions as there is more chance of stroke. The ligation of ICA has a 24% chance of ischemic complications in the treatment of ICA aneurysm.<sup>[11]</sup> Extracranial ICA bypass followed by carotid ligation is thought to reduce the risk of stroke, but it does not exclude a thromboembolic event from occluded artery.<sup>[12,13]</sup> In case of asymptomatic patients with incidental diagnosis, the ICA pseudoaneurysm is managed conservatively with serial images. In our case, immediately endovascular embolization by coils was done with successful outcome.

## CONCLUSION

Aneurysm of the ICA and its rupture at the intrapetrous site is an extremely rare incidence. Due to complication of forceful ear syringing, rupture of petrous ICA aneurysm is an extremely rare incidence. Its clinical presentations depend on

its direction of expansion and may lead to mild hearing loss to fatal bleeding from the ear. Treatment of ICA pseudoaneurysm is often individualized, and the treatment of petrous ICA pseudoaneurysm is surgically inaccessible and so need endovascular occlusion. Forceful ear canal syringing should be discouraged and should be avoided from the nontrained and nonskilled person. A routine follow-up after endovascular coiling is must for successful outcome.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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