

## Vertebrobasilar dolichoectasia and trigeminal neuralgia

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**Section:** Neuroradiology

**Area of Interest:** Arteries / Aorta

**Procedure:** Diagnostic procedure

**Procedure:** Intraoperative

**Imaging Technique:** MR

**Imaging Technique:** Image manipulation / Reconstruction

**Special Focus:** Dilatation Pathology Case Type: Clinical Cases

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**Patient:** 55 years, male

### Clinical History:

The patient presented with pain on the left side of the face for 8 months. Pain was in the lower half of the face which used to aggravate by cold air on the face, drinking cold water and brushing teeth. The pain used to subside spontaneously, was continuously progressive, presently not relieved by analgesics.

### Imaging Findings:

MRI brain plain study with CISS sequence was done, which showed dilated tortuous vertebrobasilar artery complex (Fig.1a) compressing the left trigeminal, abducent, facial, vestibulocochlear nerves and right trigeminal nerve (Fig. 1b, c) and right oculomotor nerve (Fig. 1d). Bilateral internal carotid arteries were also dilated (Fig. 1e). The patient was scheduled for left retromastoid craniotomy and microvascular decompression of trigeminal nerve. Per-operatively a large dolichoectatic basilar artery (BA) was seen significantly compressing the left trigeminal nerve at root entry zone and the nerve thinned out and flattened (Fig. 2). A teflon patch was placed after relieving the compression over the nerve.

### Discussion:

Tortuously dilated and elongated basilar artery (BA) and/or vertebral artery (VA) is termed vertebrobasilar dolichoectasia (VBD). This was first proposed by Smoker et al [1]. As per the angiography and autopsy study results the incidence is <0.05% [2].

VBD is often observed in older male hypertensive patients suggesting causative factors to be hypertension and atherosclerosis [3]. In children smooth muscle atrophy and reticular fibre deficiency in the vessel wall is frequently encountered [4]. VBD is not uncommonly associated with congenital conditions.

Clinical presentation is non-specific and accounts to its compressible effect on adjacent structures. Commonly present with brainstem infarcts and even results in death due to vital areas involvement [2]. Another common effect is cranial nerve damage which is seen to involve almost all nerves. The nerve root compression of facial and trigeminal nerves due to pulsations of VBD manifest as trigeminal neuralgia (TN) and muscle spasms [5] and are resistant to drugs as seen in our index case. Rarely CSF flow is obstructed to result in hydrocephalus.

#### Imaging:

1. CT/CT angiography: Imaging criteria used for the diagnosis are as proposed by Smoker et al. Bifurcation point of BA beyond the level of suprasellar cistern is termed elongation and calibre of >4.5 mm is dilated [6].
2. MRI/MR angiography: Used to detect the complications and associated abnormalities. 3D CISS/3D FIESTA are the preferred sequences which clearly demonstrate cranial nerves and their adjacent anatomy. Ubogu et al. defines as length >29.5 mm, deviated vessel from the line connecting BA origin point to its bifurcation by >10 mm, formation of BA at/above level of pontomedullary junction, termination above suprasellar cistern, extension beyond the margin of the clivus or dorsum sellae on either side. VA is elongated if length >23.5 mm, or at any point the vertical distance from the connection of the skull entry point and BA starting point is >10 mm [7].
3. Digital subtraction angiography is the standard method to diagnose and treat aneurysms (fusiform/saccular), dissections arising from the ectatic vessels.

Management: Presently treatment is directed at symptoms/complications [2, 8, 9].

1. Diverting blood flow through the ectatic vessels by vascular anastomosis.
2. Flow diversion technology.
3. Overlapping stent or coil-assisted stent reconstruction.

Microvascular decompression is the most effective treatment because all the symptoms are related to compression of vital structures [8] which was attempted successfully in our case.

VBD is a progressive vasculopathy with multiple causative factors. It is independently associated with neurological morbidity and mortality due to its diverse effects on the adjacent structures in the brain. Management is directed at symptom relief and close follow up to detect possible complications with interventions as necessitated.

**Differential Diagnosis List:** Vertebrobasilar dolichoectasia causing trigeminal neuralgia, Space-occupying lesion, Infarct

**Final Diagnosis:** Vertebrobasilar dolichoectasia causing trigeminal neuralgia

#### References:

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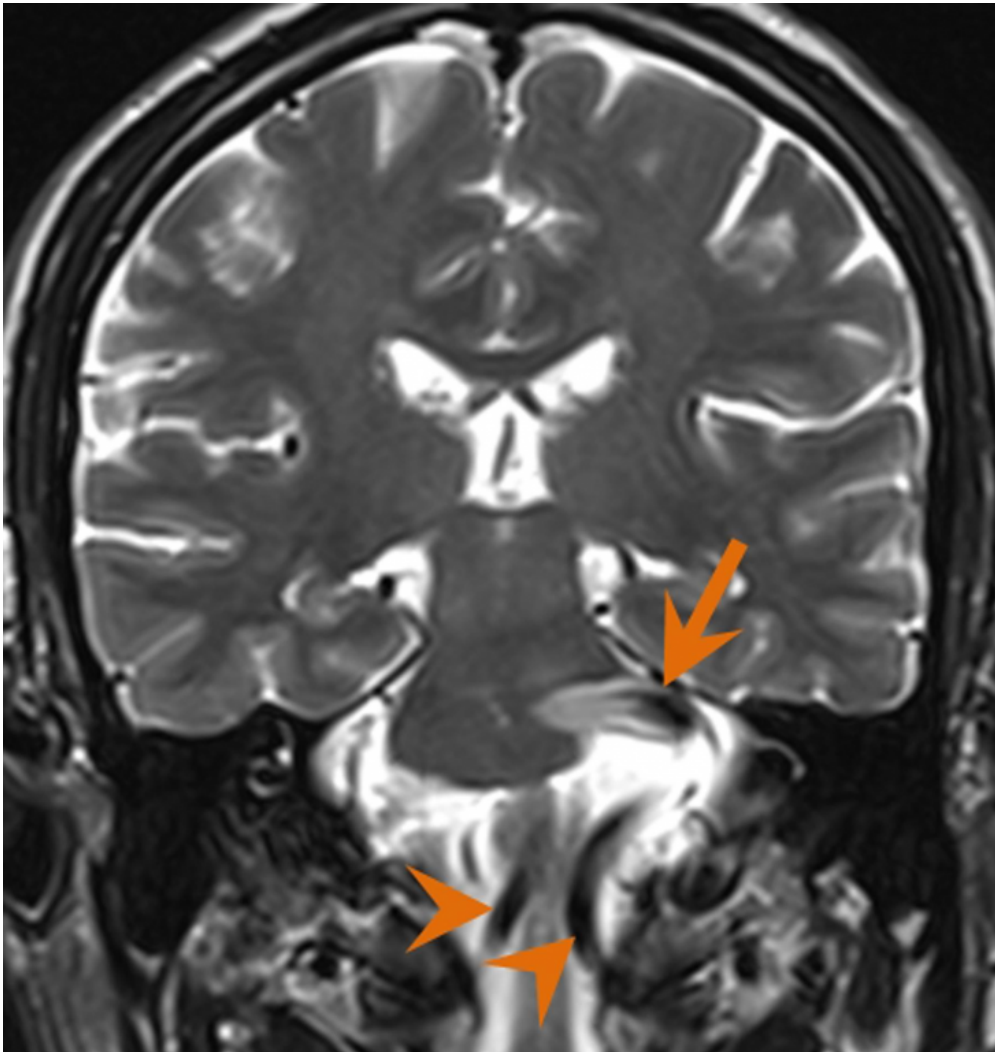
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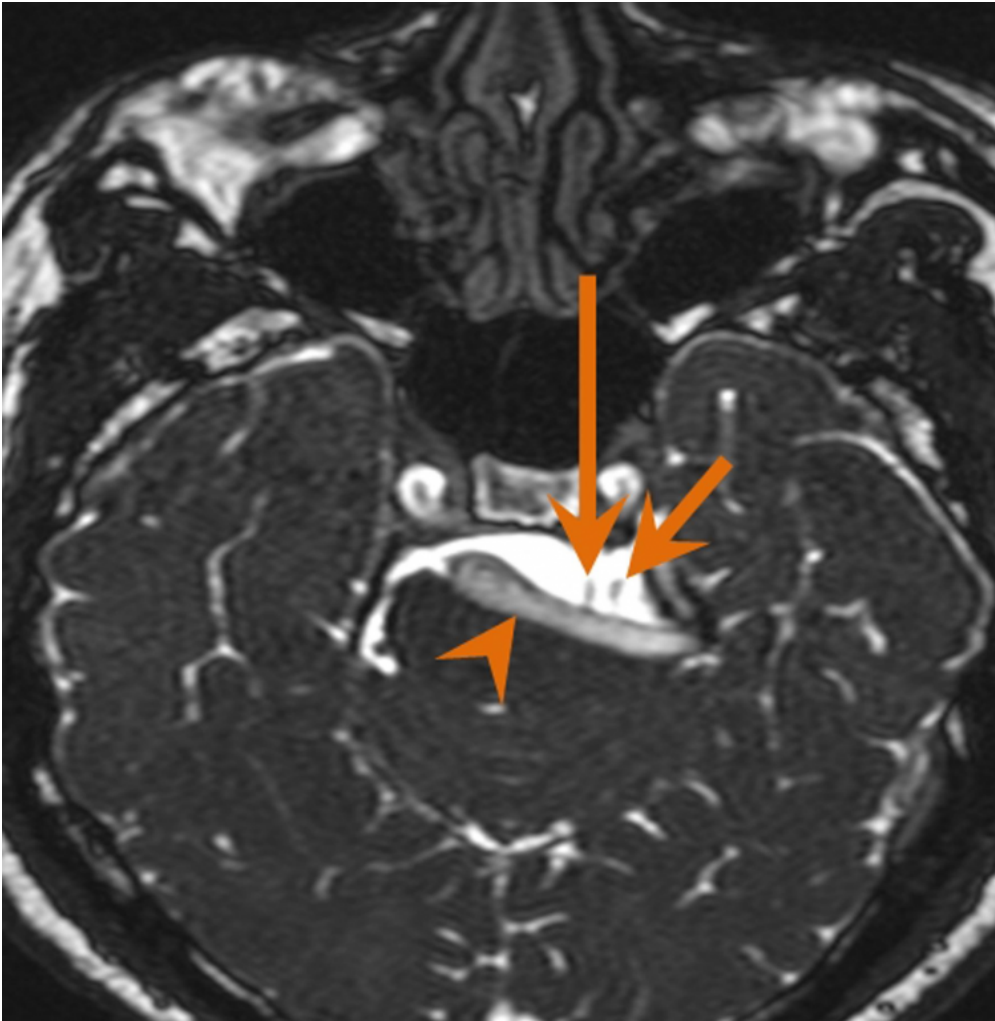
**Figure 1**

a



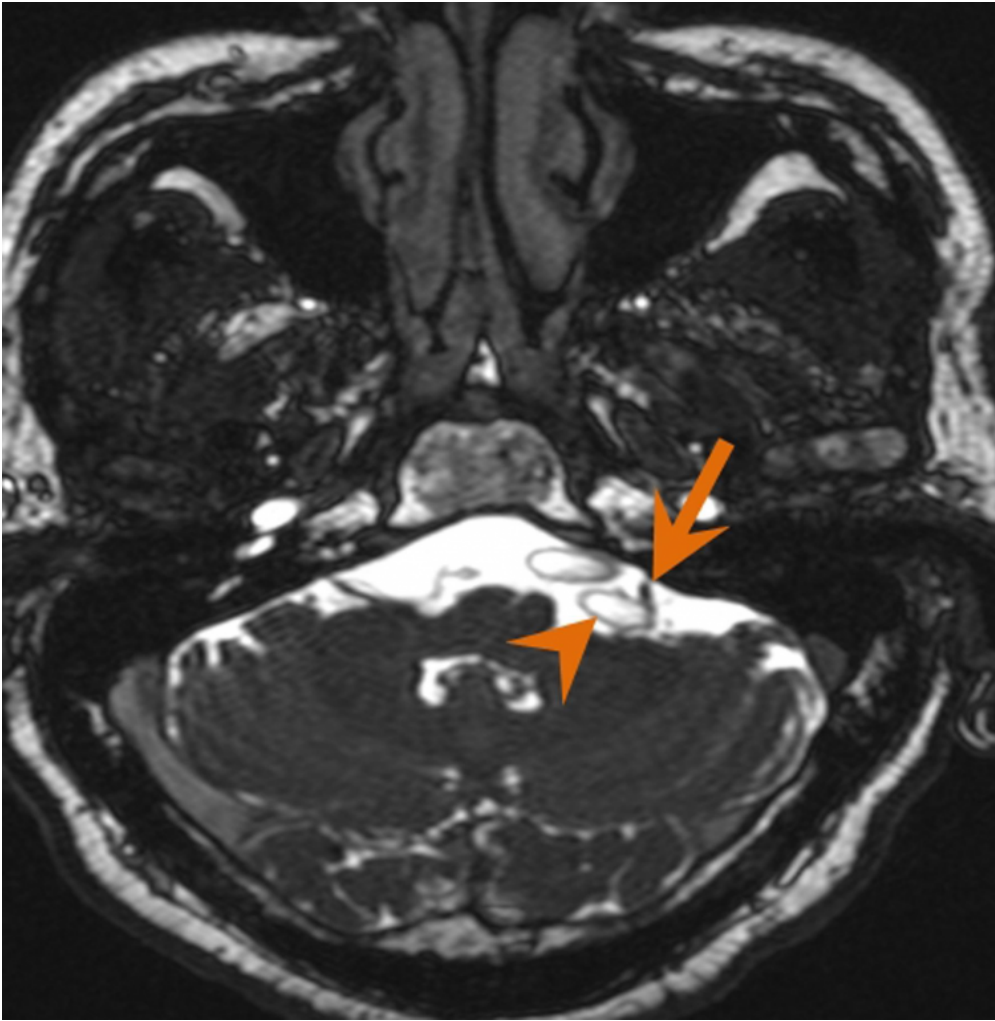
**Description:** T2W coronal image showing flow voids of bilateral vertebral arteries (arrowheads) and basilar artery (arrow) crossing the midline. **Origin:** Kiran M, Department of Radiology, Kamineni Hospital, Hyderabad, India.

**b**



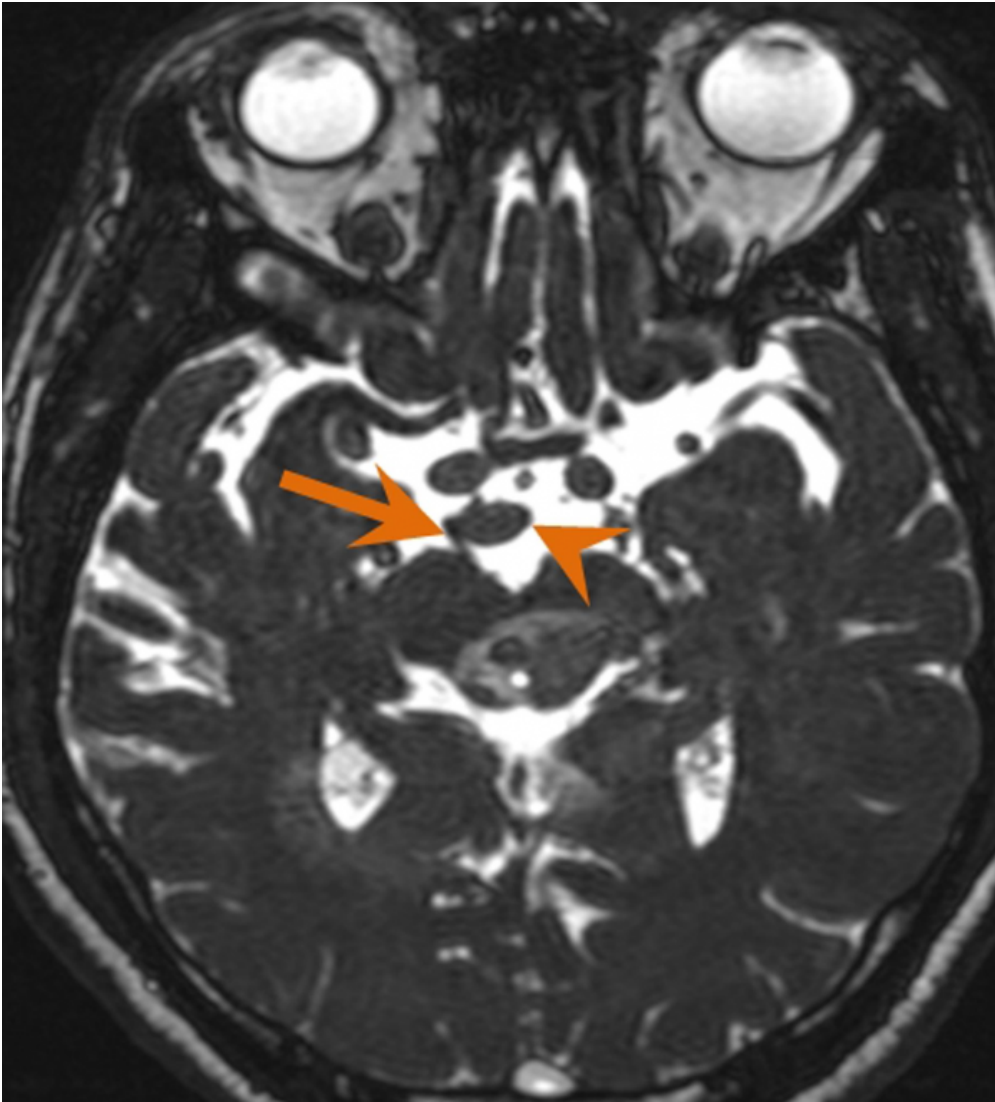
**Description:** 3D-CISS showing tortuous, dilated (6 mm) basilar artery (arrowhead) crossing midline by compressing left abducent nerve (long arrow), left trigeminal nerve (short arrow), right trigeminal nerve and reaching anterior aspect of right half of pons. **Origin:** Kiran M, Department of Radiology, Kamineni Hospital, Hyderabad, India.

**c**



**Description:** 3D CISS image to show the left vertebral artery (arrowhead) compressing left facial and vestibulocochlear nerves (arrow). **Origin:** Kiran M, Department of Radiology, Kamineni Hospital, Hyderabad, India.

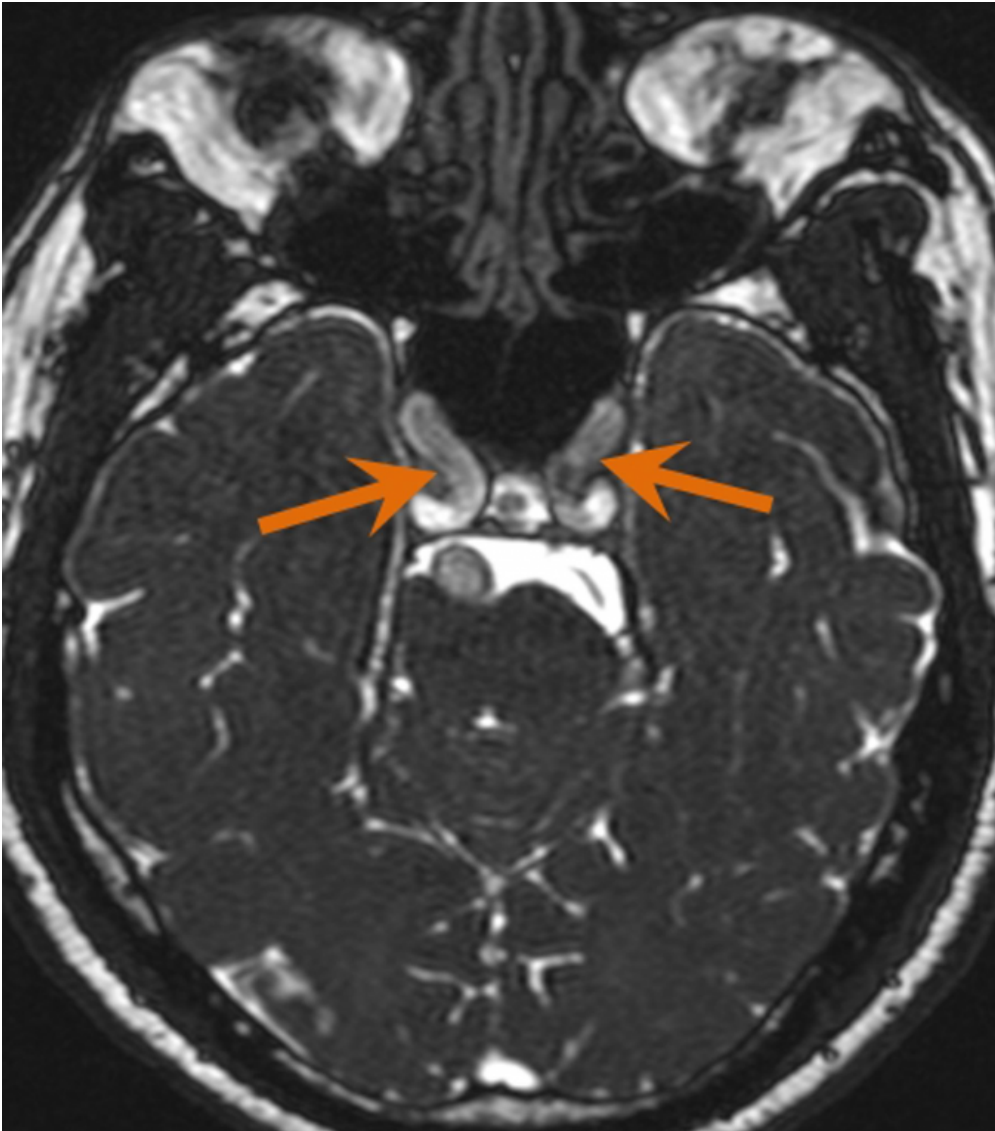
d



**Description:** 3D CISS image showing basilar artery (arrowhead) compressing the right oculomotor nerve (arrow) just before bifurcating into posterior cerebral arteries. **Origin:** Kiran M, Department of Radiology, Kamineni Hospital, Hyderabad, India.



e

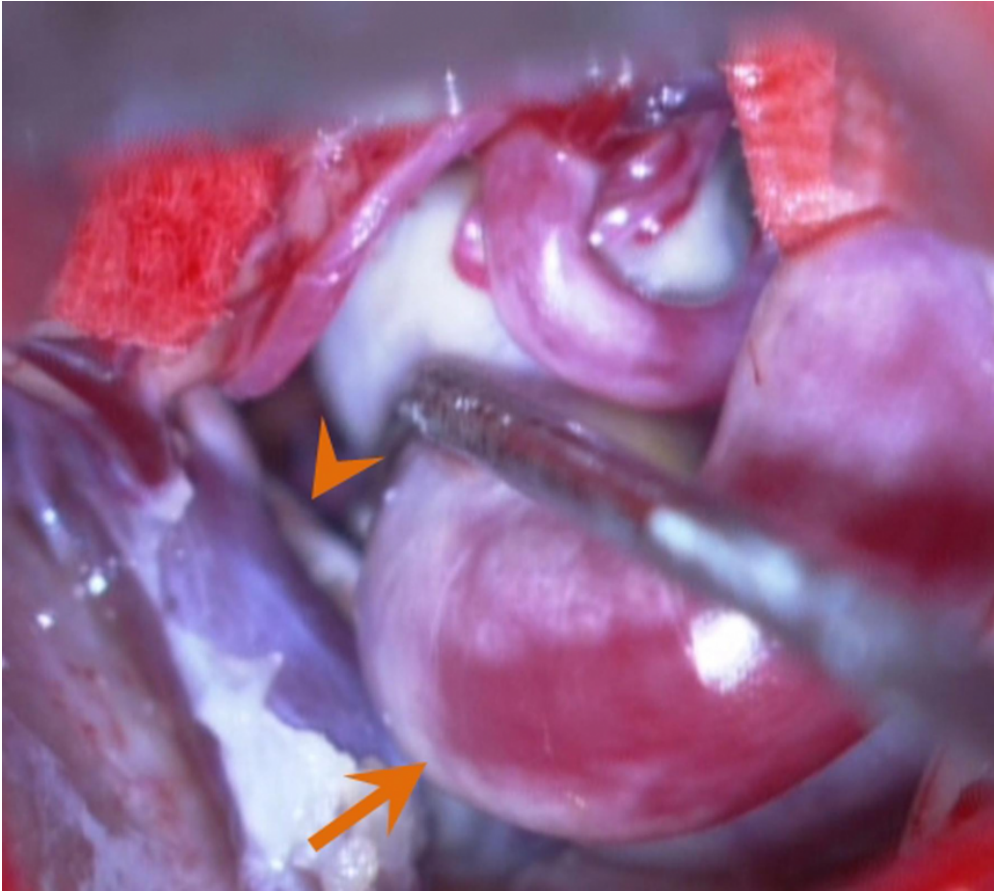


**Description:** 3D CISS image showing ectatic bilateral internal carotid arteries (arrows). **Origin:** Kiran M, Department of Radiology, Kamineni Hospital, Hyderabad, India.



**Figure 2**

**a**



**Description:** Operative picture to show the ectatic basilar artery (arrow) compressing the left trigeminal nerve (arrowhead) which is thinned out. **Origin:** Kiran M, Department of Radiology, Kamineni Hospital, Hyderabad, India.