ScientificScholar®
Knowledge is power
Publisher of Scientific Journals

www.surgicalneurologyint.com

Surgical Neurology International

**Editor-in-Chief:** Nancy E. Epstein, MD, Professor of Clinical Neurosurgery, School of Medicine, State U. of NY at Stony Brook.

*SNI: Unique Case Observations*

**Editor**
S. Ather Enam, MD, PhD
Aga Khan University, Karachi, Sindh, Pakistan

SNI
Open Access

*Letter to the Editor*

# Pathological laughter as an unusual first-presenting symptom of petroclival meningioma

Pavan Tulshiram Lanjewar[1], Mayank Tripathi[1], Simran Kaur Syal[2], Binoy Kumar Singh[1], Shailendra Anjankar[1], Charandeep Singh Gandhoke[1]

Departments of [1]Neurosurgery and [2]Pediatrics, All India Institute of Medical Sciences, Raipur, Chhattisgarh, India.

E-mail: Pavan Tulshiram Lanjewar - pavanlanjewar001@gmail.com; Mayank Tripathi - dr.mtvns@gmail.com; Simran Kaur Syal - simransyal100@gmail.com; Binoy Kumar Singh - drbinoysingh@yahoo.com; Shailendra Anjankar - anjankar.gmc@gmail.com;
*Charandeep Singh Gandhoke - charandeepsingh2008@gmail.com

***Corresponding author:**
Charandeep Singh Gandhoke, Department of Neurosurgery, All India Institute of Medical Sciences, Raipur, Chhattisgarh, India.

charandeepsingh2008@gmail.com

Received: 09 August 2024
Accepted: 24 October 2024
Published: 15 November 2024

**DOI**
10.25259/SNI_673_2024

**Quick Response Code:**

Dear Editor,

Pathological laughter is described as a sudden outburst of uncontrollable, spontaneous, and inappropriate laughter when a subjective feeling of euphoria is ruled out.[1] Pathological laughter is a rare but distinct presenting symptom associated with pathologies such as benign and malignant intra- and extra-axial brain tumors, ischemic insult to the brainstem, epileptic phenomenon, and degenerative disorders.[5] Its association with petroclival meningioma is an unusual and rare finding. The exact physiology of normal and "pathological" laughter remains poorly understood since the mechanism of normal laughing is complex.[8]

We report a case of a 42-year-old male who presented with complaints of pathological laughter for 6 weeks followed by headache, unsteady gait, weakness in the left upper and lower limbs, and difficulty in swallowing liquids for 15–20 days. On examination, his mental status was normal. He had a Glasgow Coma Scale score of 15/15 with left upper and lower limb power of 4/5 and pathological laughter. He had grade 2 facial weakness with an absent gag reflex. Cerebellar signs were positive. Preoperative contrast-enhanced magnetic resonance imaging of the brain revealed a well-defined globular extra-axial lesion in the left petroclival region, which was T1 isointense, T2 iso to hyperintense, measuring 3.5 × 4.2 × 4.0 cm with homogenous postcontrast enhancement [Figure 1]. The lesion was expanding the pontomedullary cistern and displacing the midbrain and pons toward the right side. Posteriorly, the lesion was causing a mass effect over the left cerebellar hemisphere and left middle cerebellar peduncle. The aqueduct of Sylvius was completely displaced, and the 4$^{th}$ ventricle was effaced [Figure 1]. The patient underwent right-sided Frazier's point medium pressure ventriculoperitoneal shunt followed by left retromastoid suboccipital craniotomy and gross total excision of the lesion 3 days later [Figure 2]. Postoperatively, his pathological laughter resolved completely.

Pathological laughter has been reported in lesions causing anterior and anterolateral compression and distortion of the upper brainstem. The etiopathogenesis for pathological laughter in our case can be postulated as follows:

- Compression of the pontomesencephalic brainstem and its distortion.[3,7]

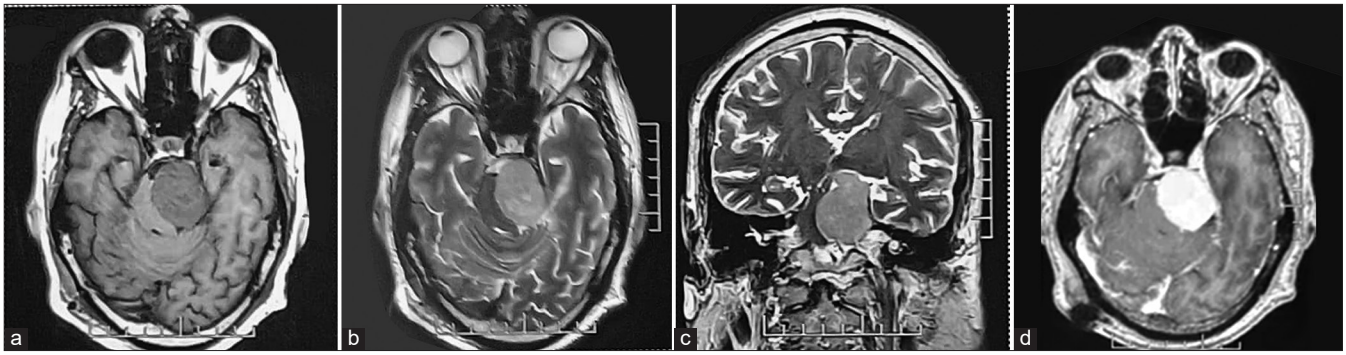


**Figure 1:** Preoperative magnetic resonance imaging brain (a - T1 axial, b - T2 axial, c - T2 coronal, d - contrast) suggestive of left petroclival meningioma with upper brainstem compression.

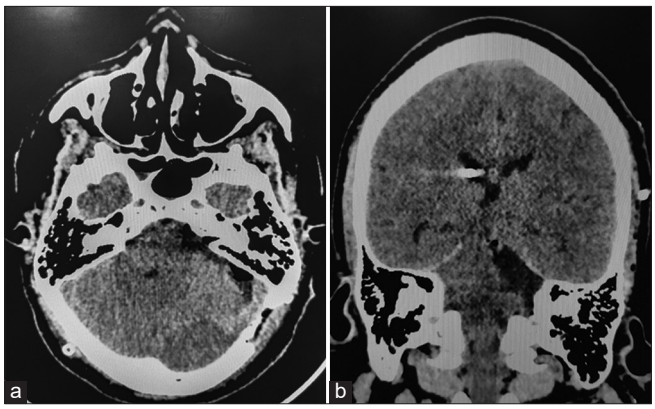


**Figure 2:** Postoperative noncontrast computed tomography scan of the brain (a - axial, b - coronal) suggestive of complete excision of the tumor with resolved brainstem compression.

- Disinhibition of the fibers from the primary motor area passing through the cerebral peduncles ventrally to reach and inhibit the periaqueductal gray matter and reticular formation in the dorsal mesencephalon.[4,7]
- Deafferentation of the cerebellum from cortical (prefrontal and cingulate cortices) and subcortical inputs (hypothalamus and brainstem serotonergic raphe nuclei).[6]
- Interference with serotonergic neurotransmission due to lesions of the raphe nuclei.[2,6]

We have reported this case to highlight the significance of pathological laughter as an early localizing symptom for petroclival meningioma and its complete resolution after surgery.

### Ethical approval

Institutional Review Board approval is not required.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

### Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

## REFERENCES

1. Adams RD, Victor M, Ropper AH. The limbic lobes and the neurology of emotion. In: Adams RD, Victor M, editors. Principles of neurology. 6th ed. New York: McGraw Hill; 1997. p. 508-21.
2. Anderson G, Ingeman-Nielsen M, Vestergaard K, Riis JO. Pathoanatomic correlation between poststroke pathological crying and damage to brain areas involved in serotonergic neurotransmission. Stroke 1994;25:1050-2.
3. Bhatjiwale MG, Nadkarni TD, Desai KI, Goel A. Pathological laughter as a presenting symptom of massive trigeminal neuromas: Report of four cases. Neurosurgery 2000;47:469-71.
4. Gosal JS, Pandey S, Das KK, Khatri D, Rangari K, Jaiswal AK, *et al*. Pathological laughter as an early and unusual presenting symptom of petroclival meningioma: A case report and review of the literature. World Neurosurg 2019;123:161-4.
5. Muzumdar D, Agrahar P, Desai K, Goel A. Pathological laughter as a presenting symptom of petroclival meningioma - case report. Neurol Med Chir (Tokyo) 2001;41:505-7.
6. Parvizi J, Anderson SW, Martin CO, Damasio H, Damasio AR. Pathological laughter and crying: A link to the cerebellum. Brain 2001;124:1708-19.
7. Shafqat S, Elkund MS, Chiocca EA, Takeoka M, Koroshetz WJ.

Petroclival meningioma presenting with pathological laughter. Neurology 1998;50:1918-9.
8. Wild B, Rodden FA, Grodd W, Ruch W. Neural correlates of laughter and humor. Brain 2003;126:2121-38.

**How to cite this article:** Lanjewar PT, Tripathi M, Syal SK, Singh BK, Anjankar S, Gandhoke CS. Pathological laughter as an unusual first-presenting symptom of petroclival meningioma. Surg Neurol Int. 2024;15:420. doi: 10.25259/SNI_673_2024