

Temporary Visual Hallucinations in a 31-year-old Female Patient Post Falcotentorial Meningioma Resection with No History of Psychosis: A Case Report

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ABSTRACT

Introduction: Falcotentorial meningiomas are rare, comprising 1%–2% of all intracranial meningiomas, arising at the junction of the falx cerebri and tentorium. These tumors may compress the quadrigeminal plate and/or splenium, leading to peduncular hallucinosis—vivid, colorful visual hallucinations of people and animals, which can persist even after tumor removal.

Case Description: A 31-year-old woman with no psychosis history presented with a bilateral visual field deficit and left extremity weakness. Brain MR imaging revealed a lobulated mass attached to the right cerebellar tentorium, posterior falx cerebri, and adjacent venous sinuses. Visual field analysis showed homonym superior quadrantanopsia. Following craniotomy and tumor removal, histology confirmed a mixed-type meningioma. Post-surgery, the patient experienced vivid visual hallucinations that resolved in two weeks, but bilateral visual field deficits remained. A post-op CT showed reduced structural compression around the lesion with slight narrowing of the quadrigeminal cistern.

Discussion : Visual hallucinations in falcotentorial meningioma patients, often as peduncular hallucinosis, occur due to compression of the quadrigeminal plate and/or splenium and may persist post-surgery if lesions are present in the cerebral peduncles or nearby midbrain areas.

Conclusion: The patient's temporary hallucinations may have resulted from post-resection tissue edema causing quadrigeminal cistern narrowing or indicate lesions in the cerebral peduncles or adjacent midbrain regions.

Keyword : falcotentorial meningioma; visual hallucination; falcotentorial meningioma complication, homonym superior qudranopsia.



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1. Introduction

Meningiomas are tumours that arise from the three membranes (meninges) surrounding the brain and the spinal cord. Although mostly benign (90%), meningiomas comprised 33.8% of all primary brain and central nervous system tumours in the United States from 2002 to 2006.[1] Defined by their localization, falcotentorial meningiomas are meningiomas localized at the junction of the tentorium and the falx cerberin and may occur at any point along the falcotentorial junction (FTJ)

from the junction of the vein of Galen and the straight sinus to the torcular herophili. Falcotentorial meningiomas are rare, and account for 1%-2% of all meningiomas.[2] Common presenting symptoms include headache in a majority of patients (with or without nausea and vomiting) along with visual changes and/or gait abnormalities.[3] Visual hallucinations are a rare phenomenon that can occur in patients with brain lesions, including meningiomas. To the best of our knowledge, Miyazawa et al reported the first case of visual hallucinations in the form of peduncular hallucinosis (PH) due to meningiomas originating in falcotentorial region was in 2001. The reason that PH is rare, even though midbrain infarction and pineal tumours are common, is unknown.[4]

2. Case Description

A 31-year-old female came to the outpatient clinic complaining of symmetrical visual field loss and weakness on the left extremities. The complaints were experienced by the patient for the last 1 month. No sudden-onset headache was experienced. The patient denied a history of diabetes mellitus or hypertension. History of trauma was denied.

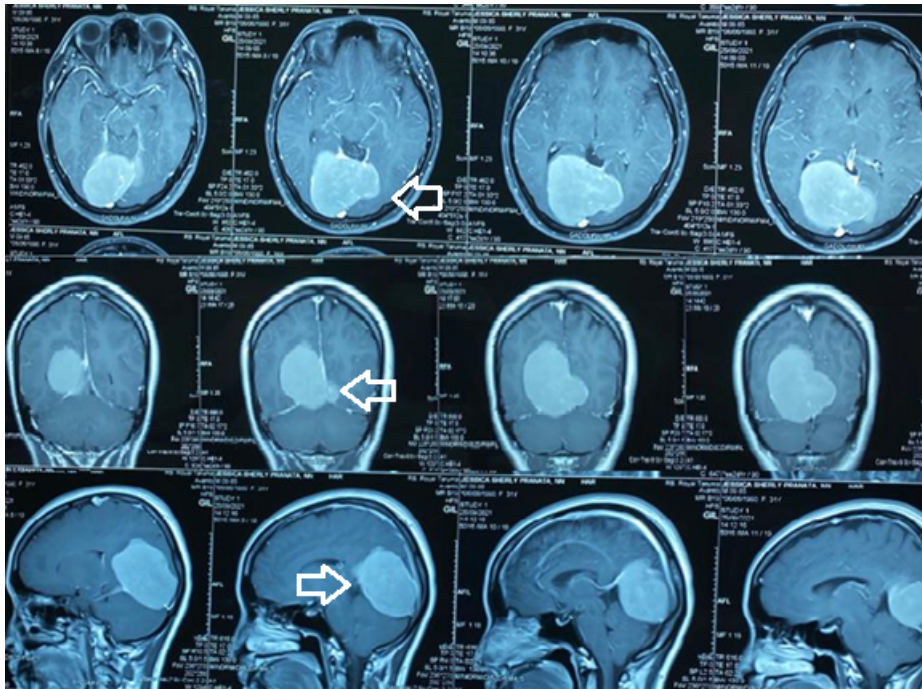


Figure 1: Magnetic resonance of axial (top), coronal (middle), and sagittal (bottom) post-contrast images: a large posterior fossa contrast-enhanced tumor mass (arrow) occupying both right and left parasagittal (dominantly right) which attached to the right cerebelli tentorium, posterior falx cerebri, posterior aspect of the superior sagittal sinus, and the right transverse sinus.

The patient's general condition was moderately ill with normal vital signs. Neurological examination revealed left hemiparesis and the patient exhibited a bilateral visual field deficit. The patient then was consulted to ophthalmologist. The best corrected visual acuity was 20/20 in both eyes with normal anterior segment findings, the pupil was isochor with no sign of relative afferent pupillary defect (RAPD). Ophthalmoscopy examination revealed papilledema in both eyes that indicates increased intracranial pressure.

Laboratory studies was normal. The chest X-ray revealed nothing out of the ordinary. Magnetic Resonance (MR) Imaging with contrast of the brain demonstrated a well-defined, contrast enhanced lobulated tumour mass measuring 6.1 cm x 5.9 cm x 6.5 cm on both right and left

parasagittal (dominantly right) which attached to the right cerebelli tentorium, posterior falx cerebri, posterior aspect of the superior sagittal sinus, and the right transverse sinus.

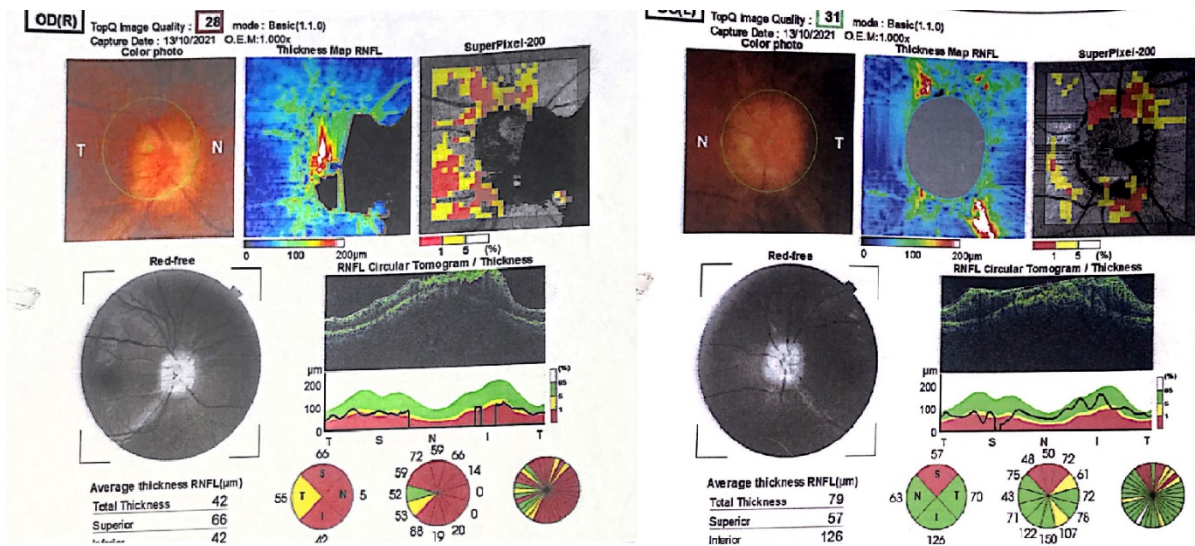


Figure 2: Optical Coherence Tomography (OCT) examination revealed papilledema in both eyes

The mass description matches the characteristic of a meningioma. The mass appeared pressing on the right hemisphere of cerebellum towards the inferior and causing a tonsillar herniation. The protrusion of the cerebelli tonsilla through the magnum foramen was about +/- 3,3mm. No intraparenchymal hyperacute infarct or acute haemorrhage was revealed. MR Angiography revealed stenosis at the vertebrobasilar junction. MR Venography revealed normal variant of the transverse sinus, sigmoid sinus, and the left internal jugular vein which each of them experienced a slight shrinkage. Optical Coherence Tomography (OCT) examination revealed papilledema in both eyes. Humphrey Visual Field Analyser (HFA) concludes a homonym superior quadrantanopsia.

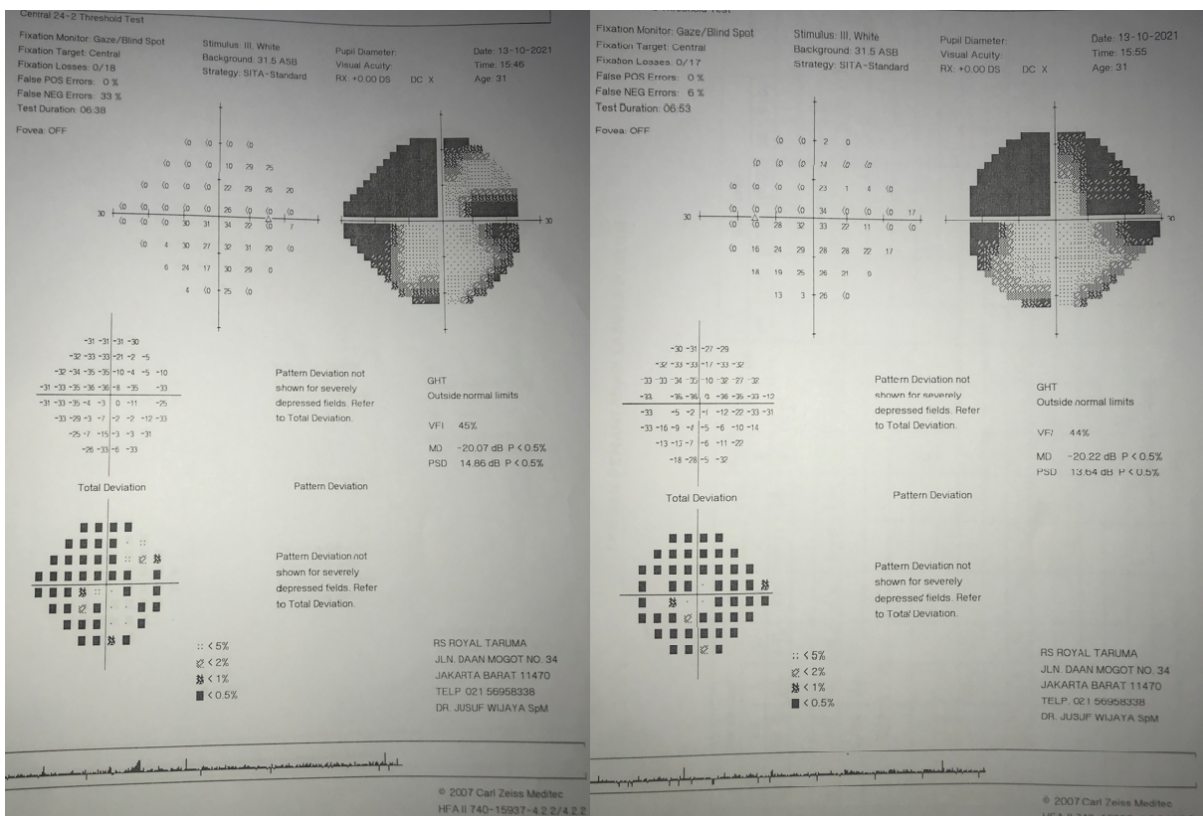


Figure 3: Humphrey Visual Field Analyser (HFA) concludes a homonym superior quadrantanopsia

The patient was planned to undergo a craniotomy tumour removal with general anaesthesia. The operation was using the parietooccipital supratentorial approach with prone position and a horse shoe design incision. The surgery only operates at the supratentorial level and did not enter the infratentorial space. The gross total resection (GTR) achieved was about +/- 98%. The surgery was uneventful, and the patient admitted to the intensive care unit for 3 days, followed by 4 days in the high care unit and returned to ward afterwards. Histopathological examination revealed a mixed type meningioma with dominantly fibrous meningioma pattern and confirmed the diagnosis of a WHO grade I meningioma.



Figure 4: horse shoe design incision (A), continued with a biparietal occipital approach (B). the meningioma (arrow) was identified and resected and only operating on the supratentorial space. The total volume of tumor resected from the patient (D).

A follow up post-surgery head Computed Tomography (CT) scan shows bone defect and soft tissue changes around the surgical area, haemostatic surgical material on the previously tumour bed region at the right occipital, structural compression around the lesion was reduced, mild cerebellar tonsillar protrusion remains unchanged, and a small increased in the narrowing of the quadrigeminal cistern. In the days following the surgery, the patient experienced gradual improvement and fully recovered in her motoric function of the left extremities. However, no improvement in the visual field deficit. In addition, after the patient woke up from the surgery, she reported the onset of intermittent visual hallucinations. The hallucinations were described as vivid and colourful scenes of more than one people surrounding her bed that would appear and disappear abruptly. They were not associated with any triggers and occurred multiple times throughout the day. The hallucinations persisted even after the patient went home.

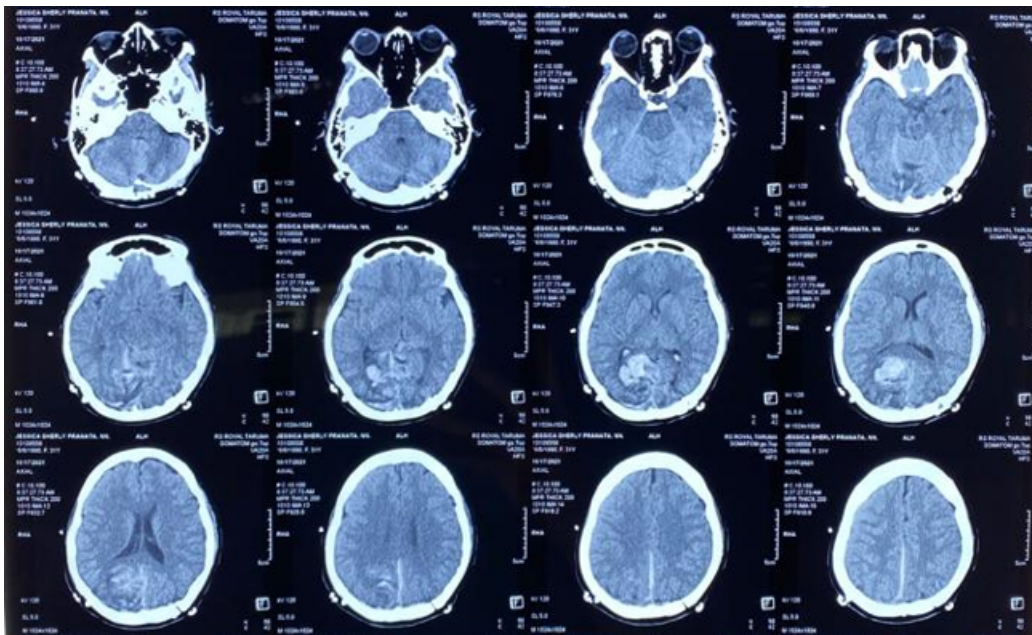


Figure 5: Post craniotomy Head CT shows bone defect and soft tissue changes around the surgical area, haemostatic surgical material on the previously tumour bed region at the right occipital, structural compression around the lesion was reduced, mild cerebellar tonsillar protrusion remains unchanged, and a small increased in the narrowing of the quadrigeminal cistern.

Given the patient's recent brain surgery, unimproved visual field deficit, and the onset of visual hallucinations, a thorough evaluation was conducted to rule out potential causes. Neurological examination was unremarkable.

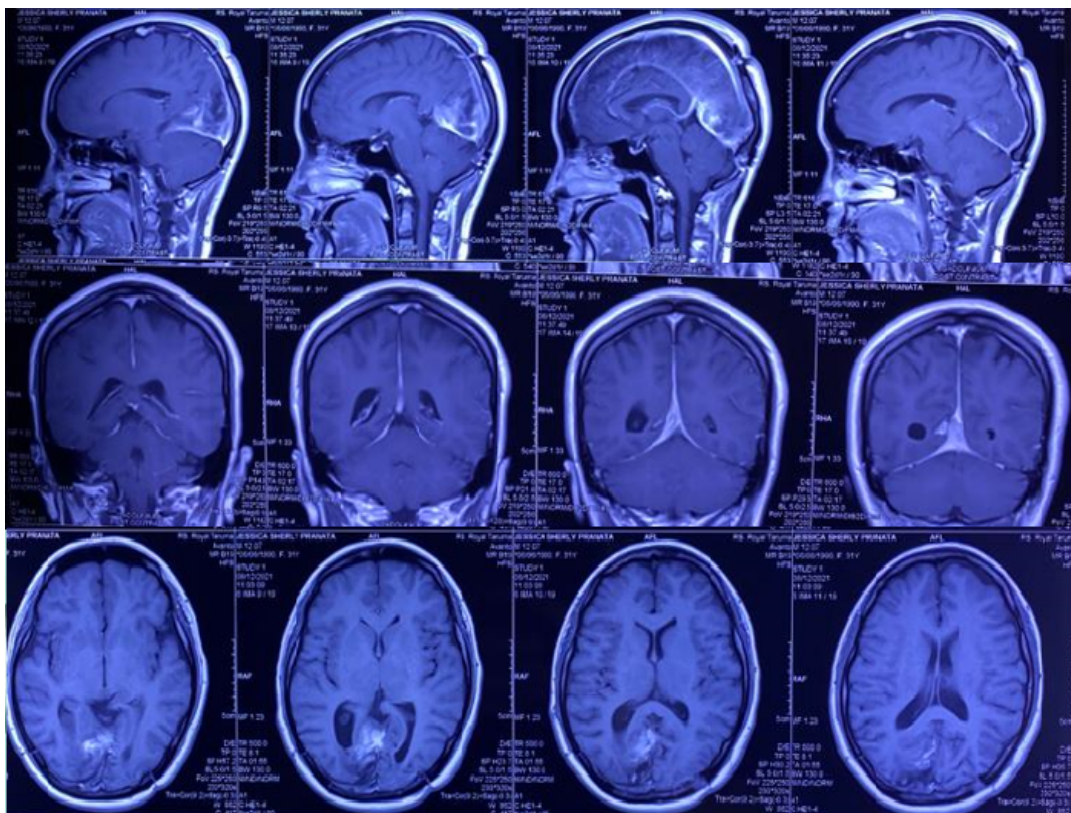


Figure 6: Follow-up MR imaging of the head three months after the surgery remained stable and no confirming tumor recurrence.

Over the course of two weeks, the visual hallucinations gradually decreased in frequency and intensity, ultimately resolving completely. Visual field defect persisted, confirmed with homonym

superior quadrantanopsia in HFA result. Another follow-up brain MR imaging three months after the surgery remained stable, confirming no tumour recurrence.

3. Discussion

The Visual changes and hemiparesis can be associated with intracranial mass effect such as meningiomas. Falcotentorial meningiomas patients present with symptoms of increased intracranial pressure (ICP) and occasionally visual symptoms related to the tumour's occipital location. The most common finding on physical examination was papilledema, sometimes accompanied by cranial nerve dysfunction (such as facial droop or homonymous hemianopsia).[5,6] In addition to a neurologic exam, a preoperative examination by a neuro-ophthalmologist, including a formal Humphrey Visual Field Analyser (HFA), funduscopic examination, and documentation of visual acuity is often helpful.[7] Meningiomas are characterized by homogenous gadolinium contrast enhancement. On T1-weighted series, they are isointense to brain parenchyma; on T2-weighted imaging, they may be hyperintense or hypointense, the latter of which is typically indicative of a fibrous or partially calcified tumour. Other potential imaging findings include surrounding edema, which may be significant, particularly in large supratentorial tumours and hydrocephalus, particularly in patients with a significant infratentorial component.[5,7] In this patient's MR imaging findings shows a well-defined, contrast enhanced lobulated tumour mass measuring 6.1 cm x 5.9 cm x 6.5 cm on both right and left parasagittal (dominantly right) which attached to the right cerebelli tentorium, posterior falx cerebri, posterior aspect of the superior sagittal sinus, and the right transverse sinus.

There are many approaches have been described for the resection of falcotentorial meningiomas, including infratentorial supracerebellar, biparietooccipital craniotomy in the sea lion position, occipital intrahemispheric transsplenic, combined supra-and infratentorial transinus, occipital transtentorial, and a combined midline occipital and suboccipital approach. Because of the limited number of falcotentorial meningioma-specific reports, it is difficult to conduct meaningful comparisons of the various approaches to these lesions. Hong et al. reported a 91% rate of GTR in 11 patients, who primarily underwent resection via the occipital transtentorial approach in the three-fourth prone position.[2,8] A parietooccipital approach with prone position and a horse shoe design incision was used in this patient, only operates in the supratentorial space, and achieved a GTR of +/- 98%.

Mortality associated with resection is rare but has been reported.[7] Significant visual impairment is exceedingly common in the immediate postoperative period, specifically cortical blindness following a bilateral occipital transtentorial approach or hemianopsia following the unilateral occipital transtentorial approach.[6,7] Nowak et al. described when the occipital transtentorial approach is used, contralateral homonymous hemianopsia is observed immediately postoperatively due to the occipital compression, conversely, the visual field deficits return to normal in most patients.[6,9] This patient's preoperative HFA test conclude a homonymous quadrantanopsia and postoperatively persist and unimproved.

Visual hallucinations are a rare complication following brain surgery, particularly in meningioma patients. The exact pathophysiology of post-operative visual hallucinations is not fully understood, but potential mechanisms include cortical reorganization, neurotransmitter imbalances, or disruption of neural circuits. Miyazawa et al reported one case of penicil meningioma originating from the falcotentorial junction that experienced a type of visual hallucinations in the form of peduncular hallucinosis (PH). The clinical syndrome of PH involves the visualization of geometric patterns and more complex kaleidoscopic scenes of landscape, flowers, birds, animals, and/or people,

which often animated, intensely coloured, mobile, vivid, and lifelike. These visions are not mistaken for reality and they are not frightening or stereotypical. Patients with PH sometimes memorize the hallucinations as vivid pictures. To the best of our knowledge, this is the first report of PH due to selective compression of the quadrigeminal plate by a pineal tumour.[4]

Peduncular hallucinosis was first described in 1922 by Lhermitte.[10] In 1927, Van Bogaert first provided the pathological confirmation of the site of the lesion. A lesion affecting the dorsal nuclei of the raphe causes transient increase of the ponto-geniculate-occipital spikes, recorded on EEG during the paradoxal sleep, and evokes potential dreams, namely hallucinosis.[11] In our case though the patients was not diagnose with peduncular hallucinosis, the visual hallucinations that the patient experienced was similar to the clinical syndrome of PH whereas the patient describes the hallucinations as vivid and colourful scenes of more than one people surrounding her bed that would appear and disappear abruptly. Over the course of two weeks, the visual hallucinations gradually decreased in frequency and intensity, ultimately resolving completely.

4. Conclusion

The temporary hallucinations that occurred on the patient may originated from complications of the narrowing of the quadrigeminal cistern due to post resection tissue edema and/or indicative of lesions in the cerebral peduncles or immediate adjacent areas.

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