

# Olfactory groove and planum sphenoidale meningioma

## *Dementia masquerade*

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**O**lfactory groove and planum sphenoidale meningiomas are rare. They are benign, slow-growing tumours. Cognitive impairment and behavioural changes—the common presentation of this condition—can be mistaken for dementia or depression.

Although olfactory meningiomas are rare, they are treatable and reversal of dementialike symptoms can be expected. Dismissing cognitive impairment and behavioural changes as part of dementia, depression, or aging might lead to loss of opportunity for treatment. Family physicians serve as patients' first point of entry into the health care system and as the continuing focal point for all necessary health care services.

The case we present illustrates the importance of suspecting an organic lesion when encountering a patient with features suggestive of early-onset dementia, especially in the primary care setting.

### Case

A 60-year-old man presented with a 10-month history of progressively worsening short-term memory impairment and marked behavioural changes. His wife reported that his initial symptoms were forgetting events and appointments, progressing to being unable to find his way home. He became socially withdrawn and apathetic, and demonstrated inappropriate social behaviour. He consequently lost his job owing to poor performance. However, he was still capable of self-care. He had no past medical history of illness or known exposure to ionizing radiation, and he was described as meticulous and intelligent. He had no known family history of intracranial tumours or dementia.

On examination, he was disoriented to time, had anomic aphasia, and lacked insight. A neurologic examination revealed bilateral anosmia with no visual deficits, weakness, or frontal release signs. Neuropsychological tests revealed a Mini-Mental State Examination score of 28 out of 30 (cutoff score for impairment in a patient with college education is 27)<sup>1</sup> and a Montreal Cognitive Assessment score of 24 out of 30 (cutoff score for impairment in those aged 60 to 79 years is  $\leq 24$ ).<sup>2</sup>

In view of his age, a neurologic lesion causing cognitive impairment (eg, frontotemporal meningioma) was considered. Other differential diagnoses were early-onset dementia, metabolic abnormalities, and depression.

Initial blood investigation results (ie, complete blood count, glucose level, liver function test, renal function test, thyroid function test, vitamin B12 level, folate concentration, and syphilis serology) were normal. Magnetic resonance imaging (MRI) of the brain revealed a large extra-axial mass centred on the olfactory groove and planum sphenoidale displacing both frontal lobes. Mass effect and entrapment of the left lateral ventricle were also visible (**Figure 1**).

### EDITOR'S KEY POINTS

- Symptoms and signs of cognitive impairment and behaviour changes are suggestive of a frontal lobe lesion; this together with visual symptoms and anosmia should raise suspicion of olfactory meningioma.
- Magnetic resonance imaging is the criterion standard method for detecting meningiomas. Any person presenting with features suggestive of early-onset dementia should be evaluated thoroughly for reversible causes.
- Olfactory meningiomas are rare but treatable. After surgical resection, reversal of the changes in thought processes can be expected.

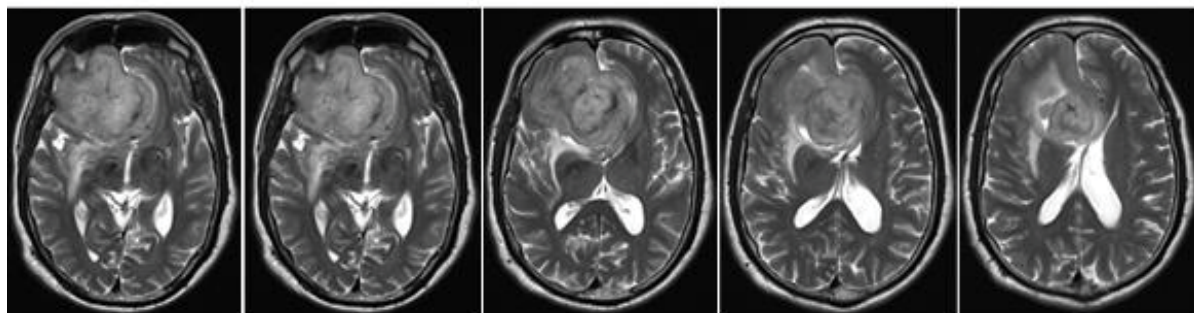
### POINTS DE REPÈRE DU RÉDACTEUR

- Des signes et des symptômes de déficience cognitive ainsi que des changements comportementaux laissent présager une lésion au lobe frontal; de telles manifestations, accompagnées de symptômes visuels et d'anosmie, devraient faire soupçonner un méningiome olfactif.
- L'imagerie par résonance magnétique est la méthode standard privilégiée pour détecter des méningiomes. Toute personne qui présente des caractéristiques évoquant une apparition précoce de démence devrait faire l'objet d'une évaluation approfondie pour détecter des causes réversibles.
- Les méningiomes olfactifs sont rares, mais ils peuvent être traités. Après une résection chirurgicale, on peut s'attendre à l'arrêt des changements dans les processus mentaux et à un retour à la normale.

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**Figure 1.** Magnetic resonance imaging of the brain showing a large extra-axial mass centred on the olfactory groove and planum sphenoidale displacing both frontal lobes



The patient's case was reviewed by neurosurgeons, and consequently he underwent endoscopic surgical excision of the meningioma. After surgery, he had full recovery of his functional and mental status within weeks. His anosmia persisted and he had diplopia on looking down after the operation. The diplopia resolved after 6 months but the anosmia remained. He has since resumed work.

## Discussion

A literature search was performed in PubMed and MEDLINE using the key words *meningioma*, *behaviour changes*, and *dementia*. The search was delimited to *case series*. A total of 67 papers were shortlisted for review, of which 8 were included in this article. Hand searches contributed 4 additional articles.

Olfactory groove and planum sphenoidale meningiomas are rare, constituting only 2% of all primary intracranial tumours.<sup>3</sup> Displacement of the olfactory tracts and optic chiasm occur when the meningioma extends into the paranasal sinuses and nasal cavity.

Clinical presentation and diagnosis often occur in the late stage, as many patients are asymptomatic before the meningioma reaches a sufficient size (>4 cm) to compress the frontal lobe and optic nerve or optic chiasm.<sup>4</sup> The patient usually presents with dysexecutive syndrome (severe cognitive impairment and profound changes in personality), which is usually first noticed by family members; headache; or visual symptoms. Anosmia is a common finding on physical examination, but it is not a typical presenting symptom.<sup>5</sup>

A review by Nakamura et al of 82 olfactory meningiomas showed time from initial symptoms to surgical tumour removal ranged from 0.5 to 168 months (mean 34.8 months).<sup>6</sup> Minimally invasive keyhole surgery decreases morbidity.

The expected outcome for the recovery of thought processes is good. A retrospective review of 9 patients

with meningiomas showed that reversal of cognitive impairment and behavioural changes occurs in most patients after resection of the meningioma.<sup>7</sup> Postoperative improvement of visual symptoms depends on the preoperative duration of those symptoms.<sup>8</sup> Loss of olfactory function is usually permanent.

The recurrence of olfactory meningiomas depends on the extent of resection and duration of follow-up. A review by Obeid and Al-Mefty found the recurrence rate to range from 5% to 41%.<sup>9</sup>


Although olfactory meningiomas are rare, they are treatable and the expected outcome is good for reversal of the change in thought processes. Hence, physicians should be aware that dismissing short-term memory loss and personality changes as secondary to aging, depression, or dementia might lead to misdiagnosis and loss of opportunity for treatment. This is especially pertinent to primary care physicians, who are the first points of contact. A high index of suspicion leads to earlier appropriate investigations, referral, and management.

Early-onset dementia is uncommon and is defined as the onset of symptoms before age 65. The average prevalence of dementia in those younger than 65 is only 80 per 100 000 people.<sup>10</sup> Patients younger than 65 who present with clinical features typical of dementia should be evaluated thoroughly for reversible causes, as dementia has serious life-altering consequences for patients and their family members. In addition to routine blood investigations, the Fourth Canadian Consensus Conference on the Diagnosis and Treatment of Dementia recommended that either noncontrast computed tomography (CT) or MRI of the brain be performed in the initial evaluation of patients with symptoms of dementia, if findings of unsuspected cerebrovascular disease would change the clinical management. Although MRI is more expensive and less readily available, it is preferred to CT.<sup>11,12</sup> Our patient was also referred to the memory clinic on first

presentation, which is also in accordance with Fourth Canadian Consensus Conference recommendations for early-onset dementia.

Magnetic resonance imaging is the diagnostic tool of choice for meningiomas, as it more clearly visualizes en plaque and posterior cranial fossa meningiomas, which might be missed on CT.

## Conclusion

As the first point of contact with the health care system, primary care physicians must recognize dysexecutive syndrome as potentially being caused by a meningioma. Although olfactory meningiomas are rare, they are treatable and the expected outcome is good for reversal of dementialike symptoms. The family physician's role is to provide definitive care to patients with undifferentiated symptoms and to provide continuity of care. 

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### Competing interests

None declared

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