## Case report

# Frontal lobe meningioma presenting with schizophrenia-like symptoms: an organic cause of psychotic disorder

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#### SUMMARY

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Accepted 14 April 2020



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**To cite:** Suradom C, Suttajit S, Soontornpun A, *et al. BMJ Case Rep* 2020;**13**:e234526. doi:10.1136/bcr-2020-234526

BMJ

#### A 51-year-old woman had been diagnosed and treated for schizophrenia for 10 years. Two weeks prior to admission, she developed headache and diplopia. Then, she was found unconscious and was sent to the hospital. A tumour in the left frontal lobe of the brain, causing brain herniation, was diagnosed and surgical excision of tumour was performed immediately. The psychotic symptoms of the patient were completely resolved after surgery. The histological diagnosis was meningioma. This case demonstrates an uncommon presentation of meningioma, the most common primary brain tumour. Patients presenting with psychotic symptoms may be misdiagnosed with schizophrenia, when a tumour is present, allowing the tumour to grow and causing associated complications. Early diagnosis and treatment could prevent mortality and morbidity. The treating physician should be aware of organic possibilities and carefully search for atypical presentations of psychiatric disorders in their patients.

#### BACKGROUND

Schizophrenia is a disease that accounts for significant disability worldwide.<sup>1</sup> Typical presentations include lack of insight, auditory hallucinations and delusions, with young onset of symptoms and a chronic course of the disease.<sup>1</sup> Atypical features, for example, late onset of symptoms, disorientation and/or confusion, catatonic symptoms, visual hallucination and certain delusions, such as delusions of misidentification (ie, Capgras syndrome), should trigger concerns of secondary psychoses.<sup>2</sup> Moreover, accompanying symptoms, especially those pointing to focal alterations in brain functions, may well be indicative of psychosis due to medical conditions.<sup>2</sup> In this study, we are reporting on a 51-year-old female patient who was diagnosed with and treated for schizophrenia. Ten years after she had been undergoing treatment, she was given the diagnosis of frontal lobe meningioma following the development of complications involving brain herniation and compressive symptoms.

#### **CASE PRESENTATION**

A 51-year-old Thai woman was found unconsciousness and was sent to the emergency unit. She lived with her husband and worked for a telecommunication company. Ten years prior to admission, at 41 years of age, she had anxiety, auditory hallucinations, aggressiveness and impulsivity, disorganised speech and behaviours. She was diagnosed with schizophrenia due to auditory hallucination and disorganised speech and had received treatment with perphenazine, trihexyphenidyl and nortriptyline. Her symptoms persisted for weeks and subsided after treatment. She had good medication adherence. During those 10 years, she had minimal symptoms including lack of insight and mildly disorganised behaviours, which prompted the psychiatrist to continue psychotropics for maintenance treatment.

Two weeks prior to admission, she developed new-onset headache, weakness, red eye, blurred vision and diplopia. She went to see a general practitioner, and after an eye examination, she was told that she had conjunctivitis and presbyopia, given some medication and advised to see an optometrist. The next morning, she was found unconscious and was brought to the hospital immediately.

At the emergency department, her vital signs were stable. The patient was noted to be stuporous and her Glasgow Coma Score was E1V2M5. Her pupils were dilated but still reacted to light.

#### **INVESTIGATIONS**

The CT scan with contrast of her brain revealed an intense enhancing mass at the left frontal region with surrounding white matter oedema in the left frontal region (figure 1), subfalcine and uncal brain herniation with secondary hydrocephalus. A diagnosis of meningioma was given.

#### DIFFERENTIAL DIAGNOSIS

This case is a good example of how a brain tumour can be difficult to diagnose in the early stage when presenting with pure psychiatric symptoms due to its unpredictable nature and variable presentation of associated symptoms. A late onset of schizophrenia in an otherwise psychologically sound female patient and her lack of negative symptoms should raise some concerns. Although there were no focal neurological signs or symptoms at first and her hallucinations were restrictively auditory, therefore not indicative of organic psychosis, intracranial lesions could not be completely ruled out. As in this patient, neurological signs and symptoms may be too subtle to detect at first and may develop later on following tumour progression. The complete resolution of symptoms when the tumour was removed



**Figure 1** The CT scan with contrast revealed an intense enhancing mass in the left frontal region with surrounding white matter oedema at the left frontal region.

and weaning off all medication confirmed the organic cause of the psychosis.

Meningiomas are the most common primary brain tumours, making up 13%–26% of intracranial tumours.<sup>3</sup> Middle-aged women are more than two times as likely as men to develop this type of tumour. Most meningiomas occur between the fourth and seventh decade of life and rarely occur in children.<sup>3</sup> The initial manifestations of meningiomas of the brain may be purely psychological, which occur in a significant number of cases.<sup>4</sup>

#### TREATMENT

Emergency surgery, a left frontal craniotomy to remove the tumour was carried out and there were no complications. The pathological examination of the tumour confirmed the provisional diagnosis of frontal convexity meningioma, clear cell variant (WHO grade II).

#### **OUTCOME AND FOLLOW-UP**

After the successful operation, the psychiatric symptoms of the patient were resolved. After reviewing her past psychiatric problem, the meningioma was concluded as being responsible for her psychiatric symptoms. Therefore, her psychotropic medications were discontinued. At the 1-month, 6-month and 1-year follow-up appointments after tumour removal and drug discontinuation, the patient had no signs or symptoms of psychosis with no remarkable results from complete neurological examinations. Her cognitive functions gradually improved to her premorbid level and she was able to continue to work. The final diagnosis was psychotic disorder due to meningioma in the left frontal lobe. Nonetheless, the possibility of concurrent primary psychotic disorder with secondary psychosis from the tumour could not be ruled out completely and had to be included as a differential diagnosis until proven otherwise.

#### DISCUSSION

Eighty-eight percent of the tumours causing psychiatric symptoms are located in the frontal region.<sup>5</sup> The frontal lobes of the brain are often a 'silent' area, as in benign tumours such as meningiomas which externally compress the frontal lobes may only produce significant symptoms other than a progressive change of personality and cognitive function when they become large.<sup>6</sup> Psychiatrists are often the first to see these patients, and the correct diagnosis may be made only when the tumour has grown to a considerable size and begun to displace the brain.<sup>6</sup> Neurological symptoms can be easily misdiagnosed as symptoms of a mental disorder, especially in patients who have a chronic mental illness or personality disorder.<sup>7</sup>

Although anatomical differences in brain lesions yielding different neuropsychiatric presentations have been well studied, some uncommon and unsuspected presentations are still underdiagnosed including psychosis. It is not common for brain tumours, regardless of their location, to present with only psychiatric symptoms.<sup>8</sup> Of psychiatric symptoms, mood symptoms are the most common occurring in 36% of the cases reported, whereas psychotic symptoms were found in 22% of cases.8 In addition, previous studies have found depression to be mostly associated with frontal lobe tumours, especially if they occur in the left frontal lobe.<sup>69</sup> However, a rare presentation of psychosis associated with left frontal lobe tumours have been reported.<sup>10 11</sup> Nonetheless, it is still atypical for frontal lobe tumours to present with schizophrenia-like symptoms as was the case with the patient in this report. These symptoms would normally be found with temporal lobe or pituitary gland tumours.<sup>9</sup><sup>12</sup>

Meningioma may not cause any manifestations other than psychiatric symptoms in the initial phase. Correlation between peritumoural oedema and psychiatric symptoms has been found indicating that the underlying mechanism could be from disruptions in intracerebral pathways rather than due to a mass effect of meningioma on intracranial pressure.<sup>13</sup> Symptomatic intracranial meningiomas present with various symptoms as a result of compression of adjacent structures, direct invasion of or reactive changes in the surrounding brain tissue, and alteration of cerebrospinal fluid pathways, cortical veins or venous sinuses. Symptoms and signs include seizure disorders, increased intracranial pressure sign, early morning headaches, focal neurological deficits, ataxia, language deficit, cranial neuropathies, psychomotor symptoms and behavioural disturbances.<sup>3</sup> Headache, papilloedema and focal neurological signs often emerge only when the meningioma has progressed to an advanced stage. Unfortunately, the correct diagnosis may be established only after irreversible cerebral damage has been caused.<sup>6</sup><sup>13</sup> Early diagnosis is necessary for preventing prolonged distress for the patient and their family as his or her personality disintegrates, which could result from a delay in diagnosis. Surgery often leads to a complete cure, but the damage to the patient's personal work and relationships may persist. Although meningiomas are usually benign, patients may not reach full neurological recovery after surgery when the tumour has grown to a considerable size.<sup>6</sup>

Frontal lobe tumours are more likely to be misdiagnosed or overlooked in patients with a history of alcohol abuse, depression or personality disorders, as the symptoms may overlap. The gradual nature of the symptoms usually leads clinicians to mistake the symptoms as those of depression or schizophrenia. Additionally, after a patient has been diagnosed as having a psychiatric disorder, the case is rarely reviewed for possible organic causes.<sup>14</sup> Slow-growing tumours often do not cause noticeable focal deficits until very late in the course of the disease because of the ability of the brain to accommodate and compensate in pace with the expanding compressive process. This is especially true for the frontal lobe, which is the largest lobe of the brain.<sup>15</sup>

Secondary psychosis usually begins following the onset of the medical condition with severity of symptoms that varies on the progression of medical disease. However, exceptions may apply, such as psychosis in temporal lobe epilepsy, which may persist for several years after the onset of the seizures. In contrast, a medical illness may precipitate a relapse of schizophrenia, despite not being a direct cause of psychological signs or symptoms.<sup>2</sup>

## Learning points

- It is often impracticable for a psychiatrist to provide every patient who presents with psychiatric problems to the neuroradiological investigation.
- The first onset of psychosis in a middle-aged person with no history of psychiatric disorder or atypical presentations of schizophrenia should draw the attention of psychiatrists to consideration of an organic disease.
- Although no neurological signs and symptoms may present at the first visit, a thorough examination at follow-up visits would be beneficial, together with concerns for physical complaints apart from psychiatric.
- Psychiatrists must also realise that response of the psychiatric symptoms to treatment does not exclude an underlying organic cause, a pitfall that psychiatrists should be aware of due to potentially life-threatening consequences.

**Contributors** CS and MP: collected the data from the patient. CS: drafted the manuscript. MP, SS and AS: co-wrote the manuscript. All authors approved the final version.

**Funding** The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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## REFERENCES

- 1 Picchioni MM, Murray RM. Schizophrenia. BMJ 2007;335:91-5.
- 2 Keshavan MS, Kaneko Y. Secondary psychoses: an update. *World Psychiatry* 2013;12:4–15.
- 3 Whittle IR, Smith C, Navoo P. El al. meningioma.. Lancet 2004;363:1535–43.
- 4 Gupta RK, Kumar R. Benign brain tumours and psychiatric morbidity: a 5-years retrospective data analysis. *Aust N Z J Psychiatry* 2004;38:316–9.
- 5 Khouzam HR, Emes R. Late life psychosis: assessment and general treatment strategies. Compr Ther 2007;33:127–43.
- 6 Maurice-Williams RS, Dunwoody G. Late diagnosis of frontal meningiomas presenting with psychiatric symptoms. *Br Med J* 1988;296:1785–6.
- 7 Sengstaken EA, King SA. Chronic schizophrenia or meningioma? J Am Board Fam Pract 1994;7:71–3.
- 8 Madhusoodanan S, Opler MGA, Moise D, et al. Brain tumor location and psychiatric symptoms: is there any association? A meta-analysis of published case studies. Expert Rev Neurother 2010;10:1529–36.
- 9 Madhusoodanan S, Ting MB, Farah T, *et al.* Psychiatric aspects of brain tumors: a review. *World J Psychiatry* 2015;5:273–85.
- Nagaratnam N, Ghougassian DE, Wong K, et al. Psychiatric presentation of a venous angioma of the frontal lobe. Br J Clin Pract 1990;44:34–5.
- 11 Hunter R, Blackwood W, Bull J. Three cases of frontal meningiomas presenting psychiatrically. *Br Med J* 1968;3:9–16.
- 12 Filley CM, Kleinschmidt-DeMasters BK. Neurobehavioral presentations of brain neoplasms. West J Med 1995;163:19–25.
- 13 Lampl Y, Barak Y, Achiron A, et al. Intracranial meningiomas: correlation of peritumoral edema and psychiatric disturbances. Psychiatry Res 1995;58:177–80.
- 14 Mumoli N, Pulerà F, Vitale J, et al. Frontal lobe syndrome caused by a giant meningioma presenting as depression and bipolar disorder. Singapore Med J 2013;54:e158–9.
- 15 Fisicaro RA, Jost E, Shaw K, *et al*. Cortical plasticity in the setting of brain tumors. *Top Magn Reson Imaging* 2016;25:25–30.

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