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Neurological Conundrums: A Case Series on Brain Tumors Masquerading as Psychiatric Disorders

Aayush Srivastav[1], Priyanka Renita D'Souza[1], Keshava Pai[1], Sharanya B. Shetty[1], Shreyas Aneja[1], and Priya Suraj Ramesh[2]

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Brain tumors are broadly classified into two types: primary tumors, which originate in the brain tissue, and metastatic tumors, which spread to multiple areas of the brain. Consequently, metastatic tumors are more likely to exhibit neuropsychiatric symptoms.[1] While most brain tumors cause distinct neurological signs due to mass effect, a few may remain neurologically silent, presenting with mood symptoms, psychosis, anxiety, memory impairment, or personality changes as their primary clinical manifestations.[2] In our case series, the first case discusses the probable association of psychosis with tentorial meningioma, a rare tumor. The presentation of psychotic symptoms with tentorial meningioma is the least extensively studied; hence, this case adds to the limited literature. The second case describes frontal lobe astrocytoma misdiagnosed as primary depression because no neurological deficits were observed in the initial presentation. Psychiatric symptoms may be seen in brain tumors. However, the predominant and initial manifestation of depressive-like symptoms in frontal lobe astrocytoma, which is uncommon, blurred the clinical picture, leading to misdiagnosis.

Tentorial meningioma presenting with psychosis and astrocytoma presenting with depressive symptoms represent uncommon clinical phenomena. Thus, these cases broaden the differential diagnosis for both psychiatrists and neurologists with an importance to consider organic brain pathology in psychiatric disorders. Furthermore, this case series emphasizes the need for neuroimaging in patients with psychiatric disorders even though neurological symptoms are obscured on diagnostic assessment.

Case Series

Case 1

A 75-year-old female, a retired school teacher, was referred to the psychiatry department for suspiciousness and irritability towards family members. Over the past two months, she began accusing her daughter of attempting to harm her for financial gain, believing that her daughter was plotting to physically injure her for the ornaments and money. She also frequently reported that her daughter and son were involved in an inappropriate sexual relationship, which led to verbal arguments with them. The onset of these symptoms was insidious, with a gradually progressive course. On further history, she had minimal memory disturbances over the past month but had no impairment in her activities of daily living. She had no prior history or family history of any psychiatric illness. Her general physical examination and neurological examination were unremarkable. On mental status examination, she had delusions of persecution but no perceptual abnormalities. No clouding of consciousness and recent memory was intact. Blood investigations comprising complete blood count, thyroid, liver, and renal function tests,

[1] Dept. of Psychiatry, Kasturba Medical College Mangalore, Manipal Academy of Higher Education, Karnataka, Manipal, India. [2]Dept. of Radiodiagnosis, Kasturba Medical College Mangalore, Manipal Academy of Higher Education, Karnataka, Manipal, India.

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Address for correspondence: Priyanka Renita D'Souza, Dept. of Psychiatry, Kasturba Medical College Mangalore, Manipal Academy of Higher Education, Karnataka, Manipal, 576104, India.
E-mail: dsouza.priyanka@manipal.edu

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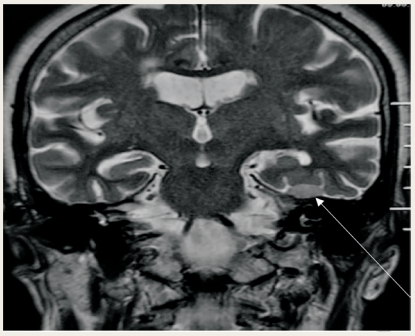
vitamin B12, folate, and serology showed raised erythrocyte sedimentation rate (ESR) and other parameters within the normal range. Magnetic resonance imaging (MRI) of the brain was done due to late-onset psychotic symptoms. It showed a well-defined, isointense, homogenously enhancing extra-axial lesion measuring 12 mm x 14 mm x 9.6 mm suggestive of meningioma along the left tentorium cerebelli indenting the left temporal lobe with prominent bilateral lateral and 3rd and 4th ventricle (**Figure 1**). Hence, the diagnosis of psychotic disorder due to another medical condition was considered according to the Diagnostic and Statistical Manual of Mental Disorders—Fifth Edition (DSM-5).[3] For symptomatic management, she was started on Tab aripiprazole 5mg/day and referred to the neurosurgery department for further evaluation. However, as the patient did not follow up in the psychiatry department, further progress could not be assessed.

FIGURE 1.

Magnetic Resonance Imaging (MRI) of the Brain with Contrast, Coronal Plane, in Case 1 Showing Meningioma Along Tentorium Cerebelli Indenting Left Temporal Lobe.

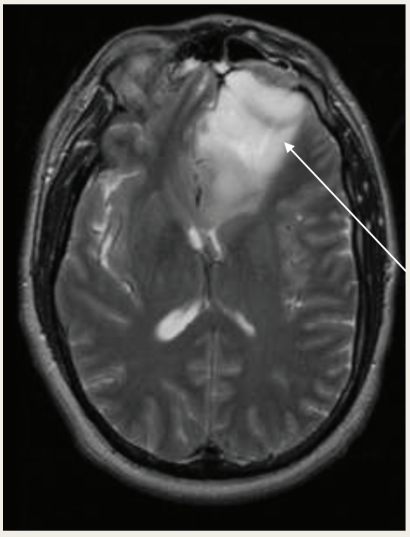


Case 2

A 38-year-old female, a homemaker, was brought to the psychiatry department with low mood, decreased interaction, and poor self-care over the past two weeks. She also had episodes of irritability on trivial provocation. The onset of the symptoms was acute and rapidly progressive. In the first week of symptom onset, she sought consultation with a private psychiatrist, and after the clinical assessment, she was diagnosed with major depressive disorder. She was started on the antidepressant escitalopram 10 mg/day. However, there was no response noted. In the following week (or week two), she developed multiple episodes of vomiting with giddiness, and her interaction further deteriorated. No episode of loss of consciousness, altered sensorium, or seizures. She had no prior history or family history of psychiatric illness. Her general physical and neurological examination was within normal limits with no focal neurological deficits. However, higher mental function assessment revealed impairment in recent memory. Fundoscopy showed papilledema, suggesting increased intracranial pressure. On mental status examination, she had decreased psychomotor activity, minimal speech output, and depressed affect. No perceptual abnormalities were noted. Blood investigations comprising complete blood count, thyroid, renal, and liver function tests, vitamin B12, folate, and serology were all within normal limits. Due to the rapid deterioration in her symptoms and fundoscopy findings, neuroimaging was recommended. The MRI of the brain showed an inhomogeneous expansile mass lesion in the left frontal lobe measuring 6 cm x 7 cm x 4 cm with broad cortical involvement and subcortical extension suggestive of left frontal astrocytoma (**Figure 2**) with perilesional edema. Hence, the diagnosis of depressive disorder due to another medical condition was considered as per DSM-5.[3] She was subsequently referred to the neurosurgery department for surgical resection of the brain tumor. Two weeks after the surgery, during her psychiatric follow-up, the patient showed a complete resolution of her depressive symptoms.

FIGURE 2.

Magnetic Resonance Imaging (MRI) of the Brain, Axial Plane, in Case 2 Showing Left Frontal Lobe Astrocytoma with Broad Cortical Involvement and Subcortical Extension.



Discussion

A lesion in a specific region of the brain may manifest symptoms based on the function of the affected neuronal area. The functions of the networks underlying the affected areas determine the symptoms of the brain lesions. For example, a strong association has been identified between anorexia and hypothalamic tumors, a possible association between memory disturbances and thalamic tumors, psychotic symptoms and temporal lobe, mood symptoms and frontal lobe tumors.[2] Keschner et al. observed that neuropsychiatric symptoms were present in 78% of 530 patients with brain tumors. However, in 18% of these cases, psychiatric symptoms were the first clinical presentation of the tumor.[4]

In case 1, the patient had predominantly psychotic symptoms and minimal cognitive impairment. Due to late-onset psychotic symptoms without any family history of psychiatric illness and minimal cognitive changes as observed by the family, organic etiology was considered, and neuroimaging was recommended. Imaging showed meningioma along the left tentorium cerebelli, indenting the left temporal lobe with prominent ventricles. Tentorial meningiomas are rare, comprising of 2%–6% of the intracranial meningiomas. They may occur at any age and have a female predisposition. The predominant clinical features associated are usually headache secondary to hydrocephalus and visual deficits.[5] The case highlights the possibility of psychosis as a rare and primary manifestation of tentorial meningioma, which is not extensively studied in the existing literature. In addition, left temporal lobe pathology has been implicated in psychosis, which was observed in the above case with indentation of the temporal lobe.[6] However, the accurate association of meningioma with psychopathology could not be established

as the patient could not be reviewed on subsequent follow-up.

A study done by Fulton et al. found symptoms of decreased interest, difficulty in concentration, poor communication, and social withdrawal in patients with tumors involving the left frontal lobe,[7] Yet another study by Cheema et al. found patients with tumor location in the left frontal and temporal lobe to be presenting with symptoms of depression, anhedonia, low energy, insomnia, and suicidal ideations.[8] The left frontal lobe was affected in case 2, which is in line with the above studies as well as a meta-analysis that found a putative association between depressive symptoms and frontal lobe tumors.[2]

Astrocytomas are among the common brain tumors and belong to a heterogeneous group of gliomas.[9] Ghaziuddin et al. found that patients with frontal and brainstem astrocytoma presented with depressed mood, irritability, reduced communication, and poor self-care.[10] Similarly, depressive symptoms were the initial symptoms reported in case 2 despite an organic etiology of the frontal lobe tumor. Antidepressants were ineffective, as the underlying primary etiology was missed. The rapid progression of symptoms associated with episodes of vomiting, though not a specific neurological sign and features suggestive of raised intracranial tension in the later course of presentation, pointed towards organic etiology. Case 2 demonstrates the initial misdiagnosis of major depressive disorder, underscoring the overlap between psychiatric symptoms and brain tumors. This highlights the rarity of depressive symptoms as the initial presentation of a frontal lobe astrocytoma and emphasizes the diagnostic challenge posed due to the absence of neurological deficits early in the course of the illness.

The psychiatric manifestations as presenting features of brain tumors represent the "tip of the iceberg," often leading to delays in diagnosis and treatment. A rapidly growing tumor, such as an astrocytoma with perilesional edema, is more likely to cause neurological symptoms as the tumor progresses. In contrast, slow-growing tumors like meningiomas allow the brain to adapt over time. They may primarily present with psychiatric symptoms rather than neurological ones, as described in the case series.[11]

One of the criteria for primary psychiatric disorders in DSM-5 is to confirm that the current presentation is unlikely due to concurrent medical conditions. By the strictest standard for diagnostic evaluation, a patient does not meet DSM-5 criteria until medical or neurological causes are ruled out.[3] In the above cases, clinical manifestations of psychiatric disorders like psychotic and depressive symptoms obscured the organic and neurological etiology.

Neuroimaging is not typically a first-line investigation in psychiatric disorders as it is rare for psychiatric presentation without accompanying neurological manifestations in brain tumors.[11] A systematic review on the clinical and cost-effectiveness of structural imaging using MRI or computed tomography (CT) in patients with psychosis, particularly in those with first-episode psychosis, concluded that structural neuroimaging provided additional clinical data not apparent from history and physical examination influencing management and treatment strategies.[12] Therefore, due to neuroimaging, the average time from the onset of psychotic or depressive symptoms to the diagnosis of brain tumors was shorter in both of these cases. Hence, this case series illustrates and emphasizes the role of neuroimaging in facilitating prompt referral to the neurosurgery team for specialized management and resolution of psychiatric symptoms. The neuroimaging should be recommended in patients presenting with psychiatric symptoms in the presence of the following; i) new or sudden onset psychiatric symptoms, ii) rapid deterioration, iii) atypical psychiatric symptoms, iv) no response or refractory to psychotropics, v) focal neurological deficits, vi) late age of onset of psychiatric manifestations, and vii) cognitive changes.

Conclusions

Organic psychiatric disorders caused by brain tumors complicate the diagnostic evaluation, and the clarity of diagnosis may not be established. Thus, the diagnosis and interdisciplinary treatment in the early phase of brain tumors determine reduced mortality and enhanced quality of life. This case series highlights the need for neuroimaging along with history and physical examination for thorough diagnostic evaluation.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Declaration Regarding the Use of Generative AI

The authors are responsible for the entire manuscript content. Artificial intelligence tools have not been used in the development of this case series.

Ethical Approval

Case series is approved by institutional research ethics committee of Kasturba Medical College, Mangalore (Protocol No: IEC KMC MLR 08/2024/533).

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Patients' Consent

Written informed consent was obtained.

Statement

The case series being submitted has not been published, simultaneously submitted, or already accepted for publication elsewhere. The manuscript has been read and approved by all the authors, that the requirements for authorship as stated earlier in this document have been met, and that each author believes that the manuscript represents honest work. The manuscript, to the best of the author's knowledge, does not infringe upon any copyright or property right of any third party.

Supplemental Material

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ORCID iDs

Aayush Srivastav https://orcid.org/0009-0006-5177-6804

Priyanka Renita D'Souza https://orcid.org/0000-0002-2858-0911

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