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Case report

First episode psychosis and an underlying cerebellar tumour

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Abstract

We report on the case of a middle aged lady who was referred by her GP with what appeared to be a case of first episode psychosis. Following assessment and investigation an underlying cerebellar tumour was identified. Our aim is to draw attention to the ongoing debates regarding the possible role of the cerebellum in psychosis and cognition and on neuroimaging as a diagnostic modality in cases of first episode psychosis.

Key words: First episode psychosis; Cerebellar tumour; Neuroimaging.

Case history

Ms XX is a 45-year-old factory worker referred by her GP on account of episodes of bizarre behaviour and utterances of recent onset. At assessment, XX described déjà vu phenomenon. She felt that she had attended the interview previously with things arranged in the same way in the office. She expressed persecutory delusional ideas in relation to her work colleagues and was convinced that her house mates were poisoning her food. She denied any olfactory, gustatory or auditory hallucinations or any passivity phenomena. She denied any symptoms of depression or elation.

XX complained of intermittent bouts of headache, predominantly localised around her fronto-temporal and occipital head regions, with worsening during micturition but no associated vomiting. She described intermittent episodes of perceived darkness in the left part of her left visual field and seeing 'shadows of people' in the absence of any visual stimulus. XX reported that she had developed increasing forgetfulness in the six months prior to presentation. She denied any previous history of head trauma. Additionally, XX denied any history of alcohol or recreational drug misuse. There was no previous personal or family history of psychiatric illness. Even though her GP had alluded to the possibility of a past history of non-epileptic seizure, this was not corroborated by XX or her neighbour who accompanied her to the assessment. XX reported that she had been in good physical health prior to her recent complaints.

Collateral from XX's daughter confirmed that these symptoms started approximately two years prior to presentation and had gradually increased in the intervening period. She reported that XX had experienced intermittent episodes of forgetfulness and a tendency to repeat herself in conversation.

XX's neighbour of four years also corroborated her history with more elaborate accounts of escalating bizarre behaviour and utterances. Of note, XX was said to have

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been preoccupied with one of her female friends who had borrowed money from her. XX was discovered to have been carrying a picture of this lady in her purse and had threatened to kill her as she believed that the lady wished her harm.

On mental state examination, XX presented as well groomed with normal gait. Although she was anxious, she engaged well. Her speech was circumstantial and intermittently confused. Her mood was euthymic with a labile affect. She demonstrated paranoid delusions. She was well-oriented and had good short-term recall and long term memory on testing. Neurological examination revealed no lateralising signs, her power, tone and reflexes were grossly intact as were her cranial nerves on testing. Routine laboratory investigations were grossly normal and toxicology screen was negative.

A medical consult was sought in view of the nature of XX's complaints. In consideration of a possible risk of harm to a named third person, she was admitted to the acute psychiatric inpatient unit for further investigation and treatment. She was not prescribed any medication on admission. A brain MRI scan obtained within 24 hours of her admission revealed a 1.6cm tumour of the cerebellar vermix (oligodendroglioma).

A surgical opinion was requested following which XX was moved to the surgical ward. She was subsequently transferred to a specialist neurosurgical centre for further inpatient assessment and management. While an inpatient at the neurosurgical centre, she was commenced on olanzapine 5mg which was further increased to 15mg daily. Her neuropsychological assessment was unremarkable. She underwent surgery to resect the tumour, which was followed by extreme agitation in the immediate postoperative period requiring intramuscular sedation.

XX made good progress subsequently with complete resolution of psychotic symptoms on psychiatric assessment eight weeks post op. She remained stable 16 weeks after and her current medication includes olanzapine 15mg daily, dexamethasone and sodium valproate 1g bd for seizure prevention.

Discussion

This case of first episode psychosis associated with a cerebellar tumour is reported because it illustrates important aspects of current clinical practice surrounding the diagnosis of an underlying general medical condition in the presence of recent onset psychotic symptoms. It offers potential learning points in terms of the assessment of similar presentations.

In a patient with psychotic symptoms, a complete history at initial and subsequent presentations should include a detailed medical history. This will help to identify or outrule any underlying medical illness which may be contributing to the psychotic episode. It is estimated that a general medical condition may be a causative factor for psychosis in 5-10% of patients with psychosis.[1] The identification of an associated medical illness in a patient with psychosis throws up questions of whether it is aetiologically significant or an incidental finding.

In addition to good history taking, accurate diagnosis of an underlying general medical condition also requires appropriate clinical investigation. XX's diagnosis of a brain tumour was facilitated by an MRI scan of the brain. There has been considerable debate surrounding the use of CT scan or MRI for every case of first episode psychosis. It may be considered good practice to carry out a CT scan or MRI in all cases of first episode psychosis irrespective of cause.[1] However, the American Psychiatric Association guidelines recommend such radiological investigations primarily in cases where there is a lack of clarity in terms of the clinical picture or where there is an abnormal clinical finding from a routine examination.[2]

Albion et al, in their systematic review of neuroimaging in psychosis, noted that screening all patients with psychosis with structural neuroimaging techniques would provide little additional benefit to clinical management to that derived from a full clinical history and neurological examination.[3] They suggested that where an underlying medical condition is suspected in a psychotic illness an MRI or CT scan may be used for confirming the hypothesised diagnosis. Although cost is an issue in the use of imaging techniques for all cases of first episode psychosis, it must be noted that the cost benefit in use of these neuroimaging techniques for first episode psychosis is unclear[3] and has not been adequately studied.[1]

Our case raised a suspicion of an underlying general medical condition as a possible contributor to XX's presentation due to her reported history of headaches, weight loss despite good appetite and a vague history of non-epileptic seizures and expression of déjà vu phenomena. However, there were no clear cut symptoms suggestive of a cerebellar lesion such as ataxia or dyscoordination. It remains unclear in XX's case if the cerebellar tumour was directly responsible for her psychosis as a temporal association between the cerebellar lesion and psychosis has not been accurately established from history to date. Moreover, she had received antipsychotic treatment concurrently with medical and surgical treatment of her tumour.

However, the history of onset of psychosis in her 40s in the absence of a previous personal or family history of psychosis or psychiatric difficulties, coupled with a complete resolution of symptoms with treatment, perhaps suggests that the cerebellar tumour may have had an aetiological role in XX developing psychotic symptoms.

The absence of lateralising signs or classic signs of brain tumour in XX's case has also been observed in some other patients with brain tumours and psychosis.[4] It is expected though, that a severe brain tumour may aggravate an underlying psychosis whether or not it is aetiologically responsible for the psychosis. As such identifying and treating any brain tumour in psychosis (or other underlying general medical conditions) may improve outcome.

Fortunately, psychosis secondary to a brain tumour is rare. Lisanby et al estimate that the prevalence of psychosis secondary to a brain tumour is approximately 1.2% using a CT scan.[4] Psychotic symptoms arising from a brain tumour include simple delusions, usually paranoid. Thought disorder is relatively rare. When auditory hallucinations occur, they are usually simple in nature such as buzzing or ringing noises.[4] Brain tumours causing psychosis are thought to be more common in the temporal region, especially on the left side, but tumours in other regions, including the cerebellum have also been implicated.

The cerebellum has long been considered as an organ of coordination, gait, balance and fine motor control. However, recently it has been suggested that it plays a role in cognition[5,6] and psychosis.[7,8] Indeed, Andreasen et al have made a case for cerebellar dysfunction as possibly underlying

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schizophrenia spectrum disorders.[9] Martin et al, argue for the role of the cerebellum in non-motor brain functions and have hypothesised that the anterior vermis of the cerebellum and the corresponding fastigeal nucleus play a role in schizophrenia spectrum disorders.[10] A proposed mechanism for this role has been advanced by Pollack et al as arising from the disruption of cerebellar output to mesial dopaminergic areas, locus coeruleus and raphe nucleus or deafferentation of the thalamolimbic circuits by a cerebellar lesion such as a cerebellar tumour.[11]

In addition, Andreasen and Pierson have put forward the 'cognitive dysmetria' hypothesis which suggests a general dyscoordination of mental and sensorimotor processes resulting in thought disorder[12] in psychotic patients. A review by Picard et al, points out that there may be some evidence supporting some of the hypotheses mentioned above, including observation in patients with schizophrenia of a high prevalence of neurological soft signs, abnormal posture and proprioception, impaired eye blink conditioning, impaired adaptation of the vestibule-ocular reflex or procedural learning tests, and functional neuroimaging studies correlating poor cognitive performances with abnormal cerebellar activation.[13]

Indeed some studies using MRI have revealed structural and functional cerebellar abnormalities in psychosis, especially in schizophrenia.[14] However, Picard et al have argued that there have been no recent reviews on the clinical, cognitive and functional literature supporting the role of the cerebellum in schizophrenia,[13] and also highlight the divergent views and negative studies in relation to the role of the cerebellum in schizophrenia. They contend that clinical heterogeneity of the cerebellar structure and functions and complexity of neural networks may account for some of these divergent views and that studies are still required to elucidate the true role of the cerebellum in cognition and psychosis.

Conclusion

We have presented a case of first episode psychosis with an associated cerebellar tumour, where the initial presentation of psychosis occurred without classical signs of a brain tumour but with features raising suspicion of underlying general medical illness. Diagnosis was aided by an MRI scan. Appropriate treatment was then initiated to good effect.

While, the aetiologic significance of the cerebellar tumour to the psychosis is arguable, we held the view that the tumour was contributory to the mental illness on the balance of evidence from history. We have explored the role of neuroimaging in diagnosis of psychotic illnesses and examined the role of the cerebellum in cognition and psychosis. We suggest that further research should examine issues including the cost implications of neuroimaging in all first episode psychosis cases and prevalence of brain tumours as causes of psychosis in Ireland.

Declaration of Interest: None.

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