To assess the diagnostic utility of MRI brain imaging in excluding organic aetiologies in those whom present with psychosis and mood disorders

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Purpose

- Anecdotal evidence at our institution suggests that patients referred for MRI brain imaging to exclude attributable intracerebral organic pathology for psychosis and mood disorders have an extremely low rate of positive findings.
- The purpose of this study is to objectively determine the diagnostic yield from MRI brain imaging in detecting organic causes for psychosis and mood disorders.
- The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (DSM IV) provides a standard criteria for the classification of mental disorders and includes "secondary" or organic psychoses under the diagnostic category "Mental Disorders due to a general medical condition" to designate psychopathological syndromes which are known to be symptomatic manifestations of a systemic medical or cerebral disorder [1].

Methods and Materials

- Utilising the North Shore hospital PACS search engine, MRI neuroimaging requested by inpatient and community psychiatry services at Waitemata DHB between 01/01/2010 and 13/03/2013 were retrieved.
- Inclusion criteria: referrals to exclude organic/structural intracranial causes for symptoms of psychosis or for a known psychotic disorder such as schizophrenia were included. Referrals to exclude organic/structural intracranial causes for symptoms of a mood disorder or for a known mood disorder such as depression and bipolar affective disorder were included.
- Exclusion criteria: referrals whose indication was to evaluate for structural changes attributable to a neurodegenerative condition such as dementia and epilepsy were excluded. Referrals whose indication was to evaluate for intracranial causes for cognitive impairment were excluded.
- A total of 262 referrals from inpatient and community psychiatry services were retrieved.
- 64 cases were referrals for psychosis or a known psychotic disorder.
- 33 cases were referrals for mood disorder.
165 cases were excluded as they were referrals whose indication was to evaluate for structural changes attributable to a neurodegenerative condition or cognitive impairment. Reported MRI findings were analyzed and initially subdivided into either a normal report, generalized cerebral atrophy and/or small vessel ischaemic changes, lobar atrophy or space occupying lesion. Findings were then reclassified into either:

1. No attributable abnormality or

2. Potentially attributable abnormality

The no attributable abnormality group included a completely normal report, age appropriate generalised cerebral atrophy, small vessel ischaemic changes and other incidental findings, described in the results section below) deemed not attributable to the patient's presentation.

Age related generalised cerebral atrophy and small vessel ischaemic changes are not considered to cause psychosis and there is no statistical difference in the prevalence of these findings between patients with psychosis and control groups [2].

Results

Within the psychosis group of 64 cases, 62 (97%) had no attributable abnormality and 2 (3%) had a potentially attributable abnormality.

Within the mood disorder group of 33 cases, 32 (97%) had no attributable abnormality and 2 (3%) had a potentially attributable abnormality.

Potentially attributable abnormalities were:

1. Psychosis group: two schizophrenic patients with frontal lobe atrophy (Fig. 1 on page 4).

2. Mood disorder group: one bipolar affective disorder patient with frontal lobe encephalomalacia (Fig. 2 on page 5) and one patient with a suprasellar arachnoid cyst (Fig. 3 on page 6, Fig. 4 on page 7) and a chronic history of depression.

Lobar atrophy was considered a potential attributable finding because frontal and temporal lobe volumes have been reported to be smaller at first episode.
in schizophrenics[3]. However, it remains debatable whether these findings are actually causal or rather represent associated findings

- Several lines of evidence suggest that the prefrontal cortex is involved in the neuropathology of major depressive disorder and bipolar disorder [4]. Two independent postmortem studies morphometrically estimated cell number and density in the prefrontal region and discovered significant reductions in glial cell number, decreased neuronal cell packing density and the size of neuronal cell bodies in subjects with mood disorders as compared with psychiatrically normal control subjects [5,6]. For this reason, the finding of frontal lobe encephalomalacia in a bipolar patient was considered potentially attributable

- Of particular note, there were 0 patients presenting with first episode psychosis who had a potentially attributable finding

- Frontal lobe arachnoid cysts have rarely been associated with depression and temporal lobe arachnoid cysts with psychosis[7] but whether they are causal remains controversial. The suprasellar arachnoid cyst was tentatively included as a potentially attributable abnormality

- Findings which were relevant but not interpreted as a possible substrate for organic psychosis or mood disorder included: a cavernoma, frontal lobe neuroglial cyst and a pituitary macroadenoma. All of these findings are identified relatively frequently in patients without psychosis or mood disorder. The pituitary macroadenoma was non-functioning, not associated with local invasion into adjacent structures or cerebral mass effect. The cavernoma and neuroglial cyst (Fig. 5 on page 8) were not associated with cerebral oedema or significant mass effect and are benign developmental entities. In addition, the patient with the neuroglial cyst was a 34 year old female with postpartum psychosis and therefore this finding is unrelated to the patient's psychotic presentation

- These results are congruent with other international studies. Iris E. Sommer et al reviewed 1379 MRI scans and found a completely normal brain was reported in 74.4% of psychotic patients and in 73.4% of controls. Clinically relevant pathology was found in 11.1% of psychotic patients and in 11.8% of the controls but none of the neuropathological findings observed in the patients was interpreted as a possible substrate for organic psychosis[2].

Images for this section:
**Fig. 1:** Axial T2WI; Frontal lobe atrophy in a 45 year old patient with schizophrenia
Fig. 2: Axial FLAIR; Frontal lobe encephalomalacia in a patient with bipolar affective disorder
Fig. 3: Sag T1WI; Suprasellar arachnoid cyst in a patient with depression
**Fig. 4:** Coronal T2WI; Suprasellar arachnoid cyst in a patient with depression
Fig. 5: T1WI C+: Neuroglial cyst in a 34-year-old lady with a 6 month history of post-partum psychosis
Conclusion

This study provides objective evidence that the overwhelming majority (97% in this study) of patients who present with psychosis or mood disorder have no attributable intracranial abnormality at MRI brain imaging and therefore MRI brain scans are not a requisite of routine screening for psychotic or mood disorder patients.

Personal Information

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