

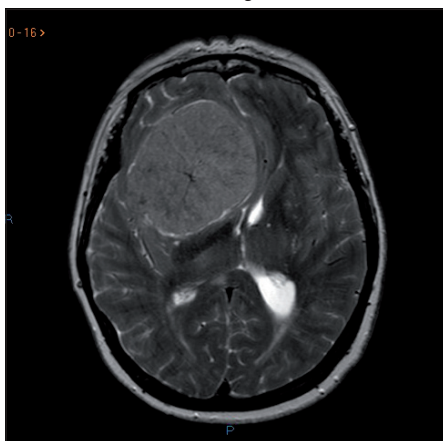
# Cerebral mass lesions presenting in a cognitive disorders clinic

## Introduction

European guidelines recommend that structural imaging be undertaken in the evaluation of every patient affected by dementia (Filippi et al, 2012; Sorbi et al, 2012). Although distribution of brain atrophy may be useful in the differential diagnosis of dementia subtype, for example of Alzheimer's disease from frontotemporal lobar degeneration, structural imaging has principally been used to exclude secondary causes of cognitive impairment such as brain tumour.

A UK national directive from the National Institute for Health and Clinical Excellence/Social Care Institute for Excellence (2006) stated that: 'Structural imaging should be used in the assessment of people with suspected dementia to exclude other cerebral pathologies and to help establish the subtype diagnosis'. However, the pick-up rate of structural imaging for secondary causes of cognitive impairment is low: one audit of the diagnostic yield of computed tomography scans done routinely in a UK memory loss clinic found

**Figure 1. T2-weighted magnetic resonance brain imaging showing large extra-axial right frontal mass lesion, probably a meningioma, causing marked mass effect, midline shift and effacement of the frontal horn of the right lateral ventricle.**



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'significant findings' in only 1% (Dawe, 2012). Nevertheless, occasional cases with hitherto unsuspected cerebral mass lesions may be encountered. This article presents illustrative cases seen over an approximately 10-year period in a clinic dedicated to the assessment of cognitive disorders.

## Discussion

Cerebral mass lesion is a rare finding in patients presenting to a cognitive disorders clinic. To the author's knowledge, the cases presented here, along with occasional cases previously reported (Ibrahim et al, 2009; Smithson and Larner, 2013), are the only examples of cerebral mass lesion encountered in one clinic over a 10-year period (2003–13) in a cohort of around 2000 consecutive patients, suggesting that cerebral mass lesions account for less than 0.5% of

referrals to a cognitive disorders clinic. Other structural abnormalities are also exceptionally rare, the most common in this clinic being intracranial dural arteriovenous fistula (three cases in 10 years; Wilson et al, 2010), in keeping with the observation that reversible structural causes of dementia are very uncommon (Clarfield, 2003).

There is no doubt that tumour was responsible for the clinical phenotypes in the cases reported here. Meningioma has long been recognized to be a potentially treatable cause of dementia (Sachs, 1950), occasionally with dementia as the presenting feature. Postoperative improvement in attention and working memory has been documented following resection of frontal meningiomas (Tucha et al, 2003). Colloid cyst is recognized to present on occasion with psychomotor slowing and memory

## Case Report 1

A previously healthy 50-year-old man presented with a 4-month history of memory problems, word finding and naming difficulties, and poor concentration, with associated anxiety and agitation. Neurological examination was normal. Neuropsychological assessment showed generalized intellectual loss (full scale IQ decline of 35 points). The patient was impaired on all measures of auditory and visual memory for immediate and delayed recall, recognition memory and working memory. He made dysphasic errors, performed poorly on copy of the Rey–Osterrieth Complex Figure, and was severely impaired on verbal fluency and the Stroop colour-word test. Based on these clinical and neuropsychological findings, a diffuse dementing illness was suspected, possibly sporadic Creutzfeldt–Jakob disease in view of the rapidity of decline.

Subsequent brain imaging disclosed a large left temporoparietal, non-homogeneous, space-occupying lesion with a large cystic component with surrounding oedema and mass effect. At surgery this proved to be an atypical meningioma grade II which was completely resected. Repeat neuropsychological assessment 4 months postoperatively showed significant improvement with no evidence of intellectual or memory impairment.

## Case Report 2

A previously healthy 67-year-old woman attended with her husband and he reported that she was forgetful, slower when walking with a tendency to shuffle, slow to get up in the morning and with a tendency to fall asleep in the day. On neurological examination the patient was evidently slow with hypomimia and monotonic voice, and had glabellar tap reflex and bilateral grasp reflexes. On Mini-Mental State Examination she performed slowly, scoring 22/30 overall with points dropped for orientation in place, 5-minute recall (1/3), and serial sevens (1/5). A fronto-subcortical pattern of deficits and daytime somnolence prompted suspicion of a synucleinopathy such as dementia with Lewy bodies.

Magnetic resonance brain imaging (Figure 1) showed an extra-axial right frontal mass lesion several centimetres in diameter causing marked mass effect and midline shift with effacement of the frontal horn of the right lateral ventricle. The mass was broadly based on the sphenoid and showed inhomogeneous contrast enhancement, most likely representing a meningioma.

problems. Postoperative cognitive problems as a consequence of damage to the fornix during surgery for colloid cyst are well described, specifically a persistent anterograde amnesia (Aggleton et al, 2000), as for fornix damage (Ibrahim et al, 2009).

In the cases reported here, the diagnosis of cerebral mass lesion came as a surprise (although a structural lesion was suspected in case 4), altering the provisional clinical diagnosis and radically changing treatment plans. This is contrary to the findings of a large clinicopathological series of dementia patients which found that neuroimaging supported but did not challenge clinical diagnoses (Snowden et al, 2011). Various diagnoses had been considered in these cases on the basis of clinical and neuropsychological assessment, including neurodegenerative disorders and depression. Therefore, although the pick-up rate of brain imaging for cerebral mass lesions is low, the recommendations from professional and regulatory bodies for neuroimaging in all cases of cognitive impairment must be endorsed. Since relatively small numbers of individuals referred to cognitive clinics have had neuroimaging performed

before referral (Larner, 2011), this burden will necessarily fall on the secondary care sector, a fact which will have resource implications. This requirement also brings with it issues of image interpretation, in particular the difficulty of attributing clinical significance to evidence of cerebrovascular disease (Sorbi et al, 2012) which is so often seen, usually incidentally, particularly on magnetic resonance imaging (Morris et al, 2009). Clinico-radiological correlation will be essential. **BJHM**

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### Case Report 3

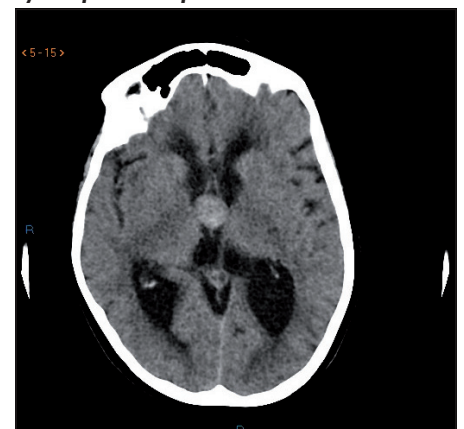
A 57-year-old woman was referred from psychiatric services with a complaint of forgetfulness for 1 year. She spent her time lying in bed, her family doing everything for her. This followed a period of alleged workplace bullying. She had a prior history of depression more than 10 years earlier, but the current episode had been unresponsive to antidepressant medications. On cognitive testing with the Addenbrooke's Cognitive Examination-Revised, which incorporates the Mini-Mental State Examination, there were many negative responses ('Can't do it', 'Can't remember', 'I'm blank'), with overall scores of 30/30 on Mini-Mental State Examination and 68/100 on Addenbrooke's Cognitive Examination-Revised. Particular problems were evident in verbal fluency for letter and with immediate and delayed recall, although one item not immediately recalled was produced after delay, suggesting a problem with retrieval of information rather than encoding. A clinical diagnosis of depression was thought likely in view of her apathy and past medical history.

Brain imaging showed an olfactory groove mass lesion several centimetres in diameter causing significant mass effect with associated frontal lobe vasogenic oedema, right greater than left. Histological examination following resection confirmed the imaging suspicion of a meningioma. Two months postoperatively both the patient and her daughter felt that she was back to normal.

### Case Report 4

A 65-year-old woman presented with her son who gave a 4-week history of declining memory and alertness in his mother such that his father had had to take over all the household duties. The patient was having difficulty walking, tending to shuffle, and had fallen on occasion. She was very sleepy during the day. A diagnosis of depression had been suspected in primary care and antidepressant medication started, without effect. Psychomotor retardation was evident on history taking and the 'head turning sign' (Larner, 2012) was present. A diagnosis of normal pressure hydrocephalus was mooted, but computed tomography brain imaging (Figure 2) showed a hyperdense lesion within the foramina of Monro representing a colloid cyst, with hydrocephalus and periventricular oedema, requiring prompt neurosurgical intervention.

**Figure 2. Computed tomography brain imaging showing a hyperdense lesion within the foramina of Monro representing a colloid cyst, with hydrocephalus and periventricular oedema.**



### LEARNING POINTS

- Cerebral mass lesions are rarely diagnosed de novo in patients presenting to a cognitive disorders clinic.
- These cases of tumour were unsuspected before neuroimaging so, although rare, they highlight the importance of neuroimaging in patients with cognitive disorders.