Cryptococcus neoformans, a budding, nonmycelial yeast with a polysaccharide capsule, is the most common fungus to involve the central nervous system (CNS). The respiratory tract is the primary site of infection in man, and the organism spreads haematogenously from the lungs to the CNS [1]. Cryptococcal infection of the CNS has been reported in immunocompetent and immunocompromised hosts [2–5]. Involvement of the CNS is observed in 70% of patients at the time of diagnosis, in the form of meningitis, meningoencephalitis, ventriculitis or intracerebral masses [1, 6, 7]. The latter can be of four types: granuloma, gelatinous pseudocyst, abscess and mixed [6, 8, 9]. Several recent reports indicate MRI is more effective than CT for detecting these lesions [4, 10, 11]. However, MRI findings in cerebral cryptococcal granuloma have not been confirmed with histochemical analysis. We report a cerebral cryptococcal granuloma with MRI features similar to those of epidermoid tumours.

Case report
A 57-year-old man was admitted with a 1-month history of disturbance of recent memory and deteriorating cognition. In the month prior to admission, he had temporarily lost consciousness. On admission he was disoriented in time and space, with poor recent memory. Chest radiographs showed no abnormality. CT demonstrated a low-density lesion suggesting a cyst (Fig. 1). On MRI at 1.5 T the lesion was isointense with cerebrospinal fluid (CSF) on T1-weighted (TR/TE 600/12 ms) and T2-weighted (4000/96 ms) images, without surrounding oedema, and did not enhance with contrast medium, which also suggested a cyst (Fig. 2). On fluid-attenuated inversion recovery (FLAIR – TR/TI/TE 8000/2000/119 ms) the lesion gave higher signal than CSF, while on echo-planar (EP) diffusion-weighted (TE 123 ms, b 1200 s/mm2) imaging (DWI) it had a high-signal “mosaic pattern” (Fig. 3). With these two sequences, the lesion was revealed as a solid mass adjacent to the anterior horn of the right lateral ventricle, extending to the skull base in the right frontal region. We therefore diagnosed an epidermoid tumour.

At a right frontotemporal craniotomy, a well-encapsulated, relatively hard, greyish-white mass was exposed through a small incision of the middle frontal gyrus. There was no communication between the mass and the ventricle. Dissection from the surrounding brain was easy, because of the capsule, and the mass was subtotally removed. Histological examination revealed small, round, eosinophilic cells in a reticular inorganic structure (Fig. 4a). There was no inflammatory response except for a small infiltrate of macrophages in the adjacent granulation tissue. The small, round cells stained positively with Grocott’s methenamine silver (Fig. 4b), alcin blue and colloidal iron stains, and mildly with periodic acid–Schiff (PAS). Mucicarmine reactivity was absent. The mass was diagnosed as a cryptococcal granuloma which had lost its biological activity.
Postoperatively, CSF cultures and Indian ink preparations were negative for *Cryptococcus neoformans*. Serology for cryptococcal antigens and antibodies (serum and CSF) was negative, as were cultures from the blood, sputum and urine. No human immunodeficiency virus (HIV) antibody titres were detected.

The patient had an uneventful postoperative course and was discharged from the hospital 1 month postoperatively. One year after surgery, he was free of symptoms.

**Discussion**

Cerebral cryptococcal granuloma is rare, although its true prevalence is unknown. The most frequent reported sites are the basal ganglia, thalamus, and cerebellum [4, 6, 10, 11]. It is generally assumed that the cryptococcal organisms enter Virchow-Robin spaces [7] and give rise to small cysts or gelatinous pseudocysts in the parenchyma. In the immunologically intact host, the organisms usually induce a chronic granulomatous reaction [10]. Diagnosis of cryptococcal meningitis has been clearly described [1, 12], but preoperative diagnosis of cerebral cryptococcal granuloma is very difficult [2, 13].

In approximately 40% of cases no clinical manifestations of meningitis were found, and the clinical course closely resembled that of cerebral tumours [8, 14].

On CT cerebral cryptococcal granulomas appear as low-density lesions with or without homogeneous enhancement [6, 11, 15], or as isodense lesions with ring enhancement [15]. Recent reports indicate that MRI is more effective than CT for detecting these lesions [4, 10, 11]. The most common findings were punctate masses giving low signal on T1- and high signal on T2-weighted imaging, without surrounding oedema. Pathological contrast enhancement of cryptococcal mass lesions is uncommon [4]. To our knowledge, this is the first reported case of cerebral cryptococcal granuloma which was examined using the combination of pulse sequences described and in which the surgical specimen was analysed histochemically. The lesion was isointense with CSF on T1- and T2-weighted images (Fig. 2). FLAIR and DW-EPI were superior to conventional spin-echo imaging in differentiating the lesion from the adjacent CSF-containing ventricle and from a CSF-filled arachnoid cyst (Fig. 3).

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**Fig. 1** CT shows a low-density lesion, suggesting a cyst

**Fig. 2 a, b** T1- and T2-weighted images demonstrate a mass isointense with CSF, without surrounding oedema

**Fig. 3 a** A FLAIR image shows a mass giving higher signal than CSF. **b** Diffusion-weighted image reveals a high-signal “mosaic” pattern, distinguishing the lesion from a cyst, especially an arachnoid cyst.