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Abstract We present four patients with uncommon encapsulated intracerebral haematomas (ICH). Because of ring enhancement, three were incorrectly diagnosed as gliomas and operated upon. In one case the diagnosis of chronic ICH was made on MRI. MRI can be used to demonstrate that a lesion is only a haematoma and is valuable in follow-up and in differentiating these haematomas from neoplasms. Angiography may reveal a vascular malformation which may be the reason for repeated bleeding, which may lead to encapsulation. The mechanism, however, remains unclear in most cases.

Key words Intracerebral haematoma, chronic · Haematoma, encapsulated · Cerebral neoplasm · Computed tomography

Introduction

The appearances and course of intracerebral haematomas have been studied extensively. They are dense and often homogeneous in the early stages (1–20 days). In the course of time, the density decreases by about 0.7 EMI units (1.4 Hounsfield units) per day [1]. Finally, the haematoma becomes of low density and resolves, leading to an atrophic or sometimes normal brain area by about 8 months [2]. Occasionally, however, intracerebral haematomas are unusual in their CT appearance and course. They may develop a surrounding capsule, which can persist for months and mimic a tumour. A ring of contrast enhancement appears in the subacute stage (5–14 days) [3] and may persist for a long time [2]. Only a few encapsulated haematomas have been reported [4], and we now report four cases treated in our hospital.

Case reports

Case 1

A 27-year-old previously healthy man presented with 3 month of numbness of the right limbs; there were no abnormal neurological findings. EEG showed a left-sided abnormality. CT revealed a mass measuring $2 \times 2 \times 3$ cm in the left insular region. During a 1-month follow-up there was no change (Fig. 1 a). Angiography was normal. MRI showed the lesion to give high signal, with a low-signal periphery on T2-weighted images (Fig. 1 b). On T1-weighted images, signal intensity was more heterogeneous (Fig. 1 c). The probable diagnosis was then an old haematoma. Because the lesion showed no sign of resolving an operation was performed and a greenish-brown transparent capsule containing dark, partly organised blood was found. Histological study revealed haemorrhage, fibrous tissue and calcification. Focal accumulations of lymphocytes were observed, but there were no neoplastic changes or vascular malformation. After 1.5 months the patient was asymptomatic, and CT demonstrated a small dense area, with slight contrast enhancement indicating a remnant of the capsule (Fig. 1 d). CT 10 months later was unchanged. After another 10 months the patient had one short seizure with unconsciousness, but the CT was unchanged. MRI revealed a small lesion with low signal intensity due to haemosiderin or possibly calcification.
Fig. 1 a–d Case 1. a CT 3 h after carotid angiography. A slightly ring-enhancing lesion without mass effect or oedema is seen. b T2-weighted MRI shows a high-signal lesion with a peripheral low-signal ring. c A T1-weighted image shows mixed intensity. d Contrast-enhanced CT 1.5 months after operation demonstrates dense area indicating a remnant of the haematoma capsule.

Fig. 2 a, b Case 2. CT a before and b after contrast medium showing a heterogeneous low-density area with a ring-enhancing multilobular mass in the right frontal lobe.

Case 2
A 65-year-old woman presented with a 1-month history of headache of sudden onset, nausea and vertigo. Neurological examination was normal with the exception of a sluggish right pupil. EEG revealed a delta focus in the right frontotemporal region. CT demonstrated an inhomogeneous low-density mass 5 cm in diameter in the right frontal lobe (Fig. 2a), with multilobulated ring enhancement (Fig. 2b). The lesion was interpreted as a neoplasm. At operation an old haematoma surrounded by a fibrotic capsule was found. Histological study showed small fragments of partly necrotic cerebral tissue with haemorrhage, vascular proliferation and macrophages, but no vascular malformation or neoplasm. Angiography demonstrated two aneurysms on the right middle cerebral artery, which were operated upon without complications.

Case 3
A 69-year-old man had suffered intense headache 3 months previously. He had hypertension, treated medically. His neurological examination had been normal. Gradually, the patient developed difficulty in speaking, disturbances of vision and memory, and vertigo. Examination revealed disturbances of memory and a partial right facial palsy. CT revealed a ring-enhancing mass measuring 2.3 × 2.7 × 2.8 cm in the left parietal region (Fig. 3a, b). This was interpreted as a glioma, but a metastasis or an abscess was possible. At operation, an encapsulated haematoma was found. Microscopically, gliotic brain tissue, fresh and organised haemorrhage, vascular proliferation, round cell infiltration and haemosiderin was found, but no neoplastic changes or vascular malformation. The patient recovered without paresis, but the disturbances of memory...