

## Subarachnoid Haemorrhage as Initial Symptom of Multiple Brain Abscesses

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### Summary

The case of evolving multiple brain abscesses which became symptomatic with a sudden hemianopsia and the clinical and radiological signs of a subarachnoid haemorrhage, is reported. A common pathomechanism which could explain both the sudden focal neurological deficit and the subarachnoid bleeding is discussed.

*Keywords:* Brain abscess; computerized tomography; cerebritis; subarachnoid haemorrhage.

### Introduction

The typical clinical feature of spontaneous subarachnoid haemorrhage (SAH) is sudden onset of severe headache, usually in combination with nausea, vomiting, and syncope. The clinical investigation routinely reveals nuchal rigidity. Focal neurological deficits and a decreased level of consciousness are usually found in more severe forms of SAH. In 75% to 92% of spontaneous SAHs, an intracranial aneurysm can be diagnosed [14]. In only 0.7% to 5% of the cases, SAH is caused by a cerebral arteriovenous malformation (AVM) [2, 14]. Sporadically, SAH is the initial symptom of benign and malignant intra- and extra-axial tumours [9, 13]. The authors report the first case, in which SAH was the presenting sign of evolving multiple brain abscesses.

### Case Report

This 56-year-old male patient came to admission one day after sudden onset of severe headache in combination with nausea and vertigo. Clinical examination revealed moderate nuchal rigidity and a left homonymous hemianopsia. Cerebral computerized tomography (CT) scans were performed immediately and showed a SAH, which was confined to the right parietal sulci (Fig. 1). The subsequent angiography failed to show the suspected vascular malformation. CT scanning, which was repeated shortly after angiography,

confirmed the subarachnoid blood in the parietal sulci and showed slight contrast enhancement of the adjacent, swollen gyri. Magnetic resonance (MR) imaging was performed on day 6 after admission to rule out an angiographically occult vascular malformation. The T1 contrast enhanced MR-images showed a single frontal and multiple parietal lesions with marked ring enhancement and slight perifocal oedema (Fig. 2). The MR findings now suggested the presence of multiple brain abscesses. The patient underwent frameless stereotactic puncture of the largest parietal lesion, and pus was drained. We failed to isolate the causative organism, but paranasal sinus infection could be identified as a potential source of the infection. Following the drainage of the paranasal sinuses and intravenous administration of antibiotics, the patient made a complete recovery within four weeks.

### Discussion

Fever, seizures and focal neurological deficits are frequent symptoms of single and multiple brain abscesses [11, 17, 24]. In patients with brain abscess, headache with nausea is the first symptom of increased intracranial pressure. A decreased level of consciousness emerges with increasing size of the abscess and the development of perifocal oedema. The symptoms of single and multiple brain abscesses are gradual in onset. The diagnosis is made by CT scanning or MR imaging [1, 4, 5, 10, 12, 15]. The radiological appearance is related to the stage of the abscess. In the early cerebritis stage, no contrast enhancement or partial ring contrast enhancement is observed. The infected tissue is hypodense in the CT scans, hypo-intense in the T1-weighted MR images and hyperintense in the T2-weighted MR images. In the capsule formation stage, the typical radiological picture of a smooth, thin, regular contrast medium-enhancing wall and a non-enhancing central portion is seen on both CT scans and MR images. In the present case, the patient became suddenly symptomatic with severe headache, nuchal

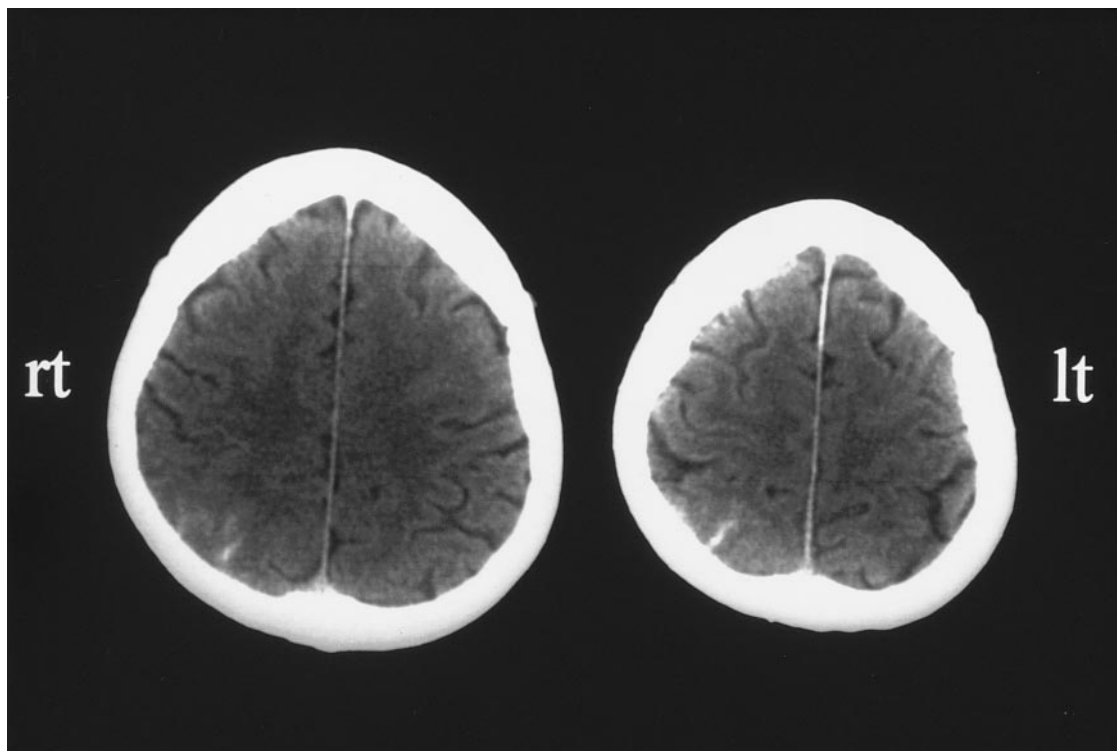


Fig. 1. The non-contrast computerized tomography (CT) scan was obtained one day after sudden onset of severe headache, nausea and homonymous hemianopsia. The scan showed a subarachnoid haemorrhage, which was confined to the right parietal sulci

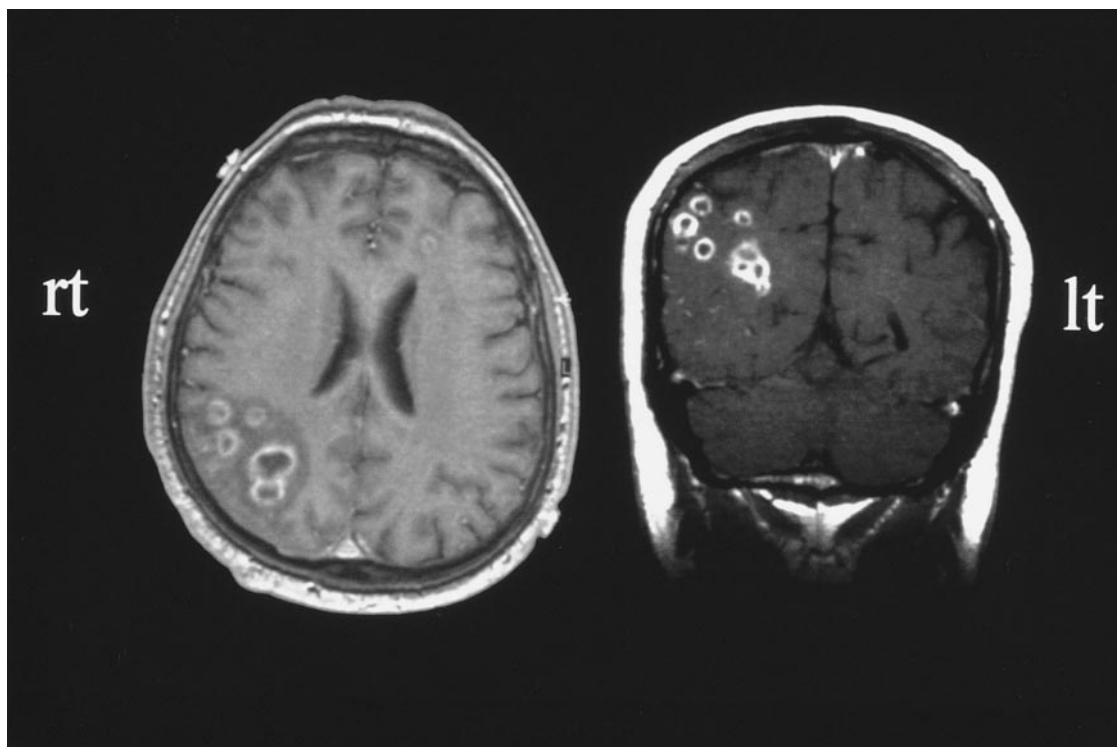


Fig. 2. The gadolinium-enhanced axial and coronal T1-weighted magnetic resonance (MR) images, which were obtained six days after admission revealed a single left frontal lesion and multiple right parietal lesions with marked ring enhancement and perifocal oedema, which made the diagnosis of multiple brain abscesses probable

rigidity and homonymous hemianopsia. The initial CT scans without contrast medium revealed subarachnoid blood in the parietal sulci. The subsequent CT scans after angiography confirmed the subarachnoid blood and showed slight gyral contrast enhancement but failed to show areas of hypodensity or partial ring enhancement which usually indicate the early cerebritis stage [5]. In the absence of a space-occupying lesion, the severe headache and the nuchal rigidity could be best explained by the sulcal SAH, and not by beginning abscess formation. The authors are well aware, that, from the scientific point of view, confirmation of the radiologically diagnosed subarachnoid bleeding by lumbar puncture would have been of value. However, lumbar puncture in cases of CT-proven SAH and typical symptoms is not an essential part of the diagnostic work-up and, therefore, was not performed.

With the exception of cranial nerve palsy, a sudden neurological deficit in conjunction with SAH is exceptional without a significant amount of intracerebral blood. It is unlikely, that the circumscribed sulcal SAH caused the hemianopsia. The development of focal neurological deficits in patients with brain abscess is related to the increasing size of abscess and perifocal oedema. However, we failed to identify any significant space occupying lesion on the initial CT scans. Thus, the sudden visual field cut could be best explained by cortical ischaemia [18]. Multiple brain abscesses are usually caused by haematogenous spread from congenital heart disease, endocarditis, and pulmonary abscesses, but are also found with middle ear infections and sinusitis [11, 17]. Possibly, septic emboli occluded cortical vessels in the vicinity of the visual cortex. Septic emboli also could explain the occurrence of sulcal SAH. Perivascular inflammation of the occluded cortical vessels results in weakening of the vessel wall with the risk of subsequent subarachnoid bleeding [4, 18]. If subcortical instead of cortical vessels are affected, intracerebral haemorrhage could be the consequence [20, 21].

Brain abscesses are managed by framebased or frameless stereotactic puncture, drainage of the purulent material and subsequent antibiotic therapy, often accompanied by corticosteroids to decrease the size of the perifocal oedema [5, 6, 7, 11, 12, 19, 22, 23]. If antibiotic therapy is initiated in the early cerebritis stage, that means, before formation of a firm capsule, which cannot be penetrated by antibiotics, surgery could sometimes be avoided [3, 8, 16]. In the present case, the abscesses became symptomatic in the very early, con-

servatively treatable stage of cerebritis, but the unusual clinical and radiological picture delayed the correct diagnosis until the capsule stage which made surgical management necessary.

In conclusion, we showed that a brain abscess in the very early cerebritis stage has to be considered as source of sulcal SAH, if more common bleeding sources have been ruled out. In such a case, any attempt should be made to establish the suspected diagnosis by early, and, if required, repeated neuro-imaging, because only timely initiation of antibiotic therapy could prevent further spread of the infection and, possibly, surgical intervention.

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