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Spontaneous bilateral subdural haematomas in the posterior cranial fossa revealed by MRI

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Abstract A 52-year-old woman treated for acute myeloproliferative disease developed progressive stupor. CT showed obstructive hydrocephalus resulting from unexplained mass effect on the fourth ventricle. MRI revealed bilateral extra-axial collections in the posterior cranial fossa, giving high signal on T1- and T2-weighted images, suggesting subacute subdural haematomas. Subdural haematomas can be suspected on CT when there is unexplained mass effect. MRI may be essential to confirm the diagnosis and plan appropriate treatment.

Keywords Subdural haematoma · Posterior cranial fossa · Thrombocytopenia · Magnetic resonance imaging

Introduction

Coagulation disorders are known to be associated with spontaneous intracranial haematomas [1], but they are rare in the posterior cranial fossa and in the subdural space. CT diagnosis of subdural haematomas may be challenging in the subacute stage. We report a patient with thrombocytopenia and bilateral subdural haematomas in the posterior cranial fossa in whom we needed MRI to establish the diagnosis and also to choose the best therapeutic option.

Case report

A 52 year-old-woman presented with fever, leukocytosis, anemia and thrombocytopenia. A diagnosis of acute myeloblastic leukaemia type M2 was made by bone-marrow biopsy. Daunorubicine and cytarabine were given. A week later the patient developed pancytopenia with extremely severe thrombocytopenia (5000/mm^3), refractory to platelet administration. Concurrently, she showed progressive deterioration of consciousness. Examination revealed spontaneous hyperventilation, pinpoint pupils, downward gaze deviation, hyperreflexia and bilateral Babinski signs, without cranial nerve deficits.

CT showed obstructive hydrocephalus and an unexplained mass effect in the posterior cranial fossa manifest as narrowing of the fourth ventricle. No mass was clearly visible even after injection of contrast medium (Fig. 1).

A right frontal ventriculostomy showed an opening pressure of 25 cm water. The ventricular fluid showed neither infection nor blood.

MRI revealed bilateral space-occupying lesions in the subdural space of the posterior cranial fossa. High signal on T1- and T2-weighted images highly suggested extracellular methaemoglobin, characteristic of subacute haematomas (Fig. 2). Angiographic MR sequences showed no arterial or venous occlusions (Fig. 3).

The patient's conscious level improved but pyramidal signs were present in all limbs. Bilateral enlarged burr holes were performed by a median approach. Following opening of the dura mater and a membrane surrounding the subdural collections, they were evacuated, after which the cerebellar cortex reached the convexity. The patient was extubated 24 h after the procedure and the ventricular drain was withdrawn on the third postoperative

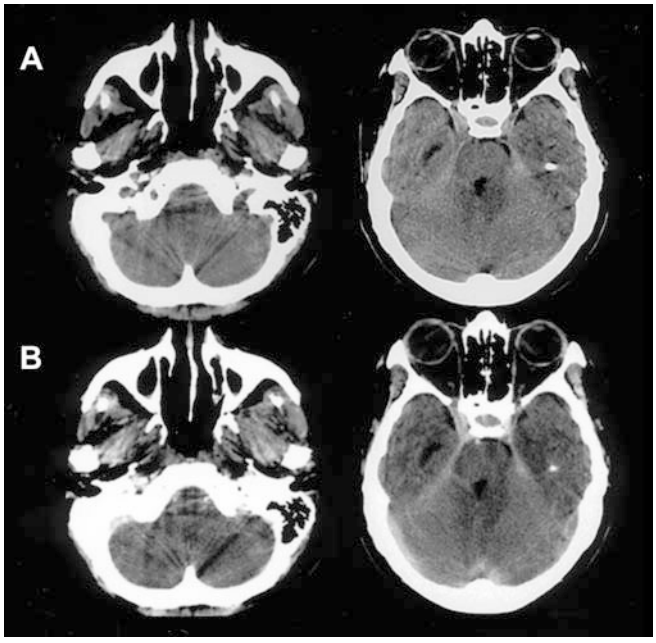

Fig. 1A, B Preoperative CT. No collection is definitely visible in the posterior cranial fossa **A** before pr **B** after intravenous contrast medium. Compression of the fourth ventricle is the only sign of a mass lesion

day. The pyramidal signs resolved within 1 month and postoperative CT showed no residual mass effect on the fourth ventricle (Fig. 4).

Discussion

Spontaneous subdural haematomas are rare in the posterior cranial fossa. Most of the published cases concern neonates [2] or are associated with ruptured arteriovenous malformations [3], aneurysms [4], or coagulation disorders such as anticoagulation or antiaggregant therapy [1, 5, 6,7]. Haemophiliac patients

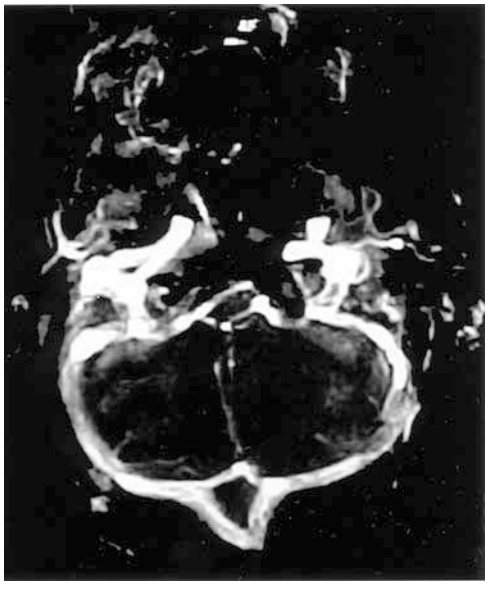

Fig. 3 MR venography shows no thrombosis of the transverse or sigmoid sinuses

[8] and those with idiopathic thrombocytopenic purpura [9] have also developed haematomas in the posterior cranial fossa; thrombocytopenia may result in a hypocoagulable state, increasing the risk of spontaneous intracranial haemorrhage [10]. In our patient severe thrombocytopenia was induced by the myeloproliferative disease and the antimitotic drugs.

On CT an acute haematoma is easy to diagnose when it is dense, but may be challenging when it is isodense in the subacute stage or in the acute stage in a patient with reduced haemoglobin levels (7.3 g/dl in our patient) [4,6]. In this case, the haematomas appeared isodense and no contrast enhancement was seen. MRI is sensitive to blood [4]. In this case, it revealed extracellular methaemoglobin, indicating the

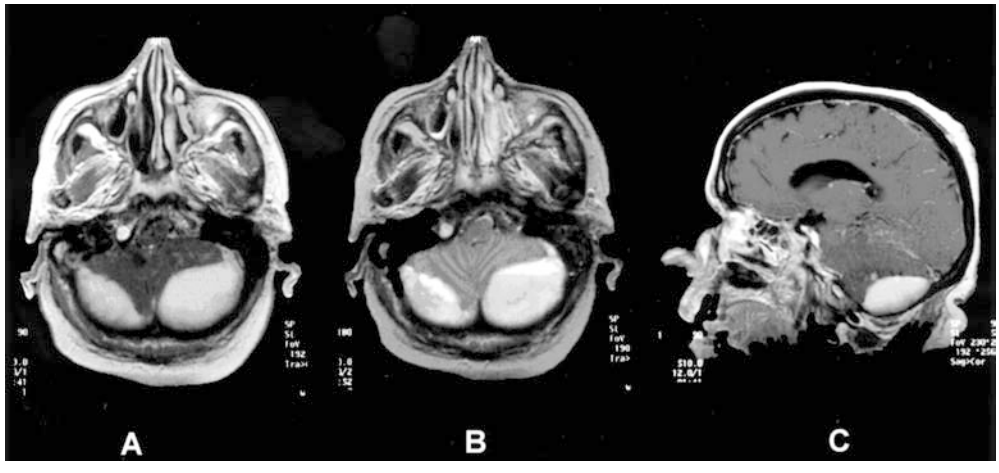

Fig. 2A–C Preoperative MRI. **A, B** Axial T1- and T2-weighted images showing bilateral subdural haematomas in the posterior cranial fossa. **C** The sagittal T1-weighted image shows its craniocaudal extent. High signal suggests of extracellular methaemoglobin

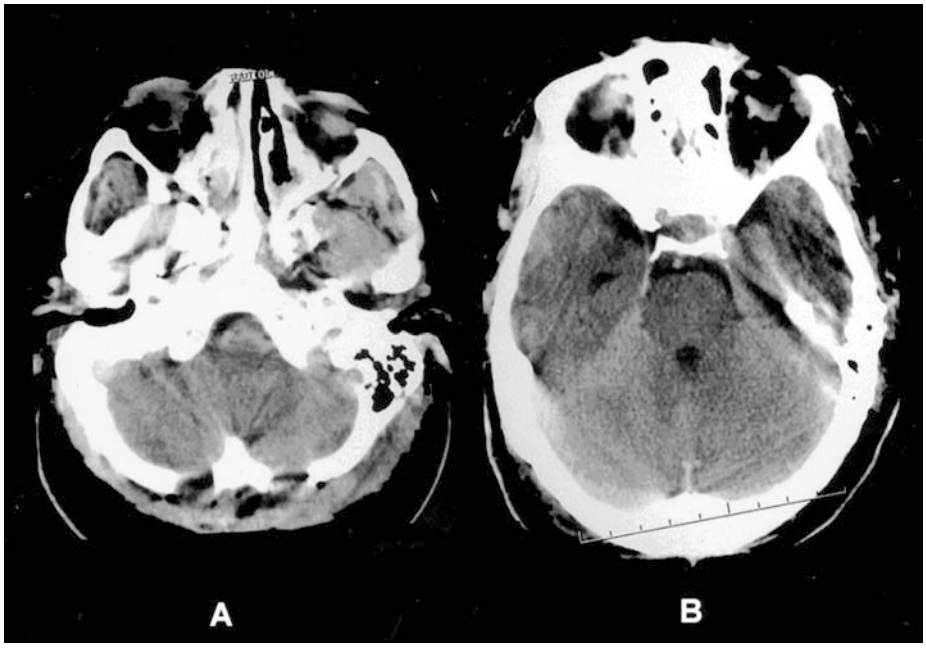

Fig. 4A, B Postoperative CT. Sections showing **A** bilateral burr holes and **B** relief of the mass effect on the fourth ventricle

subacute nature of the haemorrhage. Thus, subdural haematomas can be suspected when CT shows unexplained mass effect in the posterior cranial fossa and should be confirmed by MRI.

There is no study comparing conservative and surgical approaches to subdural haematomas in the posterior cranial fossa. A conservative approach has been suggested in conscious patients with no radiological mass effect on the fourth ventricle and/or brain stem [11]. In one report [6], the patient was treated with an external ventricular catheter and the haematoma was followed conservatively, with a good clinical outcome. In our case, ventricular drainage did not improve the clinical signs of brain-stem compression, needing surgical evacuation of the haematomas. We relieved the mass effect on both the brain stem and fourth ventricle. A ventricular catheter may be unnecessary in some cases, avoiding complications such as upward cerebellar herniation. The MRI appearances suggested to us that burr holes would be adequate for evacuation of the subdural fluid and less invasive than a craniotomy or a craniectomy.

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