

# Kernohan's notch in chronic subdural hematoma: findings on magnetic resonance imaging

## Case report

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✓ A 69-year-old man presented with mild left-sided hemiparesis of 2 years' duration. A computerized tomography scan revealed a left-sided chronic subdural hematoma and a midline shift to the right. Magnetic resonance (MR) imaging obtained on admission to the hospital also disclosed a deformity of the right crus cerebri. After drainage and irrigation of the hematoma through a single burr hole, the left hemiparesis improved significantly. Magnetic resonance imaging performed 9 days after the operation revealed that the size of the subdural hematoma had diminished and the deformity of the crus cerebri had improved markedly. Kernohan's notch, caused by a supratentorial mass and producing ipsilateral hemiparesis or hemiplegia, is rarely demonstrated radiographically. This may be the first reported case in which Kernohan's notch in chronic subdural hematoma has been demonstrated on MR imaging.

**KEY WORDS** • Kernohan's notch • chronic subdural hematoma • magnetic resonance imaging

**K**ERNOHANS' notch, which is a compression of the crus cerebri against the tentorial edge by a contralateral supratentorial mass, which produces ipsilateral hemiplegia or hemiparesis, is usually seen in patients with an advanced-stage brain tumor or severe head injury.<sup>4</sup> Kernohan's notch has been well studied clinically and pathologically, although radiographic investigation has been rare.<sup>1</sup> We recently encountered a patient who had Kernohan's notch with chronic subdural hematoma demonstrated on magnetic resonance (MR) imaging. We expect this may be the first reported case in the literature.

### Case Report

This 69-year-old man was admitted to our hospital on April 5, 1994 with mild left-sided hemiparesis of 2 years' duration. A computerized tomography (CT) scan obtained on admission revealed a left chronic subdural hematoma and a midline shift to the right. Magnetic resonance imaging performed on the same day also revealed a deformity of the right crus cerebri (Fig. 1). On the following day, the patient underwent drainage and irrigation of the hematoma through a single burr hole. The subdural hematoma was a typical chronic hematoma with an outer membrane. After the operation, the left-sided hemiparesis improved significantly. Magnetic resonance imaging obtained 9 days after the operation revealed that the size of the hematoma had diminished and the deformity of the crus cerebri had improved markedly (Fig. 2).

### Discussion

Compression of the crus cerebri against the free edge of the tentorium caused by a contralateral mass was first described by Kernohan and Woltman in 1929.<sup>5</sup> They reported a 47-year-old man with a brain tumor in the left frontotemporal lobe whose symptom was left-sided hemiparesis.

We could find only two case reports of Kernohan's notch demonstrated on MR imaging. Cohen and Wilson<sup>1</sup> reported Kernohan's notch in a 19-year-old man with acute epidural hematoma, and Jones and colleagues<sup>4</sup> described a 25-year-old man with acute subdural hematoma. In both cases, T<sub>2</sub>-weighted MR imaging disclosed a high-intensity lesion in the contralateral crus cerebri postoperatively and ipsilateral hemiparesis improved postoperatively. However, radiographic demonstration of Kernohan's notch in chronic subdural hematoma has not been reported until now.

Cooper, *et al.*,<sup>2</sup> described the CT appearance of traumatic brainstem hemorrhages and emphasized the value of thin slices to improve resolution. However, because of artefacts, a CT scan is not as effective in detecting small lesions in the brainstem. In our patient, no abnormal sign was detected in the brainstem using a CT scan. Recently, MR imaging was shown to be very effective in detecting abnormal findings such as pathological lesions and transtentorial herniation in the brainstem.<sup>3</sup> The change in the deformity of the crus cerebri closely paralleled the

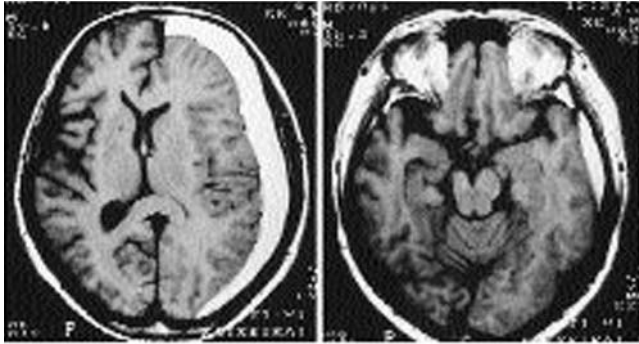


FIG. 1. Magnetic resonance  $T_1$ -weighted images of a 69-year-old man obtained on admission revealing a high-intensity chronic subdural hematoma on the left side, midline shift to the right (*left*) and deformity of the right crus cerebri (*right*).

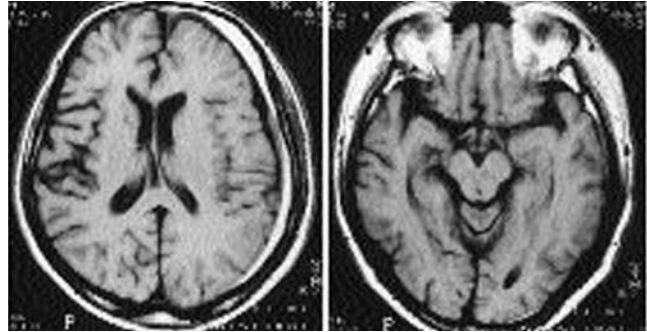


FIG. 2. Magnetic resonance  $T_1$ -weighted images obtained 9 days after operation in the same patient disclosing that the size of the subdural hematoma has diminished (*left*) and the deformity of the right crus cerebri has improved markedly (*right*).

neurological recovery in our patient, and the diagnosis of Kernohan's notch was formulated.

At our institute, MR imaging is not usually performed in chronic subdural hematoma, which can be easily diagnosed using CT scanning. However, the discrepancy between the CT findings and the neurological findings in this patient prompted us to use MR imaging. To accurately evaluate the pathophysiological mechanism of the symptoms, MR imaging should be performed even in patients with chronic subdural hematoma when neurological findings cannot clearly be accounted for based on the CT scan.

#### References

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