Multiple false localizing signs in intracranial tumor

Case report

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A case of cerebellar hemangioblastoma is presented in which multiple false localizing signs caused difficulty in the clinical localization of the lesion. The mode of presentation and pathogenesis of these signs are briefly discussed, and the observation made that the ninth and tenth cranial nerve palsies recorded in this case rarely lead to false localization.

KEY WORDS brain tumor cranial nerve palsies false localizing signs cerebellar hemangioblastoma

In patients with brain tumors, false localizing signs can be caused by a local disturbance at a distance from the site of the tumor, and whose interpretation may lead to error in the clinical localization of that tumor. This case is being reported to record a multiplicity of rare signs which influenced both diagnosis and surgical management.

Case Report

A 40-year-old woman was admitted because of a 9-month history of intermittent headache. In the week prior to admission she had developed progressively severe pain in the back of her neck, vomiting, unsteadiness, and slurred speech. The day prior to admission she had noticed some weakness of the right side of her face.

Examination. The patient was alert, cooperative and well-oriented, but there was a defect of recent memory and a decrease in higher mental function. She was dysarthritic and had marked neck stiffness. Visual acuity was reduced in both eyes and there was marked papilledema, with second degree nystagmus to the left; the right corneal reflex was absent. There was impairment of sensation over the distribution of the first division of the right trigeminal nerve, a right lower motor neuron facial weakness, and a partial right nerve deafness. The palate moved to the left with phonation and there was diminished palatal sensation on the right, with an absent gag reflex. She was unable to contract either sternomastoid muscle and showed a mild right hemiparesis with rightsided ataxia. During the first 12 hours of admission she became demented.

Skull radiographs showed erosion of the dorsum sellae. Air ventriculography demon-
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![Ventriculograms showing supratentorial hydrocephalus and displacement of the fourth ventricle forward and to the right by the cerebellar hemangioblastoma. Left: Anteroposterior view. Right: Lateral view.](image)

Strated dilatation of the lateral and third ventricles with displacement of the fourth ventricle forward and to the right, a finding consistent with a space-occupying lesion of the left cerebellar hemisphere (Fig. 1). Lumbar cerebrospinal fluid (CSF) was normal, ventricular CSF had a protein content of 100 mg/100 ml.

**Operation.** Exploration of the posterior fossa revealed a large, cystic tumor in the left cerebellar hemisphere; it contained approximately 20 ml of clear yellow fluid. A mural nodule on the posterior wall of the cyst was excised, histology showing a typical cerebellar hemangioblastoma. The floor of the fourth ventricle and the right side of the brain stem were carefully inspected and no abnormality was seen.

**Postoperative Course.** The patient rapidly recovered mental function and memory within a few hours of operation. Thereafter her visual acuity returned to normal; the dysarthria, right facial weakness, loss of palatal sensation and right hemiparesis recovered. However, the absent right corneal reflex, palatal weakness, and ataxic gait persisted. Six months later the patient showed no abnormal neurological signs. Vertebral angiography confirmed total removal of the lesion and demonstrated that there were no anomalies present in the vertebrobasilar arterial system.

**Discussion**

The first comprehensive article on false localizing signs was published by Collier in 1904. Since then there have been many reports relating to the pathogenesis of such signs. Gassel reviewed the concept of false localizing signs and analyzed their occurrence in 250 cases of intracranial meningioma. He found no evidence of palsies of the ninth, tenth, eleventh, or twelfth cranial nerves; in fact, in 20 infratentorial tumors in his series there were no false localizing cranial nerve palsies.

Our case had right fifth, seventh, eighth, ninth, and tenth cranial nerve palsies, with rightsided cerebellar signs, all of which were false localizing. The left nystagmus and right hemiparesis could have been a direct effect of the left cerebellar lesion found at operation. The acute dementia, diminished visual acuity, and mental dulling were attributed to raised intracranial pressure, and the neck rigidity to tonsillar herniation. On clinical grounds it was thought that the lesion was in the right side of the posterior fossa with direct involvement of the brain stem. The possibility of multiple lesions was considered, and therefore a midline approach to the posterior fossa was made.

Gassel comments that false localizing signs are best identified by an awareness of
their variety and frequency of occurrence. He pointed out that certain signs which included paralysis of the fourth, ninth, tenth, eleventh, and twelfth cranial nerves had rarely been recorded, whereas others such as sixth cranial nerve palsies and cerebellar signs were more common. He found that false signs were often multiple, were frequently late in appearance and developed rapidly. The signs usually improved after uncomplicated removal of the tumor and had completely disappeared after a few months. Our patient showed ninth and tenth cranial nerve palsies, both of which are very rare false localizing signs, and would therefore, by implication, normally be regarded as true signs. The multiplicity of the findings, their late appearance and rapid development were compatible with Gassel's observations, as was the rapid postoperative recovery.

Ehni, in a case report, tabulated various proposals which have been put forward to explain false localizing signs. These included general compression of a nerve with a long intradural course, edema and gliosis, infarction at a distance caused by occlusion of a vessel by herniation through a dural aperture, transmitted pressure, and gross brain displacement. The brain stem may be displaced in the sagittal plane causing traction or kinking of the cranial nerves, or it may be shifted to the side causing tentorial notching or pressure on the rim of the foramen magnum.

In our case we assumed that the mechanism was distortion of the brain stem, due either to displacement or rotation, causing traction on the cranial nerves and possibly some impairment of the blood supply to the nerves or their brain stem nuclei.

In retrospect the rapid development of these cranial nerve palsies in association with other signs of raised intracranial pressure and incipient tonsillar herniation should have led us to suspect that these signs were false localizing in nature.

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References

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