Diagnosis of Epidural Hematoma by Brain Scan and Perfusion Study: Case Report

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By using the arterial and venous phases of an anterior cerebral perfusion study, which showed downward displacement of the sagittal sinus, and the finding of a "rim" on the delayed scans, the specific diagnosis of epidural hematoma was established.

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The specific and unusual findings on the radionuclide brain images, which led us to the certain diagnosis of epidural hematoma, prompt us to report this case. Although the diagnostic features of epidural hematomas have been described (*1–3*), this case presents an unique appearance.

CASE REPORT

A 38-year-old alcoholic man came to the hospital emergency room because of two grand mal seizures within a week. The first had occurred 4 days previously; the second, on the day of admission. He had a history of seizures dating from a head injury in 1971. There had been no recent head trauma. At physical examination, the patient was seen to be confused, lethargic, and disoriented. Lower extremity reflexes were hypoactive but symmetric. No other abnormal neurologic findings were present. An echoencephalogram showed no lateral shift. Skull films taken on admission were reported as normal, but in retrospect, they suggested a slight diastasis of the sagittal and left coronal sutures. A spinal tap was done: the opening pressure was 200 mm H_2O, and the fluid was xanthochromic and had 8,000 red cells/ml. The patient was then referred for a brain scan, which was done with ^{99m}Tc-pertechnetate.

The perfusion study (Fig. 1) showed an area of decreased activity superiorly in the arterial phase, with the activity from the anterior cerebral artery failing to reach the vertex. In the venous phase, there was downward displacement of the sagittal sinus and persistence of the avascular area. A "hot nose" indicated slowing of intracerebral perfusion.

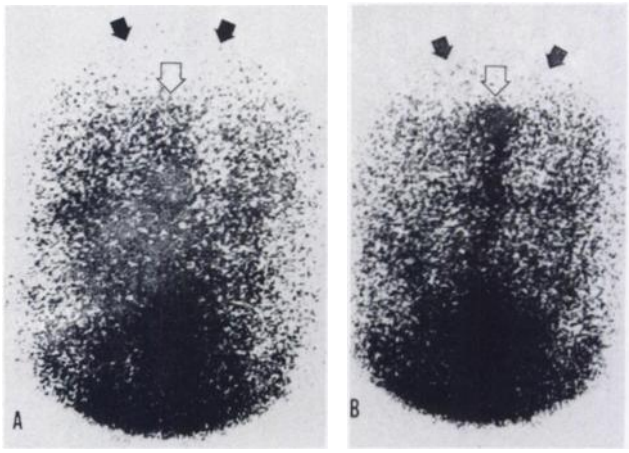

FIG. 1. Arterial (A) and venous (B) phases of anterior cerebral perfusion study show avascular area superiorly with downward displacement of anterior cerebral arteries (open arrow) and sagittal sinus (open arrow) from scalp activity (solid arrows). Nasopharyngeal area appears on arterial phase indicating relative slowing of intracranial perfusion.

The delayed scans (Fig. 2) showed a "rim" of activity in the posterior parietal area bilaterally. One viewer likened this to a monk's tonsure; another, a yarmulka. A diagnosis of epidural hematoma was made, and a cerebral angiogram performed later that day confirmed the presence of a large epidural hematoma, lentiform in shape, separating the sagittal sinus

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from the inner table of the skull (Fig. 3). A biparietal craniotomy was performed on the following day, and approximately 200 cm^3 of fresh epidural clot was evacuated.

DISCUSSION

The rim sign has been thought to indicate epidural hematoma (*1–3*), but it is not confirmatory since it has been found in subdural lesions as well (*4,5*). The rim of activity (*1*) is thought to be due to uptake in granulation tissue at the periphery of hematoma, in surrounding inflamed tissues, and in the membranes that encase the lesion. In this case, however, there was no central activity, and at craniotomy there was no discernible granulation tissue or membranes. Accordingly, the activity was thought to be in the compressed underlying brain tissues. Displacement of the major dural sinuses is unusual and indicates a lesion stripping the periosteum containing the sagittal sinus away from the skull. This finding has been previously described by Morley and Langford, Case No. 4 (*3*).

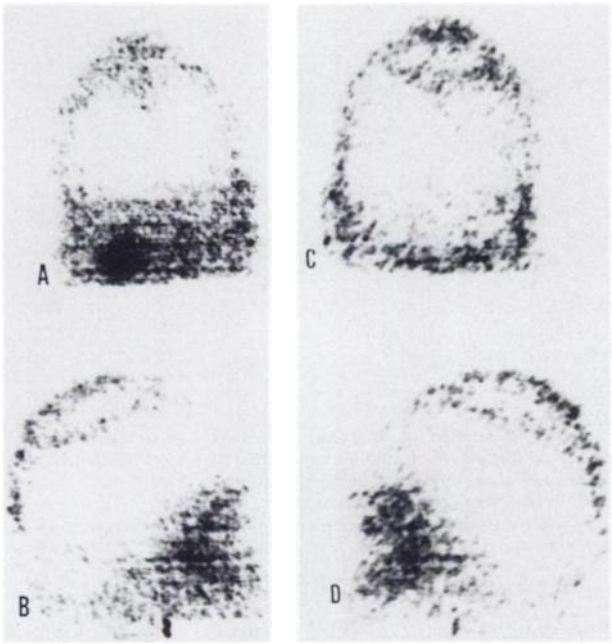

FIG. 2. Anterior (A), right lateral (B), posterior (C), and left lateral (D) delayed brain images show rim of activity crossing midline and surrounding posterior parietal lesion.

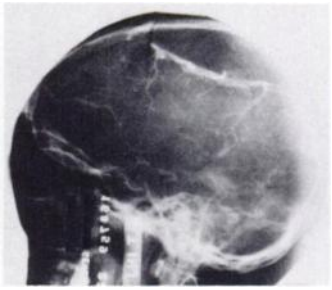

FIG. 3. Lateral film from cerebral arteriogram shows large posterior parietal epidural hematoma with displacement of sagittal sinus from skull and diastasis of coronal suture.

In our case the serendipitous midline location of the epidural hematoma displaced the sagittal sinus and yielded a bilateral rim sign on the image, which made the diagnosis certain in the clinical setting. Conceivably, such other epidural lesions as abscess or metastasis could give a similar pattern, but the clinical setting should differ. The diagnosis of a subdural lesion was eliminated by the fact that such lesions are stopped by dural attachments and, hence, they neither cross the midline nor displace the sagittal sinus. Congenital cysts, while displacing the sagittal sinus from midline, do not strip it away from the skull.

The presence of a bilateral rim sign and the displacement of a major dural sinus in a brain scan and perfusion study provide conclusive evidence for the presence of an epidural lesion.

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