Diagnostic Scintigraphic Sign in Epidural Hematoma at the Vertex: Case Report

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Brain scintigraphy was described in a case of vertical (biparasagittal) epidural hematoma confirmed by contrast angiography. The anterior dynamic and static studies showed inferior displacement of the superior sagittal sinus, diagnostic of an epidural collection. Delayed static anterior and lateral images showed an increased vertical uptake with a crescentic and straight inner contour, respectively. A transaxial computed tomographic scan was negative.

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Brain scintigraphy generally does not differentiate epidural from subdural hematoma (*1*). In contrast cerebral angiography, several criteria make the differentiation possible. Separation of dural sinuses from the inner table of the skull is a sign pathognomonic of an epidural hematoma (*2*). This report describes a case of traumatic epidural hematoma at the vertex, in which brain scintigraphy showed inferior displacement of the superior sagittal sinus, diagnostic of an epidural collection.

FIG. 1. Left (A,B) and right (C) internal carotid angiograms, venous phase, lateral (A,C) and anterior (B) projections, show separation of superior sagittal sinus from inner table of skull, diagnostic of vertical (biparasagittal) epidural collection extending more to left of midline (A,C). Note traumatic diastasis of sagittal suture (B).

CASE REPORT

A 36-year-old man had had difficulty walking for 3 years following an accident that had left him quadriparetic from a cervical cord injury. Ten days before this admission, he fell and struck his head against a cement surface. About 1 week after the fall, he developed progressive headache, vomiting, lethargy, and irritability. Physical examination revealed bradycardia (48 beats per min) and indistinct disk margins bilaterally.

Within a few hours after admission, computed tomography (CT) of the brain was performed both before and after a contrast infusion. Ten slices were taken at 1-cm intervals in planes 25° to the orbitomeatal line, but no abnormal findings were observed. Intrathecal puncture in the lumbar region revealed an opening pressure of 400 mm H_2O and the spinal fluid was xanthochromic, suggestive of a subarachnoid hemorrhage. The patient was restrained in bed, placed on parenteral dexamethasone, and closely observed. He improved dramatically and became ambulatory within several days.

On the seventh hospital day roentgenograms of the skull showed a gross diastatic fracture of the sagittal suture. Contrast angiography (Fig. 1) and ^{99m}Tc scintigraphy (Fig. 2) both revealed an epidural collection, probably a hematoma, beneath the diastatic fracture. The epidural mass displaced the superior

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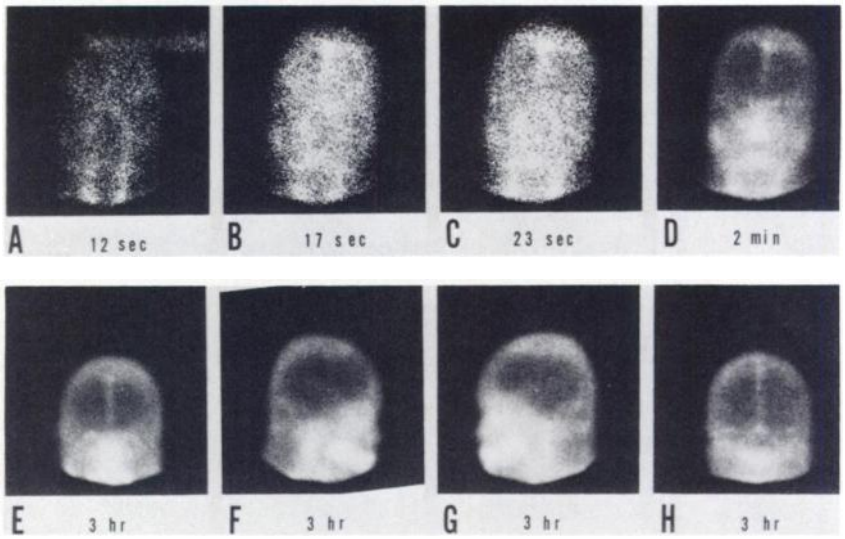

FIG. 2. Scintigrams taken with ^{99m}Tc-pertechnetate indicate vertical epidural collection. Time after intravenous administration is indicated. Inferior displacement of superior sagittal sinus on anterior images is seen at all times after onset of venous phase of flow (B–E), but not before (A). Note also increased vertical uptake with crescentic (E) or straight (G) inner contour and asymmetric biparasagittal extension on static images.

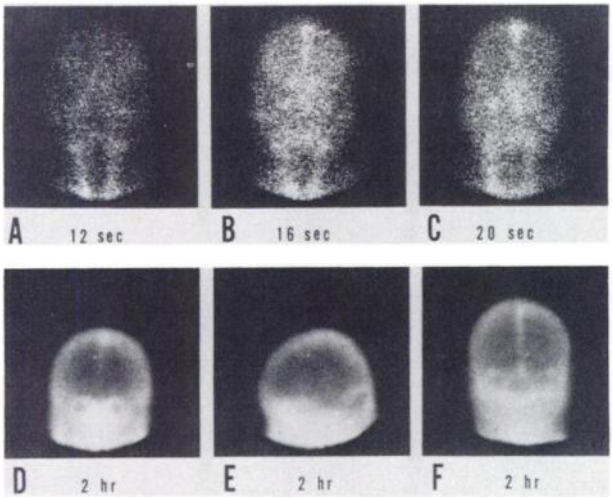

FIG. 3. Followup flow (A–C) and static (D–F) radionuclide studies indicate disappearance of vertical epidural collection: (A–D) anterior views; (E) left lateral; (F) posterior.

sagittal sinus inferiorly and extended biparasagittally, farther to the left. Following the investigation, the patient rapidly regained his baseline quadriparetic status and he was discharged without steroid therapy on the 15th hospital day. Cerebral imaging was repeated 4.5 months later (Fig. 3), and the anterior flow (venous phase) and static images showed that the superior sagittal sinus was in its normal position. Little, if any, abnormal uptake was observed near the vertex on delayed static images. These findings indicated that he had recovered from a vertical epidural hematoma. No operative decompression was performed.

DISCUSSION

Clinically, the epidural collection seen on the contrast angiograms and the ^{99m}Tc scintigrams was undoubtedly a traumatic hematoma. The epidural location was confirmed by the inferior displacement of the superior sagittal sinus. In contrast angiographic diagnosis of vertical epidural hematoma the value of this sign has been proved repeatedly (*2–4*). Rotation of the skull in lateral projections could cause an apparent separation of the superior sagittal sinus from the inner table of the skull, but a separation in the anterior projection is unequivocal (*2*). The displaced superior sagittal sinus observed on the anterior scintigrams (Fig. 2) need not be mistaken for an arteriovenous malformation or neoplasm (*5*). The finding of an abnormal concentration of activity with a crescentic or linear inner contour on the static scintigrams is reassuring (Fig. 2). In two large series of CT studies, all cases of epidural hematoma were correctly diagnosed on the CT scans without contrast angiography (*6,7*). In this case, the lesion was not detected on the CT scan, but the diagnosis of a vertical epidural hematoma by CT scanning can be difficult when, as in this case, a vertical lesion is unsuspected.

Epidural hematomata occur most commonly over the lateral convexities, notably the temporal areas, and symptoms commonly develop acutely from meningeal arterial bleeding (*8–10*). In three large series vertical or biparasagittal location represented only 2–5% (*8–10*). Vertical epidural hematoma, however, commonly has a subacute or chronic course (*3,4,8*), and at least two cases are known to have been managed conservatively without surgery (*3*). In the present case the epidural hemorrhage was probably primarily venous in origin (*4*). In describing hemostasis at surgery for 12 cases of vertical epidural hematoma, Weinman and Samaratunga mentioned hemorrhage only from venous sources (*8*).

Over a dozen reports have described scintigraphic

brain studies in a total of about two dozen cases of epidural hematoma (*1,11–13*). No flow study was described in the literature reviewed. With rare exceptions (*11,12*), the static-image abnormality described was an increased peripheral uptake that showed a crescentic and occasionally a rim pattern. One exception was a decreased uptake associated with a 2-day-old large lateral epidural hematoma reported by Silberstein (*11*). Another was a vertical uptake with a straight inner contour on the lateral scan (similar to that shown in Fig. 2G) and absence of the superior sagittal sinus from the vertex on a posterior scan, associated with a large vertical epidural hematoma (*12*).

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