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Computerized Tomography in Chronic Subdural Hematomas (Effusions) of Infancy

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Summary. During the past 2 years six infants were seen at University of Wisconsin Hospitals (UWH) with subdural hematomas (effusions). This communication describes the abnormalities found on computerized tomographic (CT) evaluation of the six infants.

Five patients recently evaluated at University of Wisconsin Hospitals (UWH) for macrocrania, excessive head growth, or other signs of elevated intracranial pressure were diagnosed from clinical data and subdural puncture as having chronic subdural hematomas. CT scans in these five patients showed ventricular enlargement, decreased density in the anterior temporal regions, large sylvian cisterns, wide cerebral sulci, wide interhemispheric fissures, and decreased density over the cerebral convexities. A sixth patient with a similar history and physical examination was diagnosed as having chronic subdural hematomas after CT scan showed findings identical to the other five infants.

Patients and Methods

We reviewed the clinical records and roentgenographic findings in all patients less than 2 years of age seen at UWH between 1975 and 1977 for evaluation of macrocrania, excessive head growth, or other signs of elevated intracranial pressure. Six infants with clinical and roentgenographic evidence of subdural hematomas (effusions) who had also undergone computerized tomography (CT) of the head were identified. CT evaluations were performed using an EMI scanner 1005 with a 160 x 160 matrix. Diagnostic subdural punctures (bilateral) were made through the lateral recesses of the anterior fontanelle (five patients).

Case 1

A 3-month-old female was evaluated for excessive head growth. Head circumference was 43.5 cm. The anterior fontanelle was tense and transillumination of the head was increased. CT scan showed moderate ventricular enlargement, wide cerebral sulci, enlarged sylvian cisterns, and a prominent interhemispheric fissure (Fig. 1). In addition there was decreased density in the anterior temporal regions and over the cerebral hemispheres. Subdural taps produced 5 ml of yellow proteinaceous fluid (1300 mg% of protein). When last seen at 8 months of age the child was developing normally.

Case 2

A 6-month-old male was evaluated for macrocrania. Psychomotor development was normal, but the head circumference had increased 12 cm since birth. Physical examination demonstrated a tense 4 x 6 cm anterior fontanelle and extensive transillumination. Head circumference was 47.2 cm. CT scan showed moderately enlarged ventricles, and a large area of decreased radiodensity over the frontal lobes. By subdural puncture 20 ml of yellow fluid having a protein content of 1500 mg% were removed. Subsequent measurements of the head have demonstrated circumferences above the 98th percentile but a rate of growth parallel to the normal curve for head growth. When last seen at 10 months of age the patient continued to demonstrate normal psychomotor development.

Case 3

A 3-month-old girl was admitted following a generalized clonic seizure. During the previous 2 weeks her head circumference had increased from 39.5 to 42.75 cm. CT scan showed a large area of decreased radiodensity over the frontal lobes. There was also slight ventricular enlargement, decreased density in the anterior temporal regions, prominent cerebral sulci, and enlarged sylvian

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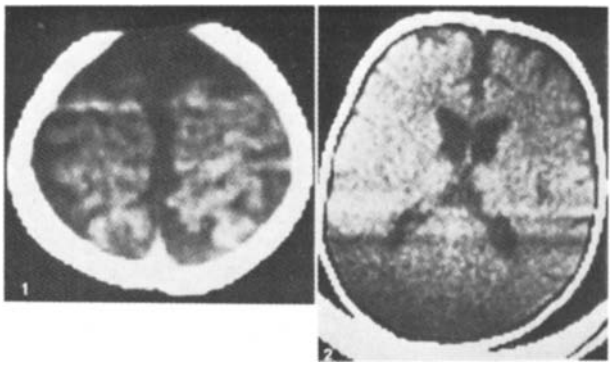

Fig. 1. Fluid density is present anteriorly over cerebral convexities. Interhemispheric fissure and cerebral sulci are enlarged

Fig. 2. Frontal horns of lateral ventricles are enlarged. Interhemispheric fissure and cerebral sulci are also enlarged

cisterns. Cerebral angiography demonstrated bilateral subdural hematomas, and subdural taps produced 5 ml of yellow fluid which had a protein of 918 mg%. When last seen at 4 months of age, physical examination, rate of head growth and developmental assessment were normal.

Case 4

A 3-month-old male infant was referred for episodic vomiting and rapid head growth. Head circumference measured 42 cm. There was an extensive area of transillumination over the anterior head regions. CT scan demonstrated slight dilatation of the lateral ventricles, large cerebral sulci, widening of the interhemispheric fissure, and enlarged sylvian cisterns. There was decreased density in the anterior temporal regions and over the frontal lobes. Subdural taps produced 15 ml of fluid which had a protein of 87 mg%. CSF collected by lumbar puncture had a protein of 41 mg%. At 6 months of age head circumference was 45.5 cm and the child was developing normally.

Case 5

An 8-month-old male was referred for macrocrania. The anterior fontanelle was full and mild suture diastasis was present. Head circumference was 51.5 cm. Transillumination of the head was moderately increased. CT scan demonstrated a large area of decreased density over the cerebral hemispheres. Mild ventricular enlargement, wide cerebral sulci, a prominent interhemispheric fissure, and decreased density in the anterior temporal regions were also present (Fig. 2). A CSF flow study using ^{169}Yb-DTPA showed an absence of flow over the convexities up to 72 h. Flow appeared to stop at the base of frontal and parietal lobes. Some 6 to 8 ml of yellow fluid were removed by subdural tap. Subsequent neurologic and developmental assessments have remained normal. When last seen at 1 year of age, head circumference was above the 98th percentile, but the rate of head growth has continued parallel to the normal curve.

Case 6

A 7-month-old male was referred for evaluation of macrocrania. Head circumference was 48.3 cm, and transillumination was symmetrically increased over the frontal regions. CT scan showed decreased density in the anterior temporal regions and over the frontal lobes consistent with a collection of fluid. The lateral ventricles were slightly dilated and the sylvian cisterns and cerebral sulci were prominent. Since the CT findings and clinical picture resembled the previous five infants, a diagnosis of subdural hematomas (effusions) was made. Subsequent measurements of head growth have remained above but parallel to the 97th percentile. When last seen at 1 year of age the child's psychomotor development was normal.

Discussion

Each of our patients presented with macrocrania and one or more additional signs of increased intracranial pressure. CT scans from the six infants were strikingly similar and demonstrated wide cerebral sulci, large sylvian cisterns, wide interhemispheric fissures, dilated ventricles, decreased density in the anterior temporal regions, and decreased density over the cerebral convexities suggestive of fluid collection (Figs. 1 and 2). The CT picture suggested cerebral atrophy, however all of our patients demonstrated normal psychomotor development. Subdural puncture (five patients) and cerebral angiography (one patient) indicated the presence of subdural fluid.

There are few descriptions of CT findings on young children with subdural hematomas. Previous reports of infants with posterior fossa subdurals have shown increased ventricular size [1, 2]. Using arteriography and air encephalography, Mori and Handa noted ventricular dilatation in two infants with subdural hematomas over the cerebral convexities [5]. There is also a recent report of an intrauterine subdural hematoma with enlarged ventricles on CT scan [3]. This is in contrast to the usual CT findings in adults with subdural hematomas which typically consist of ventricular effacement and poor visualization of cerebral sulci [4].

Subdural hematomas in infancy appear to produce an unusual picture on CT. The reason for ventricular dilatation, wide cerebral sulci, and prominent cisterns in infants with subdural hematomas is not known. Subdural collections may interfere with CSF absorption as suggested by Mori and Handa [5] and as indicated by the CSF flow study in one of our patients (Case 5).

Our experience indicates that CT findings in infants with subdural hematomas may have a characteristic pattern. In young children the presence of decreased radiodensity over the cerebral convexities, wide cerebral sulci,

ventricular dilatation, large sylvian cisterns, a wide interhemispheric fissure, and decreased density in the anterior temporal regions suggests the presence of a subdural collection of fluid. We have found the occurrence of these CT findings in infants with symptoms of increased intracranial pressure to be indicative of subdural effusion.

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