OSSIFYING SUBDURAL HEMATOMA

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Calcification within a chronic subdural hematoma occurs rarely.\textsuperscript{1,3,8,10} Although Rokitansky\textsuperscript{13} wrote over a century ago. . . . “Die Wände des Sackes, zumal die an der harten Hirnhaut haftende Wand, werden zuweilen der Sitz von Verknöcherung, d.i. von Knochen-Concretion in der Form von Platten,” only a few similar examples have been noted. In a review of the literature we have encountered 3 reports of histologically verified ossification within a chronic subdural hematoma\textsuperscript{2,6,15} to which we wish to add a fourth case.

CASE REPORT

A 23-year-old white man was involved in a motor car accident on Mar. 29, 1942. He was dazed for a moment and about an hour later experienced left frontotemporal headache. He went to his work in a steel mill the next morning but was unable to continue after 30 minutes because he could not stand the noise. Roentgenograms of the skull were said to have disclosed a “fracture.” He remained in bed for 2 weeks and 6 weeks later was able to return to his work, at which time his headache had disappeared. He was inducted into military service on Aug. 15, 1942, and went through training without difficulty except for bothersome headaches on the mornings following long study for examinations. While on duty as an armorer-gunner on a bomber in North Africa in August 1943, he struck his head against a radio desk during a difficult landing, was dazed for a few minutes, and was not aware of any other immediate complaints. In October or November 1943, he noted feelings of “tightening up” and a sense of pressure in the head which was attributed to “operational fatigue” and which was sometimes associated with a sensation of ringing in the head and some blurring of vision. When he had completed 64 missions he was returned to the United States where he mentioned that he had headaches; X-rays of the skull were taken and he was referred for physical evaluation in October 1944. Neurological findings were not remarkable, although both plantar responses tended to be extensor at times.

X-ray Examination, Oct. 10, 1944. Roentgenograms of the skull showed a somewhat mottled plate of calcification beneath the inner table on the right, extending from the anterior portion of the frontal bone posteriorly beneath the parietal bone for a distance of 13 or 14 cm. The pineal body was very faintly calcified and could be visualized only on the lateral view. The pituitary fossa was normal in size and shape and there was no erosion of the clinoids or of the petrous pyramids.

Psychometric Examinations, Oct. 18, 1944. Results of the tests pointed to an individual of average intelligence. Notable inconsistencies in performance indicated a very marked impairment of recent memory ability and some degree of weakness in the sphere of social judgment and comprehension. Performance of memory tests corroborated these findings in indicating average remote memory ability, but striking and consistent impairment of recent memory functioning. The cooperation of the patient was adequate and results were considered representative, but positive findings suggested that the results did not reflect the optimum level for the patient at the time.

- Wechsler-Bellevue Verbal Scale, Form B
- Mental age: Average adult. IQ 105
- Wells Memory Test
- Remote Memory MQ: 97
- Cornell Selectee Index
- Recent Memory MQ: 67
- Aphasia Test Battery
- Score 30/15
- Negative
Pneumoencephalogram, Oct. 25, 1944. The entire ventricular system was filled and there was also some air in the subdural space. The lateral ventricles were displaced slightly toward the left and the upper surface of the right lateral ventricle was slightly depressed. The left lateral ventricle appeared to be slightly dilated as compared to the right. Some of the subarachnoid pathways appeared to be obliterated on the right side and there was dilatation of most of the pathways on the left.

The CSF was under normal pressure; cells, total protein, colloidal gold reaction and serology were unremarkable.

EEG, Dec. 12, 1944. The EEG was normal. The dominant wave frequency was 8–10 cycles per sec. with maximum amplitude of 30 to 50 microvolts. There was no evidence of focal or diffuse abnormalities. There was no change in pattern on overventilation.

Operation, Dec. 19, 1944. Under local anesthesia a large bone flap, centered in the right temporal region, was made. On elevating the flap a somewhat bluish discoloration of the dura mater was disclosed, extending for a distance of 5 cm. from the midline. This area was stony hard to touch, although at the limits of its extent the dura mater was soft and compressible. A dural flap was outlined just beyond the inferior limits of the lesion and when it was reflected it was found to consist of what appeared to be two layers, although the inferior layer was in all probability the outer capsule of the lesion. The dura mater was carefully dissected back and reflected up to the longitudinal sinus (Fig. 1). The calcified mass extended up to the longitudinal sinus and at its attachment it was perforated by the large veins from the Rolandic area where they entered the sinus. The calcified mass was not exposed in its complete extent, a small portion still remaining under the bone at the anterior and posterior limits of the flap.

Fig. 1. Appearance of operative field showing ossifying subdural hematoma with dura mater reflected upward along the longitudinal sinus.
The main part of the mass was freed from the remaining ends with rongeurs. It was reflected toward the midline, and after bits of bone were nibbled from around the large veins entering the longitudinal sinus, it was removed by careful dissection.

The patient made an uncomplicated recovery.

Pathological Examination. The specimen consisted of an irregular ragged piece of hard material grossly resembling bone, and it was curved corresponding to the contour of the skull (Fig. 2). The overall measurements were 12 × 7 cm. and 3-4 mm. in its average thickness. The convex surface was somewhat granular in appearance, almost velvety. There were two fenestrations measuring 5 mm. in their greatest diameter. The concave side was mottled and very irregular, and several of these mottled portions were pearly white. Surrounding the firm middle portion, there were several irregular edges that seemed to be composed of hard fibrous tissue.

On microscopic examination the specimen was found to be composed of masses of hyaline fibrous tissue undergoing calcification and osseous transformation. There were some rather large spicules of bone.

A roentgenogram of the specimen is shown in Fig. 3.

Fig. 2. Photograph of specimen removed at operation.

Fig. 3. Roentgenogram of specimen removed at operation.
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DISCUSSION

Goldhahn\(^6\) excised from an 11-year-old child an intracranial mass with a bony shell, the presumed end-product of a “hemorrhagic pachymeningitis interna.” Histological examination in Boyd and Merrell’s\(^8\) case revealed heavy deposits of calcium in the thick hyalinized connective-tissue wall, some of which had undergone ossification. Typical true bone was found by Wertheimer and Dechaume\(^\text{15}\) in portions of the walls of a calcified subdural hematoma removed by operation.

In some reports dealing with the presence of calcification in the walls of chronic subdural hematomas a statement regarding a histological examination is absent. Schüller’s\(^4\) article contained photographs of two preparations from the Vienna Pathological-Anatomical Museum, demonstrating in one a “bony shell” around an organized subdural hematoma and in the other a “bony plate” over a cerebral convexity. Although Dyke and Davidoff\(^5\) described the roentgenographic appearance of “a mass of bone 1 to 2 cm. thick adjacent to the inner table of the skull,” which they felt represented an example of a chronic or ossified hematoma, this patient apparently was not operated upon and the lesion was not verified. In Critchley and Meadows’\(^4\) case the nature of the “calcified plates” encountered at operation was not fully defined. The appearance of the gross specimen in the report of Mosberg and Smith\(^9\) suggests the possibility of ossification, but their report stated only “microscopic examination confirmed the diagnosis of calcified subdural hematoma.”

A tendency to use the terms calcified and ossified interchangeably has been noted.\(^6,12\) The term ossified or ossifying should be reserved for those hematomas that show evidence of bone formation on microscopic examination, since calcification without ossification may also occur.\(^7,11\) Ossification when present may be considered a terminal phase in the organization of a chronic subdural hematoma and is usually preceded or accompanied by hyalinization and calcification, especially of the peripheral portions. It has been assumed that hematomas of long duration are most prone to calcify and ossify,\(^5\) although the data from some cases are obscure.

In this case, no obvious history of a likely causative head injury prior to \(2\frac{1}{2}\) years before operation was elicited.

SUMMARY

The clinical history of a 23-year-old man who had an ossifying subdural hematoma has been presented. The literature pertaining to ossification and calcification within chronic subdural hematomas has been reviewed and the desirability of histological study in such cases emphasized.

REFERENCES

REMOVAL OF BULLET FROM THE BRAIN BY GRAVITY

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In an excellent historical review of the literature and a report of personal expe-
riences, Wood emphasized that spontaneous movement of metallic foreign bodies in
the brain is strongly suggestive of abscess formation. Other authors have discussed the use of gravity in attempting to bring about migration of metal objects to surgically more accessible regions of the brain. Varying degrees of success have been reported. However, we have been unable to find a report of successful movement of a bullet by gravity alone from a point within the brain to a position beneath the scalp. This is a report of the movement of a bullet from a location 8 cm. within the brain to a position beneath the scalp where it was easily felt and removed. This occurred without the formation of abscess or hematoma.

CASE REPORT

B.M., a Latin American male aged 7, was admitted to Parkland Hospital on July 28, 1932, within 30 minutes after having been wounded by a pistol bullet.

Examination disclosed no neurological abnormalities. Radiographs (Fig. 1) showed the bullet to have entered the parietal region of the skull approximately 2½ cm. anterior to the lambda and 2½ cm. to the left of the mid line. A few small fragments of metal were left in the surface of the brain near the skull wound but the major portion of the bullet ranged downward, forward and slightly laterally, coming to rest in the left temporal lobe of the brain 8 cm. from the point of entry through the skull.

The wound was debrided with removal of small metal and bone fragments from the brain but no attempt was made to remove the major fragment of bullet in the temporal lobe. The dura mater was left open but the galea was closed tightly with silk sutures.

[Dr. H. F. Brewster, who was chief of surgery at Navy 128, Pearl Harbor, T.H., in January 1944, told one of us (L.B.B.) that it was possible to remove bullets by gravity, and at that hospital and at that time there were 2 cases in which bullets were removed by gravity.] During the next 12 days, the patient was kept on his back as much of the time as was possible without using restraint, and the foot of the bed was elevated. This was done to place the bullet nearly vertically above the point of entry. At the end of 12 days, the bullet could