EXTRADURAL HEMATOMA OF THE ANTERIOR FOSSA

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The classic traumatic extradural hematoma of the middle fossa caused by middle meningeal bleeding is known universally today. Extradural hematoma of the anterior fossa is rare and the past history of this lesion is one of surprise and frustration for the clinician involved. Two cases of hematoma of the anterior fossa and a review of the literature are presented herein and a solution to this vexing problem is offered.

CASE REPORTS

Case 1. KUMC 54-8823. R.S., a 4-year-old white male, fell about 8 feet, striking his head, but he was not rendered unconscious. He was sleepy but easy to rouse and vomited twice until 6½ hours later when generalized seizures began. Soon thereafter the right pupil was noted to be dilated and unreactive.

Immediately upon admission to the University of Kansas Medical Center, 10 hours after the fall, status epilepticus was present; both pupils were unresponsive to light, the right being larger than the left, and there was decerebrate posturing. The situation was deemed critical and he was rushed to surgery.

Bilateral subtemporal extradural and subdural exploration, via large subtemporal craniectomies, was negative.

Death ensued 15½ hours after the injury.

Autopsy revealed a linear fracture of the skull parallel to the right coronal suture and an underlying extradural hematoma (7X5X3 cm.) limited to the anterior fossa, which compressed the right frontal lobe markedly (Fig. 1). Microscopic study of the brain stem revealed no abnormalities. The surgical trephination had missed the posterior limits of the hematoma by a few mm.

Case 2. KUMC 58-14986. K.D., a 16-year-old white male, collided head-on with his coach while playing basketball and both were rendered unconscious for a few minutes. He recovered quickly, went home, vomited several times and complained of generalized headache. Eighteen hours after the injury he became lethargic, and 10 hours later he was stuporous.

Examination upon admission and immediately before surgery, 35 hours after injury, revealed a stuporous boy who moved all extremities to noxious stimuli, a left orbital hematoma, a dilated unreactive left pupil, diffuse hyperreflexia, bilateral ankle clonus and a right Babinski's sign.

A right-sided clonic seizure occurred immediately before and immediately after a negative bilateral subtemporal extradural and subdural exploration.

Carotid arteriography, performed 42 hours after injury, revealed a shift of the anterior cerebral vessels to the right and posteriorly (Fig. 2).

An immediate left frontal craniotomy was performed and a large epidural hematoma at the anterior pole was evacuated.

An uneventful recovery followed.

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Fig. 1. Case 1. Autopsy findings showing extradural clot and deformation of the underlying right frontal lobe.

DISCUSSION

Extradural hematomas of the anterior fossa are rare (Table 1). Jacobson, in his Case 70 and probably also Case 32, described the findings at autopsy. Jefferson reported the postmortem finding of a clot in the frontal pole after bilateral negative subtemporal explorations. Briesen mentioned a similar case. Gross and Savitsky reported 3 cases; the patient in their Case 2 undoubtedly was saved by prompt extension of a subtemporal craniectomy to the anterior fossa; however, their Case 3 was unusual in that operation was performed on the 8th day after injury and the slowly

Fig. 2. Case 2. Carotid arteriogram showing displacement of anterior cerebral vessels to the right and, in the lateral view, posteriorly.
EXTRADURAL HEMATOMA OF ANTERIOR FOSSA

TABLE 1

<table>
<thead>
<tr>
<th>Author</th>
<th>Year</th>
<th>No. of Cases</th>
<th>No. of Recoveries</th>
</tr>
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<tbody>
<tr>
<td>Jacobson</td>
<td>1886</td>
<td>2</td>
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<tr>
<td>Jefferson</td>
<td>1921</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Briesen</td>
<td>1940</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Gross &amp; Savitsky</td>
<td>1942</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Gordy</td>
<td>1948</td>
<td>1</td>
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</tr>
<tr>
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<td>1956</td>
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<td>2</td>
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<td>1958</td>
<td>2</td>
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<td>1960</td>
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developing clot may have come from venous bleeding from the “extensive comminuted fracture . . . in the left frontal region.” Gordy\(^3\) described a case in which operation was not performed because of nearly total lack of lateralizing findings. A recent article\(^5\) reported 1 case apparently unrecognized ante mortem and another in which the patient died from other associated brain damage after successful evacuation of a right subfrontal clot. Connolly\(^2\) had 2 cases of frontal extradural clots treated successfully, but in these cases there was the protective decompression of cerebrospinal-fluid leaks; or, perhaps as likely, these clots developed because of a slack dura mater and associated fractures, present in both cases, since both clots were unexpected, asymptomatic findings at operation for repair of cerebrospinal-fluid leaks, 21 and 15 days after injury. His cases seem analogous to the present-day situation in which extradural oozing at the site of a saw cut may occur when intra-venous hypertonic urea produces a slack dura mater at craniotomy.

The autopsy in the present Case 1 was a revelation. Appropriately, to quote Jefferson,\(^7\) “To my great chagrin a large middle meningeal haemorrhage was present. . . . It was anterior in position. . . .” Gross and Savitsky\(^1\) remarked, “The finding of the clot at autopsy, compressing the tip of the frontal lobe, was a new experience to us.” In the present Case 2 the anteroposterior and particularly the lateral arteriogram localized a mass lesion conclusively and a hopeless situation was converted to a total recovery. Obviously the situation in Case 2 had not been as desperate as thought originally and if arteriography had been performed initially the proper diagnosis would have been made earlier.

Extradural hematoma of the anterior fossa has been such a lethal lesion, probably because it has so often been unrecognized. Nine out of 14 patients succumbed, if Connolly’s\(^2\) 2 cases are counted, or 9 out of 12 if they are not.

In the future, carotid arteriography in the clinically suspicious case will make the diagnosis. Such arteriography should always be bi-plane. In the classic extradural clot of the middle fossa the anteroposterior view is most important. But in this lesion of the anterior fossa the lateral view is essential (Fig. 2). Had only the anteroposterior film been secured in Case 2, one might erroneously have argued that the temporal area had been explored and that this degree of lateral shift of the anterior cerebral vessels was caused by cerebral contusion and edema.

In truly desperate situations, of course, arteriography may be impractical; logically, low bifrontal burr holes should follow negative subtemporal explorations. Clinical judgment must dictate the real nature of the emergency of each situation as it arises. Exact knowledge of a traumatic lesion in the critically injured patient is of
inestimable value to the surgeon and enables him to treat the lesion accurately. Still, it is well established that one must not waste time in dealing with extradural hemorrhage. It should be pointed out that in the fatal Case 1 the patient lived $5\frac{1}{2}$ hours after being rushed to surgery, and 7 hours elapsed in Case 2 between the negative explorations and the diagnostic arteriogram. Each of these cases was considered a desperate emergency on admission. In these cases, at least, this time could better have been used for arteriography. Certainly, extradural hematoma of the anterior fossa must be added to the list of neurologic lesions diagnosed best by carotid arteriography.

SUMMARY

Two cases of extradural hematoma of the anterior fossa are presented. The literature is reviewed. Bi-plane carotid arteriography is stressed in the evaluation of patients in whom extradural hematoma is suspected.

REFERENCES