Clinical features of temporal tip epidural hematomas

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Object. The purpose of this paper was to clarify the clinical features of temporal tip epidural hematomas (EDHs).

Methods. A retrospective chart review was conducted for 53 patients who had suffered an EDH. They were divided into two groups, those whose hematoma occurred in the temporal tip (23 patients) and others (30 patients). The following variables were analyzed: age, sex, Glasgow Coma Scale score, systolic blood pressure on admission, Injury Severity Score, incidence of hematomas in intracerebral regions, location of skull fracture, incidence of cranial nerve injury, type of operation, and Glasgow Outcome Scale (GOS) score at 3 months postinjury.

Results. A greater incidence of zygomatic arch or lateral orbital cavity fracture was found in the “temporal tip” group than in the “other” group. There was a greater incidence of cranial nerve injury in the temporal tip (26.0%) than in the other group (6.6%; p < 0.05). Surgery to treat the EDH was more frequently performed in the other group (36.6%) than in the temporal tip group (two patients, 8.6%; p = 0.01). There were no significant differences between the groups in terms of the GOS score.

Conclusions. A temporal tip hematoma is not a rare injury among patients with EDHs. This hematoma tends to be induced by lateral orbital cavity and/or zygomatic arch fractures. It tends to be associated with cranial nerve injury, but it rarely requires an operation. The outcome of patients with this hematoma depends on the associated intracerebral lesions, thus indicating it to be similar to an EDH in other places. (DOI: 10.3171/JNS-07/07/0018)

KEY WORDS • temporal tip • epidural hematoma • clinical feature

TRAUMATIC acute EDHs are more frequently located in the temporoparietal and temporal regions compared with other locations. Among the previously reported EDHs, the presence of such a lesion in the cerebellar fossa, clivus, orbital part of the frontal bone, or vertex is rare. We have encountered EDHs at the temporal tip; however, so far there has been no report concerning one of these lesions occurring at the same place. We therefore conducted a retrospective review to identify the clinical features associated with an EDH at the temporal tip.

Clinical Material and Methods

Between June 2001 and May 2006, 465 patients suffering from head injuries were admitted to the Department of Traumatology and Critical Care Medicine at the National Defense Medical College, which is an 800-bed hospital in the suburban area of Tokyo, and serves a population of approximately 800,000. Among these patients, 53 had traumatic acute EDH. The lesion was diagnosed on CT scans, which demonstrated a biconvex hyperdense area that crossed dural attachments, but not sutures. The patients were divided into two groups: the first consisted of patients with acute EDH located at a temporal tip (23 patients; see Fig. 1), and the second consisted of patients with an acute EDH located in regions other than the temporal tip (30 patients).

The following variables were analyzed: age, sex, GCS score, systolic blood pressure on admission, ISS, incidence of hematomas in intracerebral regions, location of skull fracture, incidence of cranial nerve injury, type of operation, and GOS score at 3 months postinjury. The designation of skull base fracture was based on either radiographic evidence or suspicion due to the presence of opacification of the sinuses and pneumocephalus. Patients with only opacified sinuses were considered to have a skull base fracture only if clinical symptoms such as raccoon eyes, Battle sign, hemotympanum, rhinorrhea, otorrhea, or blood in the external auditory canal were observed. The intracranial lesions included acute subdural hematoma, cerebral contusion, minute cerebral hemorrhage suggesting diffuse axonal injury, intraventricular hemorrhage, and traumatic subarachnoid hemorrhage. Our surgical indications for acute traumatic EDH included patients whose GCS score was less than E4 and who had a hematoma with a width greater than 2 cm, or one with a midline shift. When the patient survived, we routinely performed follow-up head CT scans at least 6 hours, 24 hours, and 7 days after the injury for those with intracranial lesions.

Statistical Analysis

The chi-square and Student t-test were used for statisti-
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All patients were directly transferred to our hospital within 2 hours of suffering an injury. There were no significant differences between the groups with respect to sex, age, GCS score, systolic blood pressure on arrival, ISS, and associated intracerebral lesions (Table 1). Zygomatic arch fractures showed a greater incidence in the temporal tip (60.8%) than in the “other” group (3.3%; p < 0.0001). Lateral orbital cavity fractures demonstrated a greater incidence in the temporal tip (73.9%) than in the other group (3.3%; p < 0.0001). Skull base fractures showed a greater incidence in the temporal tip (91.3%) than in the other group (63.3%; p < 0.05). Cranial nerve injury showed a greater incidence in the temporal tip (26.0%) than in the “other” group (3.3%; p = 0.01). In one surgically treated case of EDH in the temporal tip group, the lesion was small on patient arrival but it dramatically increased in size within 6 hours (Fig. 2), whereas the other surgically treated lesion was large enough to require evacuation on arrival (Fig. 3). The operative findings did not disclose a bleeding source. The remaining EDHs in the temporal tip did not change in size and therefore were treated conservatively. The maximum thickness of the hematoma was less than 15 mm in all cases of temporal tip EDHs that were treated conservatively. There were no fatal cases as a result of the EDH itself, and all fatal cases were caused by a deterioration of associated intracranial lesions in both groups. There were no significant differences between the groups in terms of the GOS scores.

**Discussion**

Acute EDH is rarely spontaneously induced by medical disease or contrecoup traumatic insult; instead most acute EDHs are caused by traumatic coup insult. The temporal tip consists of the greater wing of the sphenoid and anterior squamous part of the temporal bone. The greater wing of the sphenoid is a part of the lateral orbital cavity. In addition, approximately two thirds of the zygomatic arch is made up of the zygomatic process of the squamous part of temporal bone. Accordingly, a fracture of zygomatic arch or orbital cavity can either directly or indirectly damage the dura mater of the temporal tip. This mechanism may induce EDH at the temporal tip, because an anterior branch of middle meningeal artery runs through the dura mater at this location. Nevertheless, in the two surgically treated cases in the temporal tip group, no injury to this artery could be observed. Furthermore, the low incidence of an increase in the size of the hematoma in the temporal tip group may indicate the possibility that the bleeding from the anterior branch of the middle meningeal artery was thus minimized. The superior orbital fissure, through which the oculomotor, trochlear, and abducens nerves as well as branches of
the ophthalmic division of trigeminal nerve pass, consists of the lesser and greater wings of the sphenoid. The optic canal, through which the optic nerve passes, consists of the lateral end of the chiasmatic sulcus, and it is medial to the anterior clinoid process. Accordingly, a fracture of the lateral orbital cavity, which is a part of the sphenoid, can damage the optic nerve or the nerves that control ocular movement. Kurzer and Patel previously described superior orbital fissure syndrome induced by fractures of the zygoma and orbit in a study similar to ours.

The outcome of acute traumatic EDH itself is usually favorable if the patient does not suffer a deep coma. The outcome of acute traumatic EDH has been reported to be dependent on associated intracranial lesions. Because there were no fatal cases related to the EDH itself, and all fatal cases were caused by a deterioration of associated intracranial lesions in both groups in this study, our results therefore also supported Kurzer and Patel’s hypothesis.

Conclusions

A temporal tip hematoma is not a rare injury among EDHs. This hematoma tends to be induced by lateral orbital and/or zygomatic arch fractures. It also tends to be associated with cranial nerve injury, which manifests as impaired visual acuity and ocular movement, but it rarely requires an operation. The outcome of this hematoma is therefore considered to be dependent on the associated intracerebral lesions in a manner similar to EDHs that occur in other places.

References

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