Acute subdural hematoma with swirl signs: clinical analysis of 15 cases

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【Abstract】From July 2003 to July 2009, 15 cases of subdural hematoma with swirl signs were treated in our hospital and their clinical data were retrospectively analysed. The mortality was compared between these patients and those with typical acute subdural hematoma who were treated at the same time in our hospital. Among the 15 cases, full recovery was achieved in 4 cases, slight disability in 2, grave disability in 2 and death in 7 (46.7%). The mortality of these patients was conspicuously higher than that of typical subdural hematoma (14/83, 16.9%, P<0.01). Subdural hematoma with swirl signs is often suggestive of hazardous pathogenetic condition and early diagnosis and prompt surgical intervention is essential to reduce mortality.

Key words: Hematoma, subdural, acute; Brain injuries; Craniotomy

Acute subdural hematoma is commonly seen clinically, but subdural hematoma featured in swirl signs is seldom seen and has not yet been reported to our knowledge. The swirl sign refers to a round and low density zone in a high density subdural hematoma on CT scans. It is reported that acute epidural hematoma with swirl signs is an unusual type and often has a poor prognosis. Acute subdural hematoma with swirl signs is suggestive of fresh bleeding or the blood overflow inducing uneven hematoma density as clot retraction. It is unstable hematoma and needs emergency management. From July 2003 to July 2009, 15 patients were admitted and treated in our hospital, which are reported as follows.

CASE REPORT

There were 15 cases in this series, including 11 men and 4 women, the age ranging from 23 to 62 years with the mean age of 44.2 years. The causes of injury were traffic crash in 11 cases, falling injury in 2 cases, blunt injury in 1 case, and uncertain causation in 1.

Glasgow Coma Score (GCS) was 3-5 points in 8 cases, 6-8 in 4 cases, and 9-12 in 3 cases. Bilateral pupils were found dilated in 6 cases, anisocoria in 4 cases, isocoria and light reaction existence in 5 cases. Acute craniocele occurred during operation in 1 case. After operation, his bilateral pupils were found dilated and CT revealed delayed epidural hematoma in the opposite side.

All patients were confirmed subdural hematoma by CT scan. All the hematomas were located at the temple region extending to the frontal, parietal, or occipital region and exhibited typical swirl signs (Figure 1). The interval from injury to check-up was 25 minutes-3 hours with the average of 55 minutes.

According to CT findings, we designed bone window in which the position of swirl signs was considered. All the 15 patients underwent subdural hematoma evacuation and active bleeding was found in hematomas during operation. Most cases had basal fractures. The bleeding originated from the middle meningeal artery and the position accorded with CT findings. There was no evident contusion or laceration on the cerebral surface. The purpose of surgical intervention was intracranial decompression and the procedures consisted of craniotomy, dural opening, hemostasis, tension suture of the dura, epidural negative pressure drainage, and bone flap removal.

Five patients died within 7 days postoperatively due to cerebral hernia and nonfunction of the brain stem.
Two patients died from multiple organ failure. Two patients had grave disability, 2 slight disability, and 4 fully recovered. During the same period, 83 cases of acute subdural hematoma without swirl signs were treated surgically in our hospital, in whom 14 patients died (16.9%). There was significant deference in the mortality between the two kinds of subdural hematomas by $\chi^2$ test ($P<0.01$).

In this series, the clinical and CT characteristics are concluded as follows. (1) Preoperative and perioperative findings verify subdural hematoma. The position of swirl signs in hematomas is coincident with the route of the middle meningeal artery and its branches. There is active bleeding in the hematoma and the position is identical to CT findings. Most of the cases are associated with temporal bone fractures. The pathogenetic reasons are considered that temporal bone fractures break down the middle meningeal artery and meninges to develop subdural hematoma. (2) Since it is arterial bleeding, the progression of disease is rapid and dangerous. It is liable to form cerebral hernia and the mortality is high. (3) It is easy to evacuate hematomas, but difficult to stop bleeding because of comminuted fractures at the bases of skull. In this situation, it is not until the bone window is prolonged to the malar arch at the bases of skull that the bleeding point can be seen. Bone wax and biogel as well as many other measures are often necessary to stop bleeding effectively. Brain swelling is rarely seen but infarction is high after operation. (4) The recovery time is generally long for patients with acute subdural hematoma especially concurrent swirl signs. Some patients may maintain a vegetative state.

It is suggested that acute subdural hematoma with swirl signs is a high risky situation and should be treated surgically. Early diagnosis and timely surgical treatment is essential to reduce mortality.

REFERENCES


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