Tzu Chi Medical Journal 24 (2012) 139–141

Contents lists available at SciVerse ScienceDirect

Tzu Chi Medical Journal

journal homepage: www.tzuchimedjnl.com

Case Report

Spontaneous disappearance of an acute epidural hematoma with emergence of a contralateral subdural hematoma after traumatic brain injury

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ARTICLE INFO

Article history:
Received 28 December 2011
Received in revised form
6 January 2012
Accepted 7 February 2012

Keywords:
Computed tomography
Epidural hematoma
Traumatic brain injury

ABSTRACT

Epidural hematoma (EDH) is a common sequela of traumatic brain injury (TBI) and usually results in life-threatening brain compression, which warrants emergency surgical evacuation. Here we present an 85-year-old man who had a traumatic brain injury with an EDH in the right frontoparietal area. He was transferred to our hospital with deep coma status and follow-up computed tomography (CT) showed the EDH had spontaneously disappeared within 2 hours. Furthermore, a contralateral subdural hematoma had developed, which caused a midline shift. Rare cases of rapid spontaneous resolution of an EDH have been reported in the literature. In our patient, the EDH seemed to have been pushed out from the fractured skull because the hematoma would not coagulate due to an underlying coagulopathy. Repeat CT is imperative before surgery for acute TBI and for unconscious patients whose initial CT was performed within 3 hours of injury.

1. Introduction

Epidural hematoma (EDH) is a common sequela of severe traumatic brain injury (TBI). In practice, early diagnosis and emergency evacuation of an EDH are almost always necessary. However, rapid resolution of an EDH is very rare and only a few cases have been reported [1–9]. The location of the EDH influences the operative method. Repeat image studies after TBI are a prerequisite and might change operative decisions. Here we report a patient with rapid and spontaneous disappearance of an EDH and emergence of a contralateral acute subdural hematoma (ASDH) 2 hours after severe TBI.

2. Case report

An 85-year-old man was transferred to our hospital after a motorcycle accident. The patient's wife denied he had a history of a bleeding tendency or anticoagulant therapy. After the injury, he was taken to a local hospital first and brain computed tomography (CT) performed there showed an acute EDH on the right side with an associated skull fracture (Fig. 1A1, A2), and a small acute subdural hematoma on the left side. He was transferred to our trauma center. On physical examination, his Glasgow Coma Scale (GCS) score was E1VeM4 and his pupil sizes were equal without a light reflex. His lab data showed a prolonged prothrombin time (PT) (12.3 sec, control 10.6 sec) and activated partial thromboplastin time (39.1 sec, control 29.4 sec), which both indicated coagulopathy. His platelet count was within normal limits (194,000/mL). Follow-up brain CT 2 hours after the first scan showed that the EDH on the right side had totally disappeared (Fig. 1B1). In the first scan, the EDH had a maximum depth of 2 cm, and the subgaleal hematoma had a maximum thickness of 0.7 cm. In the second scan, the EDH had disappeared, the subgaleal hematoma had enlarged to 1.3 cm (Fig. 1B1), and the left ASDH had enlarged (Fig. 1B2). Emergency surgery was performed in which the operative method was changed from right side decompression to left side decompression. During the operation, the subdural hematoma (SDH) was mostly liquid and uncontrollable bleeding occurred with bradycardia and hypotension despite transfusion of large amounts of whole blood, packed red blood cells, fresh frozen plasma, and platelets. The patient died after the surgery.

3. Discussion

An EDH usually requires immediate surgical intervention after TBI and rapid spontaneous resolution seldom occurs. With conservative treatment, hematoma resolution usually requires more than 3 weeks [3,9]. To the best of our knowledge, only

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1016-3190/$ – see front matter
doi:10.1016/j.tcmj.2012.02.007

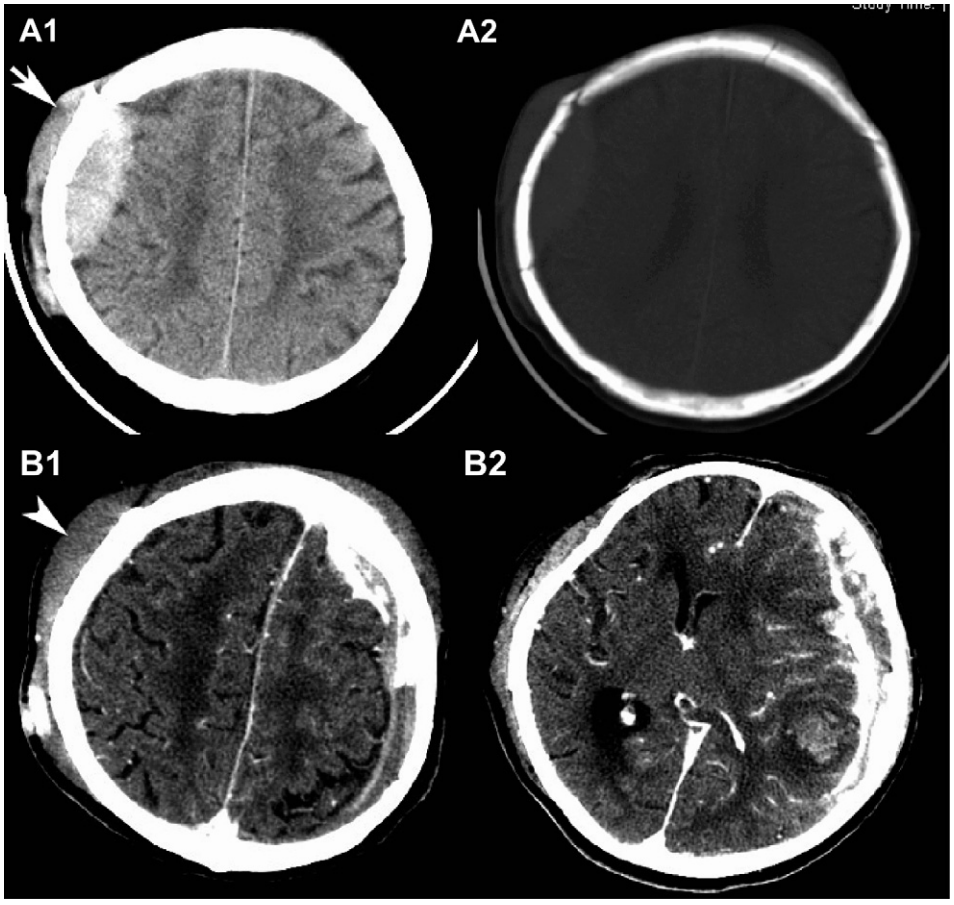

Fig. 1. (A1, A2) Axial brain CT demonstrating a right frontoparietal epidural hematoma (EDH), a 7 mm subgaleal hematoma (arrow) and a skull fracture. (B1) Two hours later, brain CT reveals spontaneous resolution of the EDH and enlargement of the subgaleal hematoma to 13 mm (arrowhead). (B2) Emergence of a contralateral subdural hematoma necessary for decompression.

10 cases have been reported, and most of them had good outcomes. Because our patient had an initially life-threatening EDH and poor GCS, surgical decompression was warranted. However, rapid and spontaneous resolution of the initial EDH and delayed contralateral new lesions changed our operative decisions. In addition, our patient had a poor prognosis because of his concomitant coagulopathy and advanced age, which have rarely been reported for this condition.

We found very rare cases of rapid resolution of an EDH in the literature. In an EDH associated with skull fracture, Neely II et al reported bleeding from the diploic veins could extend into both the epidural and subgaleal spaces [7]. In the subgaleal space, loose adherence of the galea to the outer table of skull and plasticity of the intracranial contents could drive the EDH through the fracture line into the subgaleal space. That might be the reason why spontaneous resolution of an EDH occurs. In 1983, Aoki reported a unique case of a depressed skull fracture, cephalohematoma, and epidural hematoma [10]. After the cephalohematoma was aspirated, the EDH also disappeared. This proved there was real communication between the subgaleal area and epidural space through the fracture line. Later, Aoki reported two cases with rapid resolution of an EDH in the acute stage [1]. He found the volume of the subgaleal hematoma increased after rapid resolution of the EDH. He therefore proposed the acute EDH decompressed through the fracture line. Servadei et al advocated that the onset of generalized brain swelling is the driving force in the resolution mechanism [2]. Following previous reports, Kuroiwa et al and Ugarriza et al echoed this assumption and also presented similar conditions with rapid resolution of acute EDH [3,4].

In our patient, we initially planned to perform a right side decompression according to the first CT scan done at another hospital. However, a subsequent CT scan at our hospital changed our surgery strategy to a left side decompression. In addition, the patient had coagulopathy and his blood did not clot. We postulate that both persistent enlargement of the left ASDH (anticipated increased intracranial pressure) and his coagulopathy may have forced the liquefied EDH through the fracture line to the subgaleal space in addition to the proposed mechanisms mentioned in other studies. Early, significant changes in hematomas in trauma patients may change the prognosis and operative methods. Brown et al concluded that repeated brain CT is indicated for patients with a GCS score less than 8 or neurologic deterioration [11]. Repeat CT 24 hours after blunt head trauma was also suggested in patients with a GCS lower than 12, an EDH or multiple lesions in the brain initially [12]. Servadei et al concluded that initial CT images (especially those performed within the first 3 hours) cannot exclude a change in a hematoma, which can be deleterious for patients [13]. If we had performed a right side decompression according to the first CT scan in our patient, it would have been catastrophic. Therefore, CT scans should be repeated before an operation in an unconscious patient if the first scan is done within 3 hours after trauma.

4. Conclusion

Rapid spontaneous resolution of an EDH is rare, and to the best of our knowledge, this may be the first case of an EDH which totally disappeared in 2 hours because of a contralateral enlarged SDH. We hypothesized that the mechanisms leading to disappearance of the EDH comprised the skull fracture, coagulopathy, and increased intracranial pressure. Clinically, we should make correct judgments on which side surgery should be performed based on a patient's current status; therefore, a follow-up CT should be conducted if a patient's GCS score is lower than 12 and the initial CT scan was done within 3 hours after head injury.

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