Asymmetric Bilateral Traumatic Epidural Hematoma: A Report of a Rare Traumatic Lesion

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ABSTRACT

Bilateral epidural hematoma is a rare presentation in head trauma injuries, accounting for only 1%–2% of all epidural hematomas, but with a higher mortality rate than the unilateral form. Herein, we report the case of a 27-year-old man admitted to our department following a road traffic accident. On admission, his Glasgow Coma Scale (GCS) score was 13/15. After a few minutes, he became comatose (GCS 6/15) with right anisocoria. CT scan revealed a bilateral asymmetric epidural hematoma with a left extralabyrinthic linear fracture. Surgical evacuation was subsequently performed, starting with the voluminous right hematoma. The patient was discharged on the 23rd postoperative day with a right third-nerve palsy. Conclusions: In this case report, we discuss the etiology, mechanism, and management of bilateral epidural hematoma. Early diagnosis and a judicious surgical approach for bilateral epidural hematoma are necessary to minimize mortality and morbidity. Prevention is key to reducing traumatic brain injuries.

Keywords: Hematoma; Trauma; Neurosurgery

INTRODUCTION

Acute epidural hematoma is the most common traumatic neurosurgical emergency. Classically, it is related to a coup mechanism caused by a direct impact. Epidural hematomas have high morbidity and mortality rates, which have been greatly decreased by improvements in care delays and surgical and resuscitation techniques. Most epidural hematomas are unilateral. Bilateral forms are very rare, especially those subject to surgical approach for both collections.

Herein, we report an uncommon case of bilateral temporal epidural hematoma and review the relevant literature to summarize the epidemiological, clinical, radiological, therapeutic, and prognostic features related to this condition.

CASE REPORT

A 27-year-old male patient with no pathological background was a victim of a car accident; he presented to the emergency department 3 hours after the trauma. On examination,
Conflict of Interest
The authors have no financial conflicts of interest.

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FIGURE 1. Preoperative brain CT scan showing a bilateral temporal epidural hematoma. CT: computed tomography.

his Glasgow Coma Scale (GCS) score was 13/15, without any motor deficits. Ecchymosis in the left temporal area and otorrhea were also observed. One hour later, he presented a deterioration of consciousness. He became comatose, with a GCS score of 6/15, and developed right anisocoria. The patient was subsequently sedated and intubated. A brain computed tomography (CT) scan (FIGURE 1) was then performed, revealing an acute bilateral, asymmetric, epidural hematoma. The right hematoma was temporal, measuring 27 mm in thickness; the left was also temporal, but more posterior than the first, and measured 22 mm in thickness. These hematomas were responsible for a bilateral temporal herniation. The bone windows of the scan revealed a left extralabyrinthic linear fracture.

The patient underwent emergent surgery for the removal of both hematomas during a single procedure. Initially, the right temporal hematoma was evacuated because it was thicker and ipsilateral to the anisocoria. No evidence to suggest the source of bleeding was noticed perioperatively. Subsequently, the head was turned to the opposite side to remove the left hematoma. During the second procedure, the hematoma was found to originate from the venous structures surrounding the left superior petrous sinus. This bleeding was controlled by packing the hemostatic tissue.

The patient initially remained sedated postoperatively. The right mydriasis decreased, but remained asymmetric to the left. A control brain CT scan (FIGURE 2) showed no residual collections, but revealed a right temporal contusion not seen on the preoperative CT scan as it was masked by the epidural hematoma.

Sedation was progressively tapered, while the patient presented with progressive neurologic recovery until extubation 2 weeks after surgery. Meanwhile, he presented with pneumonia, which was treated with antibiotics. He was discharged on the 23rd day postoperatively. At discharge, the patient was fully conscious and had no motor, sensitive, or verbal disturbance, but had retained right third-nerve palsy and near-total blindness in the right eye.
DISCUSSION

Bilateral epidural hematoma was first described by Roy in 1884, who defined it as blood collection located between the internal table of the vault and the dura mater. Since its identification in 2012, 278 patients have undergone surgery for intracranial epidural hematoma at our neurosurgical department. Among these patients, only the present patient underwent surgery for a bilateral epidural hematoma.

Despite the widespread use of CT scans in early diagnosis of bilateral epidural hematomas, the mortality rate remains high (15.7% in a recent series), which is higher than that of unilateral forms (5%–7%). A coup and contrecoup mechanism explains the detachment of the dura mater in 2 locations by a single directed force, which is uncommon, with only 9 cases having been reported in the literature. The negative intracranial pressure found on the opposite side of the skull compression aggravates the dural stripping. In bilateral epidural hematoma, the origin of the hemorrhage is generally mixed and associated with arterial and venous bleeding, while active bilateral bleeding related to bone fractures is less common.

In some cases, bleeding is not synchronized between the 2 sides, and a subsequent hematoma can occur after the initial CT scan. This is why a second CT is mandatory even in the case of minimum initial disbanding.

In our case, the bleeding seemed to occur simultaneously. We suspect that the coup was on the left side, being responsible for the skull fracture and arterial bleeding after the laceration of the left middle meningeal arteries. On the other side, no skull fracture was found. The origin of the bleeding was considered the rupture of the veins surrounding the superior petrous sinus after a contrecoup mechanism. This latter mechanism is rare, as no similar findings have been reported in the literature.

Traumatic mechanisms are the main cause of epidural hematoma. Nevertheless, some reports have described cases of spontaneous bilateral epidural hematoma. They may be
caused by pericranial inflammatory diseases, hemorrhagic tendencies due to coagulopathies, or vascular disorders of the dura mater.\(^6\)

Most bilateral epidural hematomas are asymmetric, with one side predominant over the other, which makes deciding on the side for initial operation easy. In our case, this decision was less evident, as both hematomas were voluminous, compressive, and of nearly the same size, leading to bilateral temporal herniation. Our decision was based on the fact that the patient had right anisocoria; therefore, we decided to begin with this side. The few reports that have discussed this dilemma have highlighted the importance of this choice. Schematically, when facing 2 hematomas of similar volume, the dominant hemisphere should be evacuated first. However, when the dimensions are different, a voluminous collection should be performed first.\(^1,3,7,8\) The best option may be for 2 neurosurgeons to simultaneously evacuate both hematomas after appropriately placing the head in a neutral position; when feasible, which is a fast method to treat intracranial hypertension.\(^1,7,8\)

In cases of bilateral small epidural hematomas, the clinical status of the patient and the overall volume of both collections should be considered. Clinically non-tolerated hematomas with an important bleeding volume should be treated.\(^1,7\)

Several complications may occur during the postoperative course of bilateral epidural hematoma evacuation. Among the most common are the consequences of ischemia in the posterior cerebral artery territory due to massive compression of this vessel. In our case, the patient had a third right nerve palsy, which is a rare complication that may be related to extended compression of the common oculomotor nerve.

**CONCLUSION**

Bilateral asymmetric epidural hematomas are rare, with a very high mortality rate. Good time management and an appropriate surgical approach are important to achieve good results and decrease the mortality rate. In cases where simultaneous evacuation of such lesions is impossible, prioritizing the evacuation of the most compressive hematoma based on clinical and radiological features is the correct approach.

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