Frontal Epidural Haematoma. Analysis of 30 Cases

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Abstract

Background: The epidural haematoma is the most important space-occupying lesion due to head injury with high index of mortality and morbidity when the correct management is not done. Frontal epidural haematoma are considered rare lesions, representing about 10% of the whole epidural haematomas. They are usually unilateral and may present with subacute and chronic evolution in 40% of the cases. Objective: To study thirty cases of frontal epidural haematoma and analyze the causes, clinical findings, evolution, and outcome. Patients and Methods: Thirty patients presenting with frontal epidural hematomas were retrospectively reviewed. The age ranged from 10 to 32 years old, with a mean of 18 years-old. Main causes were traffic accidents and falls. Results: In there were 24 male patients and six female cases the haematoma was bilateral. Acute collection occurred in 19 cases, subacute in 3 and chronic in 6 of them. The most important clinical findings were headaches, vomiting and seizures. Skull x-rays detected fracture in 18 cases and computed tomography was positive in demonstrating the haematoma. In all surgery cases was carried out in 28 patients and two cases had been submitted to conservative treatment. Two patients died in consequence of associated intracerebral and extracerebral lesions. Conclusions: 1) usually frontal epidural haematomas are more frequent in young adults; 2) its evolution is slow, usually subacute or chronic, in the majority of the cases; 3) its clinical findings course with few neurological symptoms and 4) the prognosis is good, except in those cases with multiple intracranial lesions or systemic injury.

Key words
Head injury, epidural haematoma, trauma.

Sinopse
Hematomas epidurais frontais. Revisão de 30 casos
Introdução: O hematoma extradural é a mais importante lesão que ocupa espaço devido a trauma craniano, com altos índices de mortalidade e morbidade quando o correto tratamento não é realizado. O hematoma extradural frontal é considerado incomum, representando cerca de 10% dos hematomas extradurais: é geralmente unilateral e pode apresentar evolução subaguda ou crônica em 40% dos casos. Objetivo: Estudar 30 casos de hematoma extradural frontal e analisar causas, achados clínicos, evolução e prognóstico. Pacientes e métodos: Foram estudados 30 pacientes, retrospectivamente, com hematoma extradural frontal checados por tomografia computadorizada. Resultados: Vinte e quatro eram homens e seis, mulheres. A idade variou entre 10 e 32 anos, com média de 18 anos. As principais causas foram acidentes de trânsito e quedas. Em três casos, o hematoma foi bilateral. Coleção aguda ocorreu em 19 casos,
subaguda em 5 e crônica em 6. Os achados clínicos mais importantes foram cefaléia, vômitos e convulsões. Radiografias de crânio detectaram fraturas em 18 casos, e a tomografia computadorizada foi positiva em diagnosticar o hematoma. Cirurgia foi realizada em 28 pacientes e dois casos foram tratados conservadoramente. Dois pacientes morreram em consequência de lesões associadas. **Conclusões:** 1) o hematoma extradural frontal é mais frequente em adultos jovens; 2) sua evolução é lenta, geralmente subaguda ou crônica na maioria dos casos; 3) os achados clínicos do hematoma extradural frontal cursam com poucos sintomas neurológicos durante sua evolução; e 4) o prognóstico é bom, exceto naqueles casos com múltiplas lesões intracranianas ou repercussões sistêmicas.

**Palavras-chave**

Trauma craniano, hematoma epidural, trauma.

**Introduction**

Epidural haematomas generally have an acute onset and are usually located in the temporoparietal area. The main cause of the epidural haematomas is head injury and young adults are more prone to these lesions. However, other causes were described to explain the pathology of epidural hematomas. In Brazil, about 500.000 persons die each year due to traffic accidents and the brazilian government considers it a public health problem. Much money is being dispended to treating these patients and few advances were obtained.

Nowadays, the best exam to the diagnosis of the epidural haematoma is computed tomography (CT). In the pre-CT era, mortality due to epidural haematomas was 40%-80%, and after CT, mortality rate fell to about 10%. CT scan is appropriate to trauma because it is a relatively fast exam with high accuracy. The first case of conservative treatment was described by Weaver et al. in the CT era. These authors refered that CT scan created a new group of patients: those with epidural haematomas and no symptoms. Pang et al. described the CT evolution of the epidural haematomas and divided it in two groups: type A and type B.

The specific frontal epidural haematoma (FEH) type has been noticed in 10% of the cases, and there are few papers about it. FEH may present with subacute or chronic evolution in one third of the cases and few neurological symptoms are usually found, with frequent good outcome.

The aim of this study is to report thirty cases of FEH and to discuss the evolution, neurologic presentation, treatment and outcome.

**Material and Methods**

Thirty patients with FEH were retrospectively studied in the Department of Neurosurgery of the João Alves Filho Hospital (Aracaju, Sergipe, Brazil) and in the Department of Neurosurgery of the Santa Lucia Clinic (Rio de Janeiro, Rio de Janeiro, Brazil) from 2001 to 2004. This study was approved by the Ethical Committee of each Hospital.

The patients were studied according to sex, age, etiology of the FEH, clinical findings, treatment and outcome. The Glasgow Coma Score was obtained from all patients at admission. The outcome was gauged by the Glasgow Outcome Scale (GOS): 1) good recovery; 2) moderate disability; 3) severe disability; 4) persistent vegetative state; 5) death. The patients with one or two points in GOS were considered with excellent outcome. Criteria indicating conservative treatment were: 1) no focal neurological deficits; 2) midline shift less than 5 mm in CT scan; 3) fifteen or fourteen points in Glasgow Coma Scale (GCS).

**Results**

FEH predominated in males (26:4), with age ranging from 10 to 32 years-old (mean: 18 years-old). The principal causes were: traffic accidents in 11 (36.7%) patients, falls in 8 (26.7%), beating in 5 (16.7%), bicycle and horseback falls in 4 (13.3%) and unknown in 2 (6.6%) patients. Main symptoms were headaches, vomiting and seizures. Contralateral motor deficit was found in 26 cases and anisocoria in 20%. Glasgow coma score upon admission varied from 15 to 12 in 22 patients, from 12 to 9 in 2 patients and below 9 in 2 patients. Clinical presentation had an acute (first 24 hours) evolution in 19 cases, subacute (48-72 hours) in 5 cases and chronic (more than 72 hours) in 6 cases. Fracture was detected in skull x-rays in 18 patients. CT scan was very important for demonstration of size and location of the haematomas: three patients had bilateral frontal epidural haematomas (Figure 1) and two patients presented with calcifications in the haematoma (Figure 2). In six cases, it was possible to disclose lesion of the anterior part of the superior sagittal sinus, what was confirmed upon operation. Twenty patients were treated with an osteoplastic craniotomy and haematoma drainage, eight underwent frontal craniotomy and two were submitted to conservative treatment. Two patients died in consequence of associated intracranial and extracranial lesions.

**Discussion**

Epidural haematomas, which lie between the inner surface of the skull and the stripped dural membrane, are nearly always caused by, and located near, a skull fracture. The collections take several forms in terms of size, location, speed of development, and the effects they exert on patients. Epidural haematomas usually form within a matter of hours from the time of injury but sometimes run a more chronic course, being detected only days after injury. In some cases, initial CT scan may be performed too soon in a patient in whom an epidural haematoma is still in process of forming. In circumstances in which CT scan is obtained within the first 6 hours of injury and the patient shows subsequent deterioration, a second CT scan must be obtained. In a small
number of instances, repeat CT scan reveals a sizeable epidural haematoma not shown on the first films.

Epidural haematomas may affect any region of the skull, although it is more common in some areas: temporal and temporoparietal areas are involved in 70% of the cases. Approximately 10% occur in the frontal area, 10% in the parieto-occipital and 10% in the infratentorial area, being less frequent in the vertex and in the clivus region.

The frontal epidural haematoma represents 10% of all cases of epidural haematomas, being generally unilateral. In our study, we found three bilateral frontal cases. Tatagiba et al. reported a higher incidence of subacute and chronic evolution and had lower morbimortality rate. According to Zucarello et al., frontal epidural haematomas present with a subacute or chronic evolution, because the brain can easily tolerate an anterior and postlateral compression rather than a lateral compression or in the posterior fossa. Some authors found a small predominance of epidural haematomas with chronic evolution occurring in the frontal and in the parieto-occipital areas. We found five patients with subacute evolution and six patients with chronic evolution. A low incidence of calcification in these haematomas has been reported, even though in this paper there were two chronic patients with calcification.

According to Jamieson & Yelland, a patient with epidural haematoma in the frontal fossa remains conscious all the time although usually becoming irritable and with headaches. These authors stated that young patients remain generally unconscious longer than elderly patients, just the opposite as with the epidural haematomas located in the posterior fossa, where the patient remains unconscious all the time. In some cases, the only symptom found in patients with FEH is headache and occasional irritability. Many authors reported that in FEH pupillary abnormalities are rare. In this series, eight patients presented with unilateral mydriasis and in two of them direct ocular trauma was confirmed; the others presented with mydriasis secondary to third cranial nerve compression due to a large haematoma or adjacent brain edema. According to Jamieson and Yelland, signs of cardiocirculatory disturbances such as arterial hypertension/hipotension/bradycardia are more common in epidural haematomas of the anterior and posterior fossa than those located in the lateral area, what has been observed in the patients reported here. Exoftalmus associated with subperiostal haematoma in the orbits, secondary to subfrontal epidural haematoma, has been described in medical literature. One case was found in the present series.

Surgery is the treatment of choice for epidural haematomas, although in some cases of small haematomas, non-surgical treatment is performed. Patients with GCS 14-15, haematomas smaller than 5 mm and with no midline shift demonstrated by CT scan, can be submitted to conservative treatment with excellent outcome (good recovery or moderate disability in GOS). In this series, twenty-eight patients underwent surgery for haematoma drainage and two had conservative treatment because the haematomas were small (less then 5 mm) and without symptoms. Two patients died, one of them secondary to lung damage and the other due to associated brain lesion.

Many authors say that the relation between the area of the haematoma and its prognosis is rather contradictory and conclude that this does not influence the mortality rates. Other authors say that epidural haematomas in the temporal fossa are usually associated with a worst prognosis. According to Jamieson and Yelland, haematomas located in the parasagittal and frontal area have a favorable prognosis. They also postulated that the mortality was more related to the growing speed of the haematoma than to its location, being higher for the haematomas located at temporal fossa. Tatagiba et al. reported that frontal epidural haematomas are associated with lower mortality rates, because its evolution is slow. Two of our patients died, one of them due to associated intracranial damage and the other due to multiple thoracic lesions.
Conclusions

These data suggest that:
1) The FEH is more frequent in young adults;
2) Its evolution is slow, usually subacute or chronic, in the majority of the cases;
3) The clinical findings of the FEH course with few neurological symptoms during its evolution;
4) The prognosis is good, except for those cases with multiple intracranial lesions or systemic injury.

References


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