

# BILATERAL ISODENSE EPIDURAL HEMATOMA

## Case report

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**ABSTRACT** - We present a case of a severe head injured 23 year-old male patient. The initial CT scan disclosed bilateral epidural hematoma, isodense with the brain, thus being a pitfall in diagnosis. Brief case report, image and literature review are presented.

**KEY WORDS:** epidural hematoma, head injury, computed tomography.

### **Hematoma epidural isodense bilateral: relato de caso**

**RESUMO** - Apresentamos o caso de um homem de 23 anos com traumatismo craniano grave. A TC de crânio demonstrou um volumoso hematoma epidural bilateral, isodense com o cérebro, sendo uma armadilha ao diagnóstico. São apresentados um breve relato, estudo da imagem tomográfica e revisão da literatura.

**PALAVRAS-CHAVE:** hematoma epidural, trauma craniano, tomografia computadorizada.

The computerized tomography (CT) scan of epidural hematomas usually show hyperdense biconvex shaped mass lesions. Isodense epidural hematomas are rare features with few cases reported in the neurosurgical literature<sup>1-3</sup>. Different theories have been proposed to explain this atypical radiological finding, from low hematocrit values to dilution of the epidural blood due to mixture with cerebrospinal fluid (CSF).

We present a case in which a bilateral epidural hematoma was isodense with the brain and could be easily misdiagnosed, leading to unappropriate treatment.

### **CASE**

A 23-year-old man arrived the emergency room 3 hours after suffering head injury due to an assault, with consciousness impairment. There was a history of alcohol ingestion and the initial GCS (glasgow coma score) was 14. There were not clinical signs of skull base fracture. The patient presented a rapid clinical deterioration to comatous state and required intubation. A CT scan was performed at this moment (Fig 1), and showed large bilateral isodense epidural hematomas. He was rapidly transferred to the operating room with GCS score 4 and dilated pupils. At this moment blood tests showed a hematocrit 29.4%, hemoglobin 9.6 g/dl and normal coagulation studies.

A bicoronal incision was made, with bilateral temporal craniectomy. Operative findings included partially clotted bilateral epidural hematomas and an extensive skull base fracture, with active bleeding from the inner ear. There was no dural laceration. The patient had a favorable outcome, with remarkable clinical improvement in the immediate post-operative period, being discharged in good neurological condition (GOS 5) after 19 days.

### **DISCUSSION**

Isodense epidural hematomas are rare radiological findings. In the series of 151 patients reported by Tapiero et al., 40% presented hyperacute epidural hematomas but none of these were isodense with the brain<sup>4</sup>. The densities of subdural and epidural hematomas on CT scans are related to the attenuation values of the clot, as a function of the erythrocyte and hemoglobin protein concentration and in a lesser extent related to the iron content of the hemoglobin molecule<sup>5</sup>. Serum hemoglobin concentrations ranging from 9 to 11 g/dl have approximately the same density of the brain on CT scans. The clotting mechanisms are not essential for the CT attenuation, but clot retraction with separation of serum and absorption of fluid acts increasing the focal hemoglobin concentration and the density of acute clots<sup>1</sup>.

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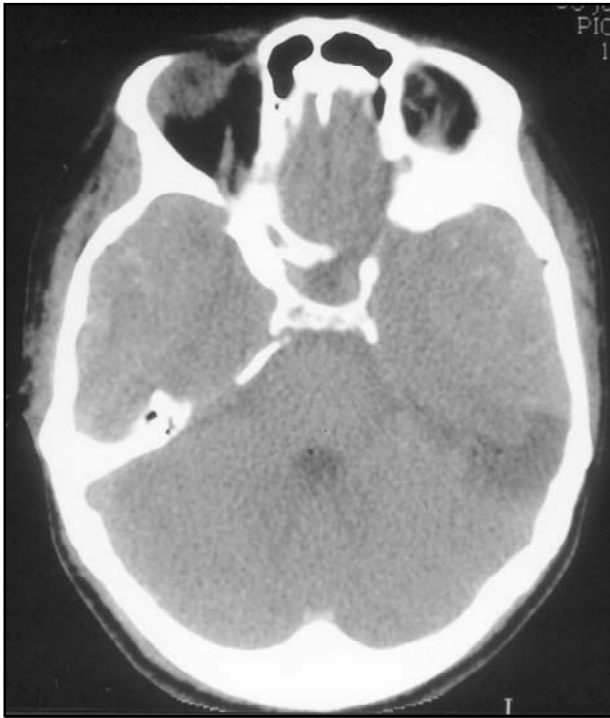


Fig 1. Bilateral isodense epidural hematoma.

The “hyperacute” extradural hematomas are usually hyperdense, with some small areas iso or hypodense within the lesion<sup>4</sup>. The possible causes of these combined densities are the presence of fresh, unclotted blood (which has a low attenuation coefficient), a low hematocrit or a mix of blo-

od with CSF due to dural lacerations. Another proposed mechanism is the continuous washout of the blood within the hematoma through the diploic veins after a skull fracture<sup>4</sup>.

In the present case, the CT findings could be explained by the anemia or by the presence of the skull base fracture. The dura was intact, thus the isodense hematoma could not be related to the CSF mixture.

It is important to state that early diagnosis and treatment of extra-axial traumatic hematomas may result in an important decline in morbidity and mortality and the misdiagnosis is a potentially fatal situation. Neurosurgeons should be aware of the above discussed condition, so prompt recognition and treatment can be achieved with better outcomes.

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