Traumatic Fronto-Ethmoidal Encephalocele: A Rare Case

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Abstract

Encephalocele is defined as herniation of the brain tissue from a bone defect in the cranium. It may be congenital, traumatic, tumoural or develop spontaneously. Traumatic fronto-ethmoidal encephalocele is rare and should be kept in mind for patients who have suffered trauma. Early diagnosis is important in terms of preventing life-threatening complications such as meningitis. Encephalocele and cerebrospinal fluid (CSF) leakage can be easily determined with basic radiological imaging methods and clinical findings. The computed tomography (CT) and magnetic resonance imaging (MRI) findings are here presented of a case with traumatic encephalocele.

Keywords: CT, encephalocele, MRI, trauma

Introduction

An encephalocele describes herniation of brain tissue through a defect in the skull base. It may be congenital, traumatic, tumoural or develop spontaneously. Traumatic encephalocele may result in iatrogenic or head trauma causes [1]. Acquired encephaloceles have a traumatic origin in 96% [2]. Potentially life-threatening events such as CSF leakage and meningitis may be accompanied by encephalocele [3]. Therefore, early diagnosis of encephalocele and CSF leaks is important to reduce the risk of developing complications. In this paper the computerized tomography (CT) and magnetic resonance imaging (MRI) findings of a traumatic encephalocele case are shown.

Case Report

An 18-year-old male presented to the Emergency Department with the complaint of a blow to the frontal area from a traffic accident. During the physical examination, no findings were determined apart from sensitivity and ecchymosis in the frontal area. After approximately 2-3 hours of observation, the patient was discharged as the neurological and laboratory findings were normal. Two weeks later, the patient was presented to hospital again as he had a clear fluid discharge from the left nostril. It was thought that the patient may have a leak of cerebral spinal fluid (CSF). A fluid sample was tested for the presence of β-2-transferrin. As β-2-transferrin was positive, brain CT examination of the patient was made. Sagittal reformatted image from CT scan through the brain showed a defect due to a fracture in the left frontal sinus inferior posterior and the left ethmoid sinus superior posterior wall (Figure 1). To investigate the presence of encephalocele, an MRI Brain scan was done. Herniation of the brain tissue within the frontal and ethmoid sinuses was observed on the MR images. (Figure 2). As the patient refused to have the recommended operation, he was discharged with the recommendation of prophylactic antibiotic therapy. Eight months later, the patient, who had not taken the medication regularly, was brought to the hospital again with the complaints of headache and blurred consciousness. According to the results of the CSF evaluation from a lumbar puncture, a meningitis diagnosis was made. Antibiotic treatment was started for the patient. After two weeks of antibiotic treatment, a surgery was performed on the patient. As no compli-
developed in the 8th month in the patient who was under prophylactic antibiotherapy.

In this study, to current practice patterns that fluid coming from the nasal channel is CSF, β-2-transferrin is examined [7]. In the current case, as the clear fluid discharged from the nose was thought to be a CSF leak, β-2-transferrin was examined and the diagnosis was confirmed.

Methods such as thin section CT, CT cisternography, MR, MR cisternography and radionuclide cisternography are used in order to determine fistula localization in patients with determined CSF leak [6]. In the case presented here, firstly CT, and then MR images were taken. As the bone defect was wide, the CT and MRI examinations were sufficient to determine encephalocele and fistula localization. There was not any need for additional imaging modalities.

Encephaloceles are classified according to the anatomic area of the bone defect. This classification is important for the surgical approach. The most recent classification revised by Gerhardt includes occipital, head dome, fronto-ethmoidal and basal encephaloceles [8]. In the case presented here, the appearance of a fronto-ethmoidal encephalocele was observed, extending to the frontal and ethmoid sinuses.

Treatment was defined by the type of cranial fracture and the severity of the accompanying CSF leak. As the basic approach was conservative; if the pathology had been stubborn and progressive, more invasive procedures would have been required [3]. In the case of encephalocele and CSF fistula, the main treatment was surgical [2]. In the case presented here, as there was encephalocele and CSF leak, the surgical operation was preferred.

In conclusion, it can be said that cases of traumatic fronto-ethmoidal encephalocele are rarely seen but should be kept in mind for patients having trauma. Early diagnosis is necessary to prevent the development of potentially life-threatening complications such as meningitis. Encephalocele and CSF leak can be easily detected using basic radiological imaging methods and clinical signs.

Informed Consent: Written informed consent was obtained from the patient who participated in this case.

Peer-review: Externally peer-reviewed.


Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study has received no financial support.

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Figure 1. The defect due to the fracture in the left frontal sinus inferior posterior and left ethmoid sinus superior posterior wall, shown on the sagittal reformatted CT images.

Figure 2. a, b. Frontal and ethmoidal sinus herniation of the brain tissue observed on axial (a) and coronal (b) T2-weighted MR images.
References


