Scholars Journal of Medical Case Reports

OPEN ACCESS

Abbreviated Key Title: Sch J Med Case Rep
ISSN 2347-9507 (Print) | ISSN 2347-6559 (Online)
Journal homepage: https://saspublishers.com

Tension Pneumoventricle as an Unusual Complication of Head Trauma: A Case Report

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DOI: 10.36347/sjmcr.2021.v09i07.013 | **Received:** 22.05.2021 | **Accepted:** 28.06.2021 | **Published:** 30.07.2021

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Abstract **Case Report**

Pneumocephalus is a frequent complication of head trauma and cranial surgery unlike pneumoventriculus which is a rare entity. Imaging plays an important role in the positive diagnosis of pneumoventriculus and the CT scan is the key examination in the assessment of skull base fractures. We report the case of one patient presenting with a neglected open head injury following road traffic accident whose computed tomography (CT) brain images confirm skull base fractures with bilateral pneumoventriculus.

Keywords: Pneumoventriculus, skull base fracture, rhinorrhea, osteomeningeal breach, CT scan.

INTRODUCTION

Pneumoventriculia is a rare form of intraventricular pneumocephalus, which may manifest itself as headache or confusion due to rapid accumulation of intraventricular air. A surgical intervention must be performed as soon as possible by external ventricular drainage. We present the case of a patient with pneumoventriculia objectified on brain CT performed after two months of his neglected head injury.

CASE REPORT

The patient was 56 years old and presented to the emergency room with severe headaches associated with rhinorrhea. A detailed interrogation revealed a history of a domestic accident causing a cranial impact fracture 2 months ago, with no immediate treatment. On clinical examination, the patient was obnubilated with a Glasgow score of 14/15, symmetrical and reactive pupils with an accentuation of rhinorrhea when the head was flexed. There is a mid-frontal depression associated.

A cerebral CT scan was ordered which showed a bilateral pneumoventriculus of moderate size, more marked on the right side, visible at the level of the frontal horns of the lateral ventricles, creating hydro-aeric levels, with a fistulous path between the left frontal sinus and the frontal horn of the homolateral ventricle, responsible for a mass effect on the median line of the right side (figure 1) associated with an osteomeningeal breach. on the bone window: fracture of the naso-ethmoido-maxillo-fronto-orbital complex. The patient underwent a two-stage surgical procedure (neurosurgical and maxillofacial).

DISCUSSION

Pneumocephalus is the presence of air inside the cranium (subdural, extradural, intracerebral, subarachnoid or intraventricular). It most often results from traumatic causes or following a craniotomy but can also be secondary to non-traumatic causes. Pneumoventriculia is a rare form of intraventricular pneumocephalus and may manifest as headache or altered consciousness due to rapid accumulation of intraventricular air [1].

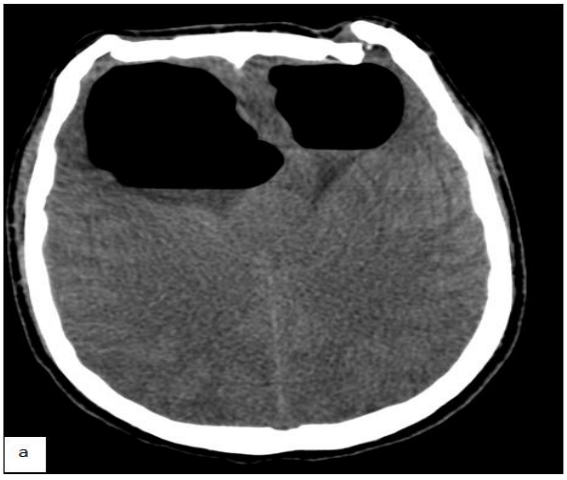
The post-traumatic osteomeningeal breach (OMB) corresponds to an osteomeningeal continuity solution that allows cerebrospinal fluid (CSF) to flow into an aerial cavity in the skull base [2].

In severe head trauma, it is difficult to look for rhinorrhea or anosmia, in this case the search for a lesion of the anterior floor is part of the complete workup, especially in the presence of periorbital ecchymosis or craniofacial depression [2]. In its typical form, easy to diagnose, it is described as an intermittent clear liquid discharge from the nose, often favored by the head bent forward. The search for glucose in this discharge by strip is definitely obsolete, because of the presence of glucose in nasal secretions. When it is possible to collect the discharge, it is the determination

of b2-transferrin, a highly specific protein of the CSF, absent in other body fluids, that confirms the rhinorrhea. This rhinorrhea is complicated by meningitis in 7 to 30% of cases [2].

Imaging plays an important role in the positive diagnosis of pneumoventriculus. X-rays of the skull are no longé relevant in the assessment of trauma to the anterior aspect of the skull. When they are performed, they can objectify a fracture of the vault, the frontal sinus or pneumocephalus. The CT scan is the key examination in the assessment of skull base fractures. Thin slices of 1 to 2 mm in the coronal and axial planes will be performed in the bone and parenchymal window. It will allow to objectify the defect even in the absence of rhinorrhea, its location, the number of fractures, the presence of pneumocephalus or other associated lesions (extra or sub dural hematoma, contusion, embarrure, lesions of the facial mass...). Finally, it will allow to classify the lesion and to establish the operative indication [2]. MRI is not of interest in emergency as high resolution CT allows a good analysis of the lesions, however it is very useful to localize the breach in the presence of rhinorrhea when the CT does not show a breach [2].

Therapeutic management aims to protect the brain from mechanical and infectious aspects, to dry up the flow and close a possible osteomeningeal breach, and to prevent recurrent meningitis, which is life-threatening for the patient [2]. A volume of pneumocephalus inferior to 2 ml and asymptomatic, can be resorbed spontaneously without management in 2 to weeks, whereas larger volumes with neurological deterioration are considered as a neurosurgical emergency and an intervention must be performed as soon as possible by external ventricular drainage [3].



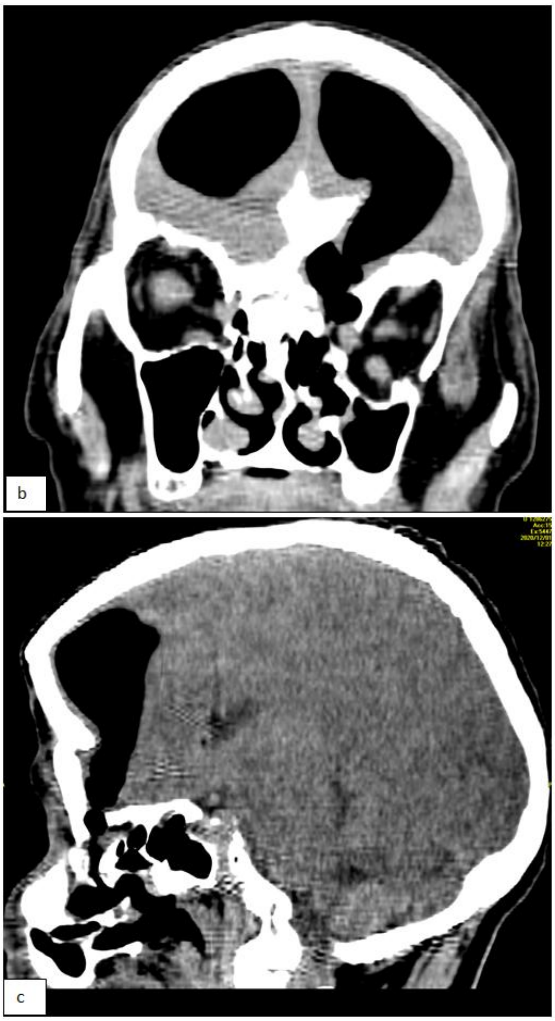


Fig-1: Cerebral CT in parenchymal window (a: axial section, b: coronal section, c: sagittal section) showing a communication between the left frontal sinus and the frontal horn of the homolateral lateral ventricle with pneumoventriculia

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