

Post-Trauma Neuroinfectious Complications; There Is Not Always A Skull Fracture Involved: A Case Report

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Introduction

Neurological infectious diseases are often clinically and radiologically insidious. They can affect otherwise healthy subjects. This clinical case underlines the importance of considering neuroinfectious conditions for young patients, particularly when a recent trauma is referred, even without fractures. Head trauma is a risk event for intracranial infections

[1]. The most frequent way of causing them is a fracture, which causes a gap between the inside and outside. However, it is not the only mechanism involved. Neuroinfectious diseases may lead to a patient's death in a few days. Thus, a prompt diagnosis and treatment can dramatically change the course of the pathology.

Case Presentation

A 32-year-old man came to the Emergency Room for sub-entrant seizures and confusion. The man, a month before, after a car accident, had a subdural hematoma without cranial bone fractures and neurological symptoms, **Figure 1a**. He denied epilepsy previously. He had no fever. C-Reactive Protein is 40 mg/dl (n.v. < 5 mg/dl) at blood exams.

He was uninhibited, disoriented, with incongruous speech. He had mild hypoesthesia in the left arm. He visual-sensorily neglected his left body side.

Brain CT showed partially regressed right hemispheric subdural hematoma and the appearance of a small hypodense area in the right temporal site of likely ischemic-compressive nature, **Figure.1b**. CT-angio sequences were unimpressive. Lumbar puncture was routine in protein e cellular count, with negative bacteriological and virological

exams. The hypothesis was a compression determined by the subdural hematoma.

After 2 days, neurological conditions worsened, with marked psychomotor agitation and confusion. Brain CT showed enlargement of the hypodense area, **Figure1c**. This rapid change made us hypothesize a possible infectious disease.

Brain MRI showed signal restriction in DWI/ADC and partially T1 hyperintense signal in subdural space, surrounded by vasogenic edema in proper temporal-frontal white matter, hyperintense in T2 FLAIR. Findings deposed for evolution into empyema of the subdural hematoma, **Figure.2a,2b**. [2].

The man underwent urgent neurosurgical surgery and broad-spectrum antibiotic therapy for *S. pneumoniae*. The patient recovered without neurological sequelae.

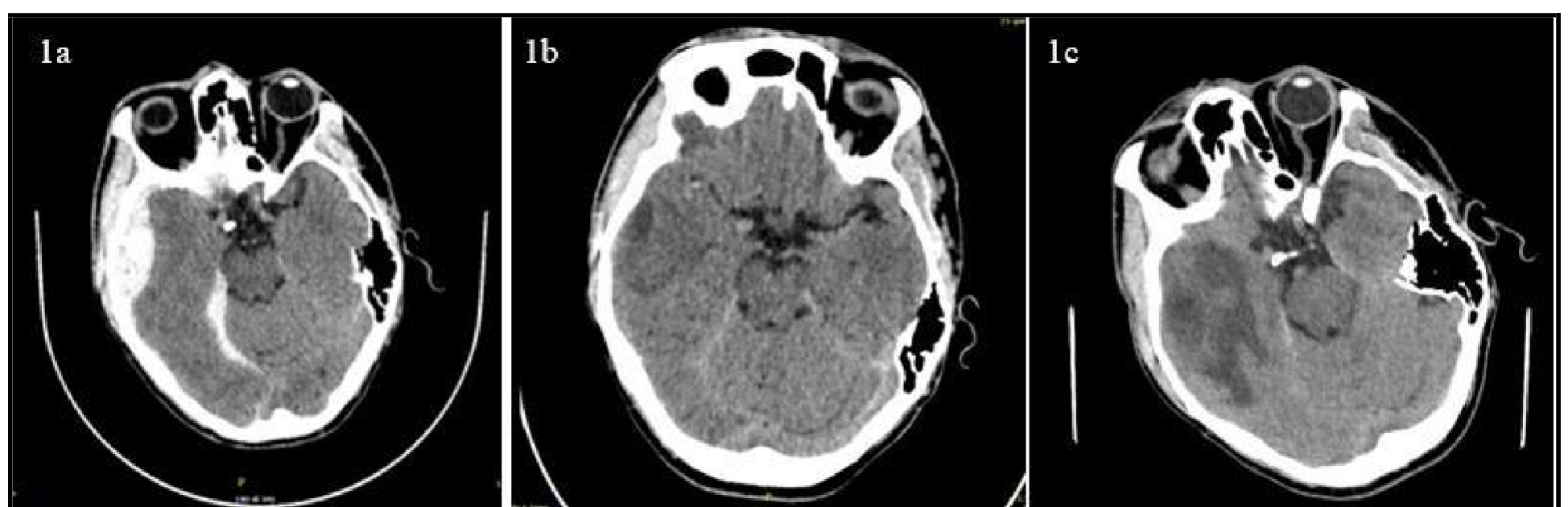


Figure 1a) Axial Brain CT of the day of the car accident, showing the subdural hematoma in its acute phase.

Figure 1b) Axial Brain CT performed the day of the access to our Emergency Room. The little hypodensity nearby the subdural hematoma is evident.

Figure 1c) Axial Brain CT after 3 days, demonstrating the huge augmentation of the hypodensity and the surrounding oedema.

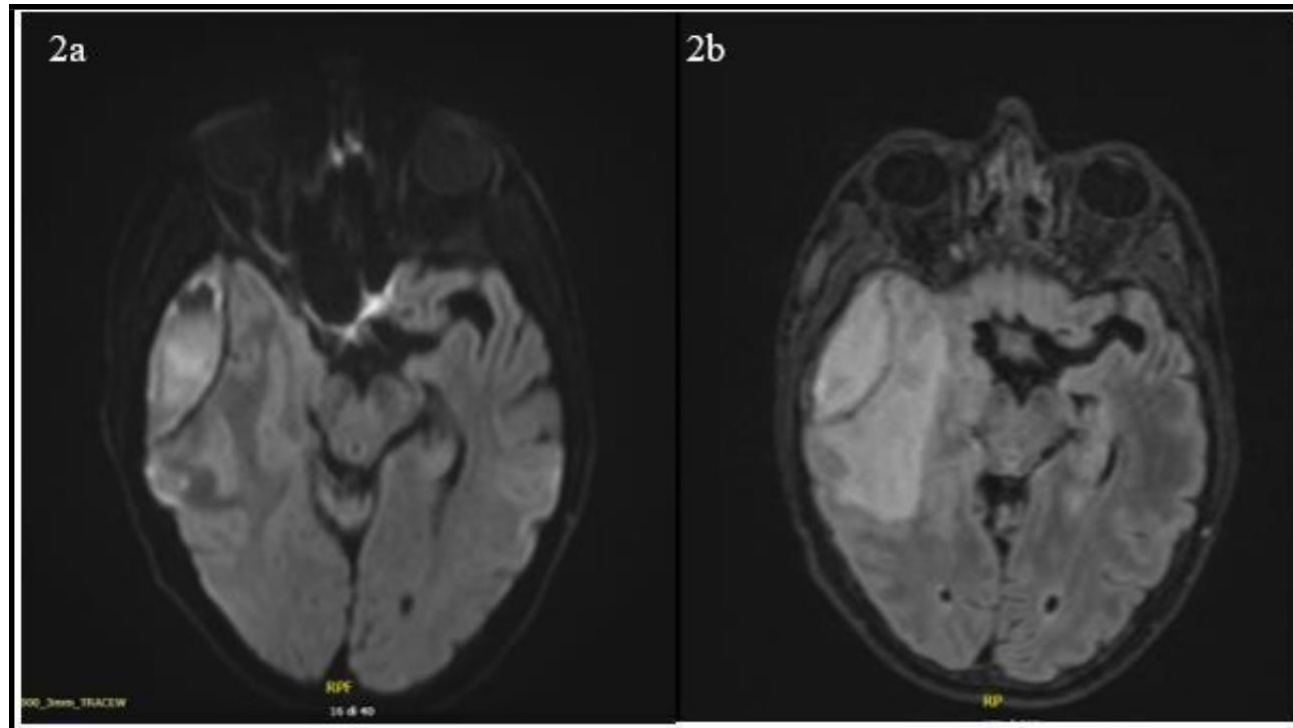


Figure 2a) Axial Brain MRI shows in DWI sb1000 sequences subdural area of signal restriction, typical of subdural empyema.

Figure 2b) Axial T2-FLAIR Brain MRI showing the empyema and the compressive effect around.

Discussion

Subdural empyema is an infectious disease involving subdural space. Mortality is about 10-20 % [2]. Clinical symptoms can be blurred and rapidly worsening. First-time seizures can be a presentation [1]. They may complicate brain injury or neurosurgical interventions. If not promptly treated, they can evolve into cerebritis, abscess formation, infarct, and cortical vein or dural sinus thrombosis [2]. Blood and CSF exams may be regular. CT brain usually shows crescent hypodense shapes not confined by sutures but limited by falx cerebri, tentorium cerebelli, and foramen magnum [2].

Brain MRI may be diagnostic; it shows restricted diffusion of the stagnant pus in subdural spaces, in opposition to other nonrestricted extra-axial collections like subdural effusion, hygroma, or hematoma [2]. The adjacent brain parenchyma may be hyperintense in T2/FLAIR

signals for edema, encephalitis, or ischemia [2]. A wide craniotomy is often preferred over drainage because of better clearance of empyema and improved clinical outcomes [2,3].

They can be the evolution of a brain injury even in the absence of fractures; some researchers show how head trauma can influence the immune system, causing an immunodepression in the days and weeks after trauma [1]. This biochemical consequence of trauma, together with local abnormalities determined, can explain the evolution of the brain subdural hematoma in empyema, like in this clinical case. This other mechanism underlines the importance of a strict follow-up of the patients after brain trauma, even without skull fractures, to rapidly intercept possible infectious complications.

Conclusions

This clinical case underlines the importance of considering infectious etiology, especially in young people, even in the absence of fever or changes in hematochemical or CSF examinations [3]. This suspicion should be, in particular, raised in case of recent trauma because of the

possible effects of it on local and global immune systems [1]. Accurate and rapid differential diagnosis, with the interpretation of brain MRI by an expert neuroradiologist, is essential for medical and surgical treatment. Prompt therapy can ensure an optimal prognosis.

Statements and Declarations

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The authors have no relevant financial or non-financial interests to disclose.

The authors have no competing interests to declare that are relevant to the content of this article.

This research study was conducted retrospectively from data obtained for clinical purposes. We consulted extensively with the Ethics Committee who determined that our study did not need ethical approval.

Informed consent was obtained from the patient included in the study. The authors affirm that human research participant provided informed consent for publication of the images in Figure 1 and 2.

The participant has consented to the submission of the case report to the journal.

Patients signed informed consent regarding publishing their data.

Keywords: Empyema, neuroinfectiology, trauma, neuroradiology, case report

References

1. Sonnevile R, Ruimy R, Benzonana N, Riffaud L, Carsin A, et al. (2017) An update on bacterial brain abscess in immunocompetent patients. *Clin Microbiol Infect.* 23(9): 614-620.
2. Li S, Nguyen IP, Urbanczyk K (2020) Common infectious diseases of the central nervous system—clinical features and imaging characteristics, *Quant Imaging Med Surg.* 10(12): 2227–2259.
3. Mattogno PP, La Rocca G, Signorelli F , Visocchi M (2019) Intracranial subdural empyema: diagnosis and treatment update. *J Neurosurg Science.* 63(1): 101-102.