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CASE REPORT

Recovery of repressed memories after herpetic encephalitis: a case report

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Abstract

Introduction: Encephalitis is an inflammation of the brain parenchyma that causes neurological dysfunction. Etiologies are heterogeneous but among infectious causes, viruses are the most common, with the herpes simplex virus accounting for most of the identified cases. Diagnosis can be challenging because of the many ways in which it can present itself. Sequelae are mainly represented by cognitive and behavioral changes and memory loss. **Case report:** We report the case of an adolescent with HSV encephalitis who recovered from an acute life-threatening event but instead of memory loss, he presented the disclosure of repressed memories related to earlier dissociative amnesia. **Discussion:** Injury in the hippocampus and amygdala fields has probably disrupted an inhibition process and consequently the recall of emotionally repressed memories. This case illustrates the possibility of a second life-threatening event inducing a rearrangement in the memory of a previous similar event.

Keywords: Encephalitis. Memory. Recovery. Trauma.

Recuperação de memórias reprimidas após encefalite herpética: caso clínico

Resumo

Introdução: A encefalite é uma inflamação do parênquima cerebral que causa disfunção neurológica. As etiologias são heterogéneas, entre as causas infeciosas os vírus são as mais comuns, o Vírus Herpes Simples (VHS) contribuindo para a maioria dos casos identificados. Devido à possibilidade de múltiplas apresentações clínicas o diagnóstico pode ser desafiante. As sequelas são maioritariamente representadas por alterações cognitivas, comportamentais e perda de memória. **Relato do caso:** Este relato descreve o caso de um adolescente que na recuperação após uma encefalite por VHS, em vez de perda de memória, apresentou revelações de memórias reprimidas relativas a um evento antigo em relação ao qual apresentava uma amnesia dissociativa. **Discussão:** A hipótese é de que as lesões ao nível do hipocampo e amígdala terão intercetado um processo inibitório previamente instalado, permitindo o acesso a memórias reprimidas. Este caso introduz a possibilidade de um segundo evento ameaçador induzir um rearranjo na memória de um prévio evento semelhante.

Palavras-chave: Encefalite. Memória. Recuperação. Trauma.

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Keypoints

What is known

- Acute life-threatening events can initiate rearrangements in previously-organized neuronal schemas.
- Recovery after HSV encephalitis can include cognitive issues, behavioral changes, seizures, attention and concentration deficits, speech disorders, and memory loss.

What is added

- Instead of memory loss, this patient presented the disclosure of repressed memories related to earlier dissociative amnesia.

Introduction

Encephalitis is an inflammation of the brain parenchyma that causes neurological dysfunction. Etiologies are heterogeneous but can be divided into two categories: infectious, stemming from direct invasion of the brain by pathogens; and immune-mediated, resulting from an attack of the nervous system through an immune response[1]. Among infectious causes, viruses are the most common, with the herpes simplex virus (HSV) accounting for 50-75% of identified viral cases[2] and 30-40% of cases with an identified cause[3], the most frequently identified cause in developed countries[3]. Nonetheless, in more than half of the cases, the origin remains unknown[1,4]. HSV encephalitis is the only viral encephalitis with an effective antiviral treatment[5].

Herpes simplex encephalitis (HSE) is an acute, potentially fatal illness. There are two types of HSV: 1 and 2. Type 1 (HSV-1) is commonly associated with orofacial manifestations and most HSE cases are in children older than six years of age[6]. Type 2 (HSV-2), however, is mostly associated with genital forms of infection and is responsible for most HSE cases in newborns[6].

Because of the many ways in which it can present itself, some of which are mild, diagnosis is often delayed, which can be life threatening. The most common presentations include oral and genital mucocutaneous lesions[7]. In a diagnostic evaluation, a detailed history and physical examination searching for neurological signs is urgent and required. Some presentations induce medium- or even low-level alarm in clinicians, and evident signs of encephalopathy can be challenging to detect.

A cerebrospinal fluid (CSF) HSV PCR is the best diagnostic tool for HSE diagnosis but occasionally it can give a false negative result in early presentations, mostly during the first four days of illness[5]. Acyclovir is the treatment of choice for HSE and can be started empirically[5].

Most patients with viral encephalitis have a positive prognosis and make a full recovery[8]. The fatality rate of HSE is below 20% when antiviral treatment is administered[5], but serious consequences may remain, particularly in children, even if they have been correctly diagnosed and treated[9]. Problems can include cognitive issues, behavioral changes, epilepsy, attention and concentration deficits, speech disorders, and memory loss (mostly anterograde amnesia)[8,9].

We report the case of HSE in a 16-year-old boy who recovered from an acute event but instead of loss of memory, the adolescent presented with an emergence of heavy emotional childhood memories that had previously been lost, recovering from earlier dissociative amnesia.

Case report

A 16-year-old male, high school student, was admitted to our hospital through the emergency department following a six-day history of headache and vomiting with progressive prostration. There had been no recent travel or head injury. The family described abnormal behavior with episodes of confusion in the few days before. He had headaches in the frontotemporal location, with an intensity of 4/10, suggestive of migraine, which decreased in severity in response to oral analgesics. He had no fever before arriving at the hospital (his axillar temperature never exceeded 37 °C). During the neurological examination, the patient's eyes remained closed. He was responsive but exhibited dysarthria and was only partially oriented. No other neurological signs were observed, and there were no signs of meningeal irritation. In the mental status examination, the patient appeared withdrawn, avoiding eye contact, consistently keeping his eyes closed, and frequently appearing drowsy. While he demonstrated orientation to person, his orientation to time and place seemed impaired. His speech was markedly slow and slurred, appearing to drag, yet he remained responsive to questions. The patient's demeanor was generally apathetic, characterized by a flat mood and blunted affect. Assessment of humor and thought content was challenging, as was the evaluation of the patient's sensory perception, with no apparent evidence of

alterations. Poor personal hygiene and refusal to eat were evident. The adolescent was placed in clinical observation and after four hours he became non-responsive to stimuli. He subsequently showed minimal improvement after mannitol was administered.

During evaluation, his blood sample showed normal renal and liver profiles, an erythrocyte sedimentation rate of 13 mm/h (1-20), C-reactive protein 0.63 mg/dL (< 0.5), lymphocytes 0.83 × 10^9/L (1.50-4.80), eosinophils 0.01 × 10^9/L (0.02-0.55), glucose 102 mg/dL (60-100), and the rest was normal. A lumbar puncture (LP) demonstrated a CSF protein level of 92 mg/dL (15-40), and normal CSF glucose and lactate levels. At the cytological examination, the total cell count was 120/mm^3, predominantly mononuclear.

Magnetic resonance imaging suggested encephalitis with predominant damage on the right, affecting the right temporal lobe and limbic structures, with marked atrophy of the right insular cortex, involving the right internal frontobasal region, and the anterior temporal lobe (as seen in the series of images in Fig. 1), and HSV-1 was detected in the LP. He was initially treated with empirical schemas and, after the pathogen was detected, with acyclovir and levetiracetam.

Two days after admission, during an electroencephalogram, the young male suffered a prolonged electroclinical seizure with an initial right occipital ictal pattern (Fig. 2). Progress was positive, with no record of further seizures, and only some sleep-related issues and episodic anxiety.

During hospitalization, he began a physical and neurological rehabilitation program due to autonomous walking deficits and daytime bladder sphincter incontinence, which improved significantly. The adolescent was discharged with no significant neurological sequelae except for sporadic episodes of diurnal enuresis.

The adolescent was being followed up by child and adolescent psychiatry and psychology, with no other relevant health history. He began receiving psychiatric support at the age of four following a road accident with his mother. Although the child had not suffered any injuries, his mother died at the scene. In subsequent years, the boy always denied remembering the event. He had notorious difficulties in expressing himself emotionally, physically, and verbally, and possessed few emotional management strategies. The child also demonstrated persistent sleep-related problems. He suffered from bullying for years at school, being consistently unable to defend himself from physical and verbal attacks. By the age of 10, he developed depressive symptoms and reported consistently missing his mother. During adolescence, he gradually became more isolated, with a small number of friends and became even more introverted. At 15 years old, he also presented with obsessive symptoms. Up until the time of the most recent event, the adolescent in question had only been diagnosed with depressive and obsessive-compulsive disorder and social anxiety.

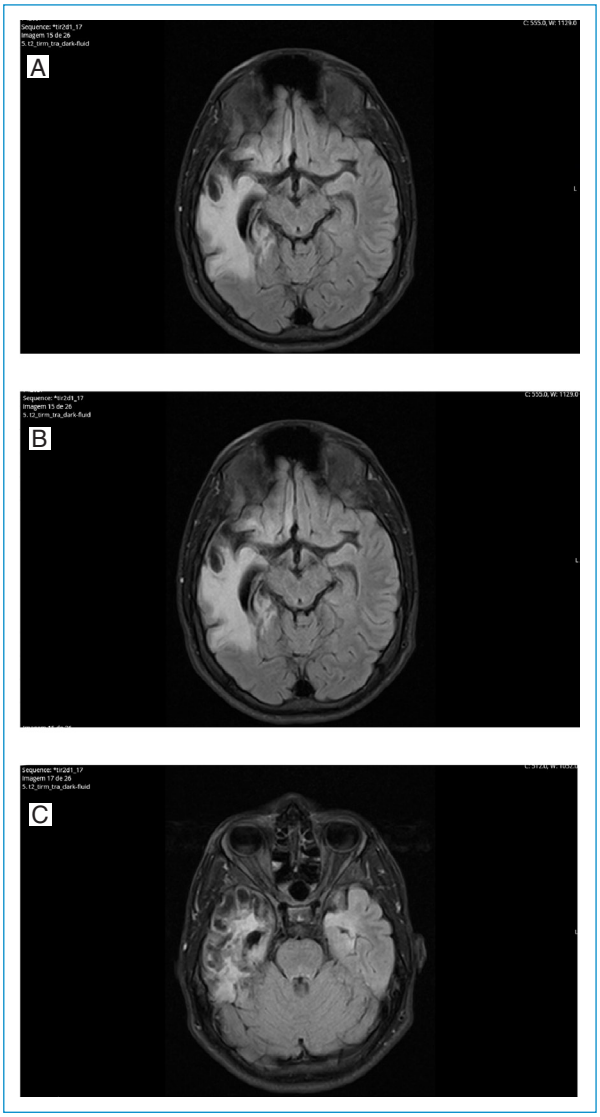

Figure 1. A, **B** and **C:** brain MRI images depicting predominant damage on the right side, affecting the right temporal lobe and limbic structures. There is marked atrophy of the right insular cortex, involving the right internal frontobasal region, and the anterior temporal area. There is also involvement of the left insular and periventricular regions, although less pronounced. Significant dilation is noted due to the retraction of the temporal horn of the right ventricle, with particularly relevant encephalomalacia observed in the anterior and inferior temporal areas on the right side.

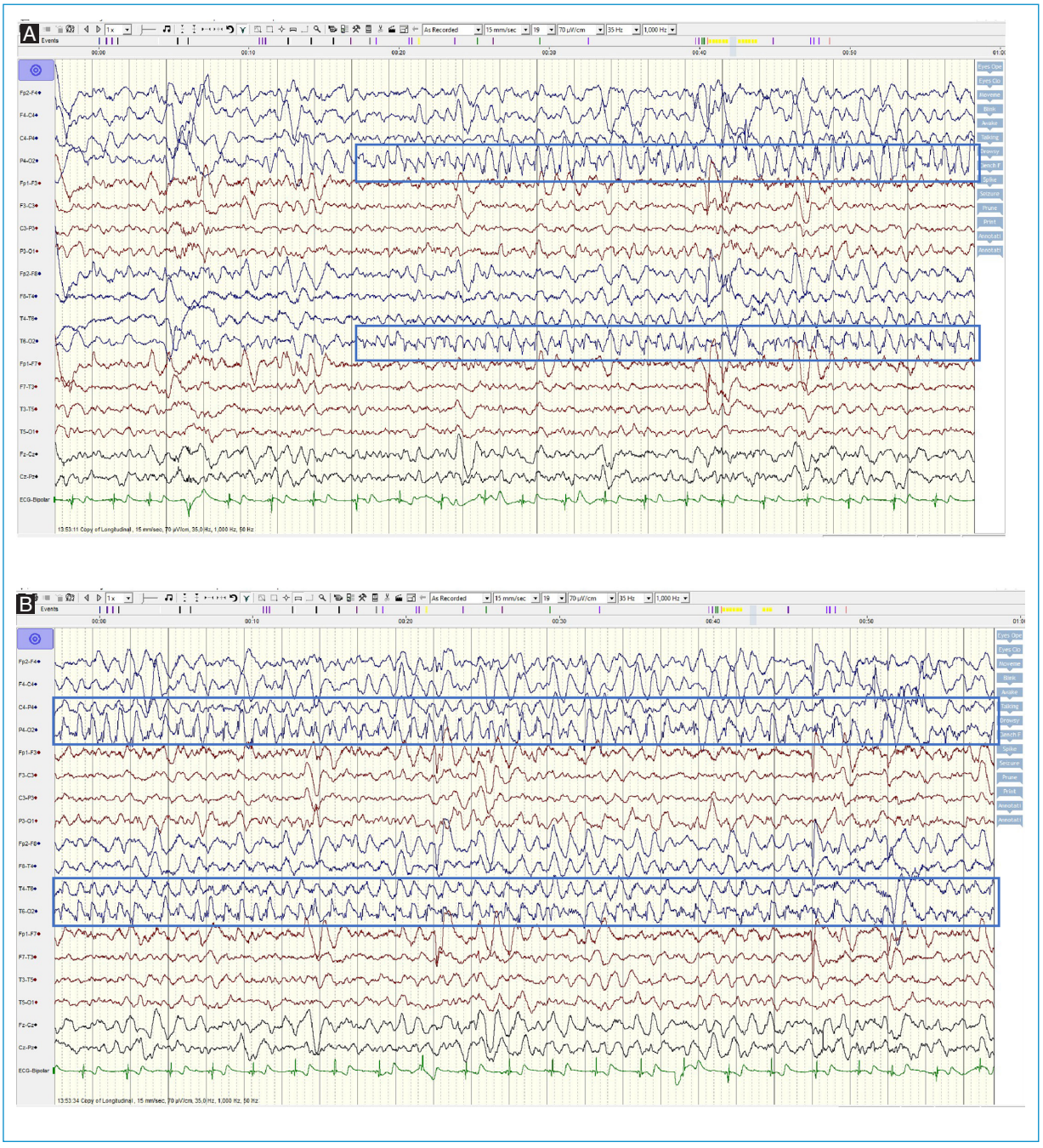

Figure 2. **A** and **B:** electroencephalogram in bipolar montage illustrating electroclinical seizure with an initial right occipital ictal pattern (inside square).

During his recovery from the encephalitis, the adolescent disclosed that he suddenly began to remember the traumatic event that he had suffered 12 years earlier with his mother. During that time, he claimed he could remember frames from the car accident and even his mother's last words to him. He became deeply interested in the subject of his deceased mother and considering this he tried, together with his family, to find out more details about her, namely her interests, hobbies, and personality.

This event has provided access to a new understanding of the patient's psychiatric history, revealing information previously hidden from clinical exploration. The intensity of the traumatic event experienced in childhood may have led to the repression of memories of the incident, due to the psychological impact that it

represented, which probably exceeded the child's capacity to process it at the time. This may have contributed to the adolescent's inability to verbalize and recall specific details of the traumatic event until now. Repressed memories can emerge following triggers, in this case after a medical event. As a result of this memory recovery process, flashbacks of the traumatic event became possible. This paradigm shift in the patient's history has led to a reformulation of the previously assessed psychiatric symptoms. By integrating these into the newly revealed trauma dimension, it has been possible to understand the emotional and cognitive symptoms represented by obsessions, compulsions, depression, and social anxiety as an indirect expression of unresolved emotional conflict. As a result, trauma intervention played a crucial role in enhancing the young individual's interpersonal functionality, which had been previously impaired due to the persistence of repressed memories, potentially underlying the complexity of the patient's clinical manifestation.

The emergence of repressed memories allowed him to integrate all his experiences into his identity. He now felt emotionally more available after internalizing the past traumatic experience, but also capable of a new vision of the future, leading him to improve his communication skills and social interaction.

Discussion

Recovery of repressed memories in the context of post-encephalitis is very rare but theoretically possible. To our current knowledge, there are no documented instances in the literature of recovered repressed memories following cases of encephalitis.

Long-term memory can be declarative (conscious/explicit) and non-declarative (unconscious/implicit)[10]. The hippocampus is the brain structure involved in memory storage and functioning[10], the amygdala is a brain structure located near the hippocampus, and these two structures are part of the limbic system[11]. The amygdala can be involved in the integration of sensory and cognitive information relating to feelings such as fear, with important connections with the prefrontal cortex responsible for emotional regulation[11]. Fear is learned during stressful experiences associated with emotional trauma[11]. The limbic system is involved in associating a stimulus (real or psychologically representative) with a fearful situation (or representative of fear)[11].

Trauma integrates biopsychosocial domains. In the case exposed here, the retrieval of repressed memories was probably the turning of the content of the dissociative amnesia into effective and available forms of memory. Dissociative amnesia represents a failure in the ability to remember autobiographical information alongside an absence of structural brain damage, and even though certain frames of memory are not accessible, they are not lost or forgotten[12,13]. Although dissociation may be a protective mechanism in the acute management of trauma, it may not be beneficial in the long-term development of the person as this functional avoidance may impact other areas of the individual and prevent them from experiencing events fully and progressing in their lives[14].

Dissociative amnesia and repressed memories are often associated with retrieval inhibition and there is an association between trauma and dissociation[15]. Retrieval inhibition is a phenomenon where a specific memory is inhibited[15]. There is one study that showed an association between dissociative amnesia, decreased activation of the hippocampus, and increased activation of prefrontal cortex activity[16] which could represent a possible association between emotional regulation and repressed memories/dissociated memories[15].

Conclusion

Under certain circumstances, the rearrangement of some areas of the brain can induce unexpected results due to the extreme neuroplastic capacity of the brain tissues. In the case report described here, the injury occurred around the hippocampus and the amygdala and has probably disrupted an emotional inhibition process relating to fear induced by psychological stimuli and the consequent recall of repressed memories. This clinical case demonstrates the close interaction between emotions and memory and the possibility of a second life-threatening event inducing recovery from an earlier one.

Author contributions

A.R. Figueiredo: conception and design of the study, report, review or other type of work or paper; acquisition of data either from patients, research studies, or literature; analyisis or interpretation of data either from patients, research studies, or literature; drafting the article; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. P. Moniz: acquisition of data either from patients, research studies, or literature; analyisis or interpretation of data either from patients, research studies, or literature; critical review of the article for important intellectual content; final approval of the version to be published;

agreement to be accountable for the accuracy or integrity of the work. C. Pereira: acquisition of data either from patients, research studies, or literature; anayisis or interpretation of data either from patients, research studies, or literature; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work. M. Laureano: acquisition of data either from patients, research studies, or literature; anayisis or interpretation of data either from patients, research studies, or literature; critical review of the article for important intellectual content; final approval of the version to be published; agreement to be accountable for the accuracy or integrity of the work.

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Conflicts of interest

None.

Ethical considerations

Protection of humans and animals. The authors declare that no experiments involving humans or animals were conducted for this research.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from patients, and received approval from the Ethics Committee. The SAGER guidelines were followed according to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing of this manuscript.

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