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Auditory Impairments and Vestibular Dysfunctions After Cryptococcal Meningitis: A Duo of Case Reports

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A B S T R A C T

Introduction: Cryptococcal meningitis, caused by the fungus Cryptococcus neoformans, is a rare opportunistic infection, mainly affecting immunosuppressed individuals. Among its less frequent but significant clinical manifestations are hearing loss and vestibular dysfunction, which impact patients' quality of life and require specific care. **Objective and Methodology:** This report presents two cases of post-meningitic cryptococcal patients evaluated in a specialized otorhinolaryngology unit. Case Reports: Two patients with sensorineural hearing loss associated with cryptococcal meningitis are described. The first patient, C.S.A, a male, developed profound bilateral hearing loss following meningitis, with no anatomical abnormalities observed, and was subsequently referred to a cochlear implant and vestibular rehabilitation outpatient clinic. Patient R.V.F, a female, developed moderate hearing loss at specific frequencies after meningitis, with radiological findings suggesting ongoing infectious activity. Additionally, she presented an opaque tympanic membrane without retractions. Both patients received recommendations for continuous audiological monitoring. **Discussion:** These cases underscore the complexity of auditory manifestations in cryptococcal meningitis and highlight the significance of audiological monitoring and further research to enhance understanding and treatment. **Conclusion:** It is imperative to enhance prevention and treatment strategies for cryptococcal meningitis to enhance the quality of life of affected patients through additional research.

Keywords: Vestibular hypofunction; Hearing Loss; Cryptococcal meningitis.

1. Introduction and Method

Cryptococcal meningitis, a fungal opportunistic infection caused by Cryptococcus neoformans, predominantly affects individuals with compromised immune systems, such as those with HIV/AIDS or undergoing immunosuppressive therapy. This infection can lead to various clinical presentations, including central nervous system involvement. Among the less common yet clinically significant consequences are otoneurological impairments, encompassing hearing loss (hypoacusis) and vestibular dysfunction. While less prevalent than the typical neurological symptoms of cryptococcal meningitis, such as headaches, neck stiffness, and confusion, these manifestations profoundly impact patients' quality of life, necessitating comprehensive evaluation and management [1] [2].

1.1 Research objective

In this case report, we aim to elucidate the occurrence of hearing loss and vestibular dysfunction in two patients following episodes of cryptococcal meningitis. Through an analysis of their clinical presentations, diagnostic investigations, and responses to treatment, our objectives are to enhance the comprehension of these atypical manifestations of the disease and underscore the significance of conducting otoneurological assessments in individuals with cryptococcal meningitis.

1.2 Methodology

This study is an observational case report conducted by accessing the medical records of two patients who experienced acute hearing impairments and vestibular dysfunctions following cryptococcal meningitis. The study was conducted in compliance with ethical standards, and both patients provided informed consent by signing the Free and Informed Consent Form. This form authorized the researchers to use the data collected and access information from their medical records. The research was carried out at the Otoneurology Outpatient Clinic within the Otorhinolaryngology Service of the Bettina Ferro de Souza Hospital, located in Belém, Pará, Brazil.

2. Case reports

Case 1: C.S.A (41-year-old male)

C.S.A, a previously healthy individual without known immunosuppressive factors, developed sudden profound bilateral sensorineural hearing loss following an episode of cryptococcal meningitis. He spent 34 days in the hospital, receiving multiple pharmacological treatments, including Liposomal Amphotericin. Despite the severity of his hearing loss, physical examinations revealed no general or otorhinolaryngological abnormalities.

Audiological assessments indicated the absence of otoacoustic emissions (Figure 1.a), low gain in the vestibulo-ocular reflex (VOR) during the Video Head Impulse Test (V-HIT), and the confirmed hearing loss on the audiogram. Notably, imaging studies, including mastoid computed tomography and cranial magnetic resonance imaging, showed no anatomical abnormalities or signs of labyrinthitis ossificans. Consequently, C.S.A was referred to the cochlear implant clinic, where he became an eligible candidate for the procedure. Additionally, he underwent specialized vestibular rehabilitation.

Case 2: R.V.F (43-year-old female)

R.V.F, another previously healthy individual without known immunosuppressive factors, experienced moderate sensorineural hearing loss in specific frequencies suddenly after an episode of cryptococcal meningitis. She reported 18 days of hospitalization and the use of multiple medications for meningitis treatment. Physical examinations revealed no general abnormalities, but the otorhinolaryngological examination identified an opaque tympanic membrane without bilateral retractions.

Audiological assessments disclosed a moderate reduction in the auditory threshold at various frequencies, both in the right ear (4, 6, and 8 KHz) and the left ear (3, 4, and 6 KHz). Importantly, her vestibulo-ocular reflex (VOR) in the Video Head Impulse Test (V-HIT) demonstrated normal gain (Figure 1.b), with no nystagmus or ocular saccades. Further investigations included cranial MRI, which unveiled radiological changes suggestive of an ongoing infectious process.

In both cases, we recommend continuous audiological monitoring to gain a profound understanding of the progression and implement personalized treatments for the auditory manifestations associated with cryptococcal meningitis.

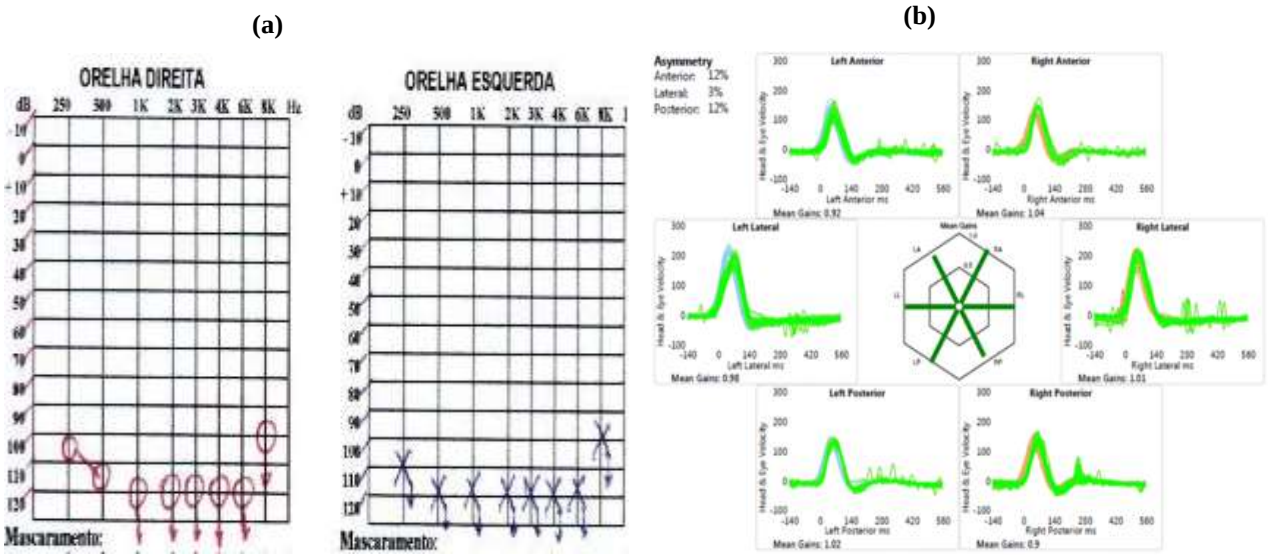

Fig.1 (a) Bilateral Profound Sensorineural Hearing Loss in Pure Tone Audiometry (Case 1); (b) Absence of Vestibular Hypofunction in V-HIT (Case 2).

3. Discussion

The presented case reports illustrate the intricate auditory manifestations associated with cryptococcal meningitis, underscoring the necessity for an enhanced comprehension of the underlying mechanisms and personalized patient care. Cryptococcal meningitis, an opportunistic fungal infection, has the capacity to influence both auditory and vestibular systems, resulting in a diverse range of clinical presentations [3] [4].

In the first case involving C.S.A, a 41-year-old male, profound bilateral sensorineural hearing loss abruptly and vestibular dysfunctions developed after cryptococcal meningitis. This sudden hearing impairment significantly impacts the patient's quality of life. Interestingly, imaging studies did not reveal any anatomical anomalies or signs of labyrinthitis ossificans, suggesting that the hearing loss may be linked to more intricate pathological mechanisms. This observation aligns with previous research indicating that cryptococcal meningitis can induce sudden hearing loss without evident direct damage to the cochlear organ[3] [4].

In the second case, R.V.F, a 43-year-old female patient, exhibited moderate sensorineural hearing loss following cryptococcal meningitis. An intriguing aspect of this case was the specific reduction in the hearing threshold at distinct frequencies. Cranial MRI unveiled radiological inflammatory markers, indicating that the infectious process associated with meningitis was still active. This raises the possibility that the persistence of infectious activity may have contributed to the observed hearing loss. It's worth noting the absence of nystagmus and ocular saccades during vestibular examinations, which can yield valuable insights into the vestibular mechanisms affected by cryptococcal meningitis [3] [5].

Both cases underscore the significance of continuous audiological monitoring for patients in post-cryptococcal meningitis recovery. The progression of auditory manifestations can be intricate and necessitates a personalized approach. Furthermore, these reports underscore the need for further investigation into the pathological mechanisms underpinning hearing loss associated with cryptococcal meningitis, which may aid in shaping future treatment strategies.

In a broader context, it is imperative to consider enhancing prevention and treatment strategies for cryptococcal meningitis with the aim of mitigating its adverse impact on the auditory and vestibular functions of patients [1] [2]. Moreover, additional longitudinal studies and more comprehensive investigations into the pathogenesis of these manifestations are imperative to advance scientific knowledge and enhance the quality of life for affected patients.

4. Conclusion

Emphasizing the intricate auditory manifestations linked to cryptococcal meningitis, it is paramount to underscore the significance of ongoing audiological monitoring and a comprehensive understanding of the underlying mechanisms. In this extensive context, the enhancement of prevention and treatment strategies for cryptococcal meningitis remains a pivotal step to mitigate the impact on patients' auditory and vestibular functions. Furthermore, conducting further studies is imperative to advance scientific understanding and consequently enhance the quality of life for those affected.

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