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Optic Neuritis and its Prevalence in Immunocompromised Patients: A Review Article

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ABSTRACT

Optic neuritis is an inflammation that affects the optic nerve, causing vision loss, eye pain, and changes in color perception. The condition can be associated with autoimmune diseases such as multiple sclerosis (MS) or infections, especially in immunocompromised individuals such as HIV/AIDS patients or those undergoing chemotherapy. In these individuals, optic neuritis usually results from opportunistic infections like toxoplasmosis and syphilis, complicating diagnosis and treatment. In immunocompetent patients, optic neuritis may indicate autoimmune diseases like MS or neuromyelitis optica (NMO), with better prognoses when treated early with corticosteroids. However, in immunocompromised individuals, the prognosis tends to be worse due to underlying infections and a limited response to immunosuppressive treatment. The management of optic neuritis involves anti-inflammatory therapies and, in cases of infections, specific antimicrobials. Continuous clinical and visual follow-up is also crucial. Studies suggest that clinical outcomes vary depending on the etiology and the patient's immune status, highlighting the need for personalized therapeutic strategies. Early diagnosis is critical to improving vision and quality of life for patients.

Keywords

Optic neuritis, Immunosuppressed, Immunocompromised, Immunocompetent, Optic nerve.

Introduction

Optic neuritis is an inflammatory condition that affects the optic nerve, often leading to symptoms such as vision loss, eye pain, changes in color perception, and neurological deficits, which can result in temporary or permanent visual loss, depending on the severity and response to treatment. The condition can occur in isolation or be associated with autoimmune, infectious, or systemic inflammatory diseases, such as multiple sclerosis (MS). Its etiology can vary considerably, involving autoimmune, infectious, and idiopathic factors. In immunocompromised patients, the risk of developing optic neuritis is increased due to immune system vulnerability, such as those living with HIV/AIDS, undergoing chemotherapy, transplant recipients, or those with viral (Herpes, Varicella-Zoster) and bacterial (syphilis, tuberculosis) infections, while in immunocompetent individuals, autoimmune causes such as Multiple Sclerosis and Neuromyelitis Optica (NMO)

predominate.

Objectives

This article aims to review the existing literature and published studies on the prevalence of optic neuritis in immunocompromised patients, discussing the possible etiologies, the importance of early diagnosis, and the implications for treatment.

Materials and Methods

A bibliographic review of published articles in the PUBMED, ScienceDirect, and Scielo databases was conducted to support the study.

Discussion

The literature review and articles reveal that optic neuritis is a significant complication in immunocompromised patients, although prevalence may vary depending on the underlying condition and immunosuppressive treatment in use. Studies show that patients with HIV/AIDS have an elevated risk of optic neuritis, often associated with opportunistic infections such as toxoplasmosis or neurosyphilis. In cancer patients, especially those undergoing chemotherapy or immunosuppressive agents, optic nerve inflammation may occur as a result of an exacerbated inflammatory response or as a side effect of treatments. Moreover, the literature suggests that the clinical presentation of optic neuritis in immunocompromised patients can be atypical, complicating early diagnosis. Symptoms such as eye pain and vision loss may be mistaken for other complications associated with immunosuppression, such as infections or tumors. Therefore, careful evaluation and the inclusion of optic neuritis in the differential diagnosis are essential. The therapeutic approach to optic neuritis in immunocompromised patients must consider the underlying condition and the immunosuppressive treatment in use. Management may include anti-inflammatory therapies, such as corticosteroids, and treatment of the underlying condition. In addition, regular monitoring of visual function and follow-up with imaging exams are crucial for effective management.

The literature points to significant differences in the causes and outcomes of optic neuritis between immunocompetent and immunocompromised patients. In immunocompetent individuals, optic neuritis is often an initial manifestation of autoimmune diseases such as multiple sclerosis, as reported in studies like Beck et al. [1], which found that about 50% of patients with optic neuritis develop MS over 15 years of follow-up. Studies like Jarius et al. [2] also highlight neuromyelitis optica as a relevant factor for recurrence and severity of optic neuritis in these individuals. On the other hand, in immunocompromised patients, optic neuritis is generally associated with opportunistic infections. Kumar et al. [3] demonstrated that in HIV/AIDS patients, infections such as toxoplasmosis and cytomegalovirus are often implicated, leading to more severe cases of optic neuritis with worse visual prognosis. Additionally, Miles et al. [4] indicated that the immunosuppressive response resulting from treatments such as chemotherapy can predispose to infections like syphilis and herpes virus, exacerbating optic nerve inflammation. Another important aspect is clinical outcomes. In immunocompetent patients, corticosteroid treatment can significantly improve visual outcomes, as shown by Costello et al. [5]. However, in immunocompromised patients, the response to treatment may be less favorable, depending on the control of the underlying infection. Studies like Jacob et al. [6] indicate that in some cases, early intervention with specific antimicrobial treatment, such as acyclovir for herpes-zoster infections, may improve visual outcomes, although damage is often irreversible.

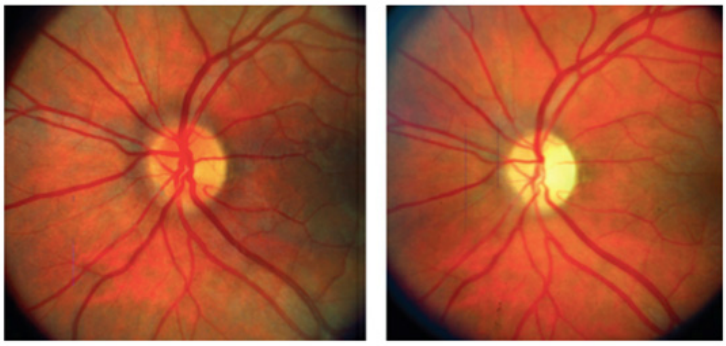

Figure 1: Retrobulbar optic neuritis (acute phase on the left and after three months).
(Source): Walsh & Hoyt's Clinical Neuro-Ophthalmology: The Essentials

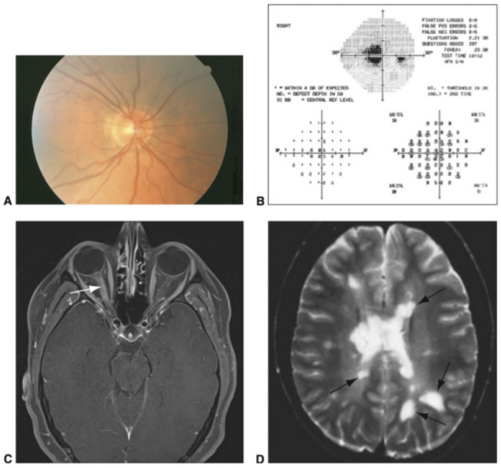

Figure 2: Retrobulbar optic neuritis: (A) Optic disc without edema. (B) Visual field test showing central scotoma. (C) MRI showing hyperintensity in the optic nerve. (D) MRI showing multiple lesions in the white matter, suggestive of demyelination.
(Source): BCSC 2020-2021, Neuro-Ophthalmology, p. 131.

Conclusion

Optic neuritis is a significant complication in immunocompromised patients, with prevalence varying according to the underlying condition and immunosuppressive treatment. Early diagnosis is challenging due to atypical clinical presentation and overlap with other complications. Therefore, healthcare professionals must be vigilant for signs and symptoms of optic neuritis in immunocompromised patients and perform comprehensive evaluations to ensure appropriate treatment. Integrating multidisciplinary approaches that consider both neurological and immunological conditions is essential to improve visual outcomes and the quality of life for these patients. It is worth noting that optic neuritis has distinct etiologies and outcomes in immunocompromised and immunocompetent patients. While in immunocompetent individuals the condition is often associated with autoimmune disorders like multiple sclerosis, in immunocompromised patients, opportunistic infections play a central role. Prognosis also varies significantly, being better in immunocompetent patients with early treatment. Understanding these differences is essential for proper management, with therapeutic approaches that consider the underlying etiology and the patient's immune status. Future research is necessary to improve treatment options and optimize visual outcomes in these patients. Therefore, the management of optic neuritis should be personalized according to the patient's immune status, taking into account not only the underlying cause but also the peculiarities of the immune system at the time of clinical presentation. Future research should focus on more effective and safer therapeutic strategies for immunocompromised patients to improve long-term visual prognosis.

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