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Optic Neuropathy Induced by Linezolid in Drug-Resistant Tuberculosis: A Retrospective Study

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Abstract: ***Linezolid has become a crucial drug in managing drug-resistant tuberculosis (DR-TB). However, reports of optic neuropathy associated with prolonged use raise significant clinical concerns. This retrospective study evaluates the incidence, clinical presentation, and outcomes of linezolid-induced optic neuropathy in a cohort of DR-TB patients. Among 86 patients treated with linezolid, 27.9% reported visual disturbances, and 5.8% were diagnosed with optic neuropathy. Early identification and intervention, including drug discontinuation, dose modification, and corticosteroid therapy, led to substantial recovery in most cases. The study underscores the importance of routine ophthalmologic monitoring in DR-TB treatment programs.***

Keywords: Linezolid, Drug-Resistant Tuberculosis, Optic Neuropathy, Visual Monitoring, Treatment Safety

1. Introduction

The emergence of multidrug-resistant (MDR) and extensively drug-resistant tuberculosis (XDR-TB) poses a significant public health challenge, particularly in high-burden countries like India. Linezolid, a synthetic oxazolidinone antibiotic, has shown efficacy against resistant Mycobacterium tuberculosis strains and is a core drug in shorter MDR-TB regimens endorsed by the WHO[1].

However, its long-term use is associated with dose-dependent adverse effects, including myelosuppression, peripheral neuropathy, and optic neuropathy[2], [3]. The mechanism of optic neuropathy is attributed to mitochondrial toxicity due to inhibition of mitochondrial protein synthesis[4]. While case reports have highlighted these effects, programmatic data from endemic settings are limited.

This study aims to investigate the frequency, clinical features, and outcomes of linezolid-induced optic neuropathy among DR-TB patients treated at a tertiary care center.

2. Materials and Methods

Study Design and Setting:
A retrospective cohort study was conducted at Ananta Hospital and Medical Science, Rajsamand, using patient records from January 2023 to April 2024.

Study Population:
All patients diagnosed with DR-TB (including pre-XDR and XDR) who received linezolid-containing regimens were included.

Clinical and Ophthalmologic Evaluation:
Standard clinical evaluations were supplemented with ophthalmologic testing for patients reporting visual symptoms. These included visual acuity testing, color vision (Ishihara), slit-lamp and fundus examination, OCT, and visual fields via perimetry.

Definition:
Optic neuropathy was diagnosed based on bilateral visual loss with optic disc changes and/or abnormal findings on OCT or visual fields, in the absence of other causes.

Statistical Analysis:
Descriptive and inferential statistics were computed using SPSS v20, with significance set at $p<0.05$.

3. Results

Among 136 DR-TB patients, 86 (63.2%) were treated with linezolid. Of these, 24 (27.9%) reported ocular symptoms, and 5 (5.8%) were diagnosed with optic neuropathy.

All affected patients had bilateral vision loss (visual acuity 6/24–6/60), reduced near vision (<N36), optic disc hyperemia, RNFL thickening on OCT, and central/ centrocecal scotomas on perimetry.

Linezolid was discontinued or dose-reduced in all cases. Corticosteroids were administered. All patients showed clinical improvement; in 2 cases, linezolid was reintroduced at 300 mg/day without recurrence.

4. Discussion

This study reaffirms that although linezolid-associated optic neuropathy is uncommon, it is a significant and potentially reversible complication. The pathogenesis is consistent with mitochondrial toxicity, similar to other drug-induced optic neuropathies such as those caused by ethambutol[5].

Timely recognition and intervention significantly improve visual prognosis. The utility of OCT and perimetry as early screening tools in DR-TB patients on linezolid is evident and should be incorporated into routine practice[6], [7].

5. Conclusion

Linezolid-induced optic neuropathy, while relatively rare, can cause significant morbidity in DR-TB patients. It is often reversible with prompt intervention. This study supports integrating routine ophthalmologic evaluation into

DR-TB programs where linezolid is used, especially in high-risk patients.

References

[1] World Health Organization. WHO consolidated guidelines on drug-resistant tuberculosis treatment. Geneva: WHO; 2020.
[2] Song T, Lee M, Jeon HS, Park Y, Dodd LE, Dartois V, et al. Linezolid-containing regimen for extensively drug-resistant tuberculosis. N Engl J Med.2012; 367 (16): 1508–18.
[3] Tang S, Yao L, Hao X, Liu Y, Zeng L, Liu G, et al. Efficacy, safety, and tolerability of linezolid for the treatment of extensively drug-resistant tuberculosis: A systematic review and meta-analysis. J Antimicrob Chemother.2015; 70 (3): 718–27.
[4] De Vriese AS, Coster RVD, Smet J, Seneca S, Lovering A, Van Haute LL, et al. Linezolid-induced inhibition of mitochondrial protein synthesis. Clin Infect Dis.2006; 42 (8): 1111–7.
[5] Menon V, Takkar A, Kumar A, Dandu H, Sood R. Ethambutol-induced optic neuropathy: Current perspectives. Clin Ophthalmol.2020; 14: 1771–1781.
[6] Rucker JC, Biousse V, Newman NJ. Toxic optic neuropathies. Semin Neurol.2007; 27 (3): 233–42.
[7] Michaelides M, Rajendram R, Marshall J, Keightley S. Multifocal electroretinography and optical coherence tomography evidence of retinal dysfunction in linezolid-induced optic neuropathy. Doc Ophthalmol.2005; 111 (1): 69–72.