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Perspective

Navigating Optic Neuropathy in Myopic Patients with Glaucoma

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DESCRIPTION

High myopia, characterized by a refractive error of more than -6.00 diopters, is a significant risk factor for several ocular complications, including retinal detachment, maculopathy, and optic neuropathy. One of the most concerning associations is with glaucoma, particularly open-angle glaucoma. Understanding the relationship between high myopia and optic neuropathy in the context of glaucoma is vital for early diagnosis, effective management, and prevention of vision loss. High myopia involves elongation of the eyeball, which leads to increased axial length. This structural change can cause mechanical stretching and thinning of the retina and choroid, resulting in a compromised optic nerve head. These anatomical alterations make the optic nerve more susceptible to glaucomatous damage, even with normal Intraocular Pressure (IOP). Glaucoma is characterized by progressive optic neuropathy with corresponding VF loss. In myopic eyes, the optic disc often appears larger and more oval, and the neuroretinal rim can be thin. These features can complicate the diagnosis and monitoring of glaucoma, as they may mimic or mask glaucomatous changes. Diagnosing glaucoma in highly myopic patients can be challenging due to overlapping features. In high myopia, the optic disc is often tilted, with an exaggerated peripapillary atrophy. This can obscure typical glaucomatous changes such as neuroretinal rim thinning and excavation. Careful assessment using imaging modalities like Optical Coherence Tomography (OCT) is essential. While elevated Intraocular Pressure (IOP) is a primary risk factor for glaucoma, many myopic patients with glaucoma may present with normal or only slightly elevated IOP. This emphasizes the importance of comprehensive evaluation beyond IOP measurements.

Myopic patients may exhibit VF defects that are not typical of glaucomatous damage, such as paracentral scotomas and temporal defects. Regular VF testing with appropriate interpretation considering the myopic alterations is vital. OCT can provide detailed images of the Retinal Nerve Fiber Layer (RNFL), which is often thinner in myopic eyes. Comparing RNFL thickness with normative databases should be done cautiously, as these databases may not account for high myopia. Increased axial length in myopia leads to mechanical stretching and thinning of the optic nerve and surrounding tissues, predisposing them to damage. The elongated and stretched sclera in myopic eyes is biomechanically weaker, making it less capable of withstanding IOP fluctuations and other stresses. High myopia is associated with changes in ocular blood flow, which can compromise the optic nerve head's perfusion, increasing susceptibility to glaucomatous damage. Genetic factors play a role in both high myopia and glaucoma. Studies have identified several genetic loci associated with an increased risk of both conditions, suggesting a shared genetic predisposition. Due to the complexities in diagnosis, myopic patients should undergo regular and comprehensive eye examinations, including IOP measurements, VF testing, and OCT imaging. Early detection of glaucomatous changes is important for timely intervention. Although IOP may not be significantly elevated in myopic glaucoma, controlling IOP remains a key strategy. Medications, laser therapy, and surgical options should be considered based on individual patient needs and responses. Each patient's treatment plan should be personalized, considering the degree of myopia, optic disc morphology, and VF changes. Close monitoring and adjustment of treatment strategies are necessary to manage progression effectively. Educating patients about the increased risk of glaucoma associated with high myopia is essential. Patients should be informed about the importance of adherence to treatment plans and regular follow-up appointments. Ongoing research aims to better understand the mechanisms underlying the increased risk of glaucoma in high myopia and to develop more effective diagnostic and management strategies. Improved imaging modalities, such as enhanced-depth OCT and adaptive optics, offer more detailed visualization of the optic nerve head and RNFL, aiding in early detection and monitoring of glaucomatous changes in myopic eyes. Identifying genetic markers associated with high myopia and glaucoma can help in understanding the shared pathways and developing targeted therapies. Studying the biomechanical properties of the sclera and optic nerve head in myopic eyes can provide insights into

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the susceptibility to glaucomatous damage and potential interventions to strengthen these tissues. Research into neuroprotective agents aims to develop treatments that protect the optic nerve from glaucomatous damage, regardless of IOP levels. This could be particularly beneficial for myopic patients with normal-tension glaucoma. High myopia significantly increases the risk of developing optic neuropathy associated with glaucoma. The elongated and biomechanically compromised structure of myopic eyes makes the optic nerve more vulnerable to damage, even in the presence of normal IOP. Early detection, regular monitoring, and personalized management strategies are crucial in preventing vision loss in highly myopic patients with glaucoma. Advances in imaging, genetics, and neuroprotection hold the potential to improve outcomes for these patients. By understanding the unique challenges posed by high myopia, clinicians can better address the needs of this high-risk population and help preserve their vision.