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Bruch’s Membrane Opening in High Myopia and Its Correlation with Axial Length

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Abstract : Introduction: High myopia has become a matter of global concern as it is a major risk factor for glaucoma. Various optic nerve head changes occur in high myopia over time. This might lead to difficulty in detecting pathologies associated with high myopia through conventional funduscopy examinations only. Bruch’s Membrane Opening (Area and Minimum Rim Width) is considered an anatomically more accurate and reliable landmark than the conventional clinical disc margin. Study Design: It was a hospital based cross-sectional and non-interventional type of study. Purpose: The purpose of our study was to measure Bruch’s Membrane Opening (area and Minimum Rim Width) in high myopic eyes and correlate it with axial length. Methods: A cross-sectional study was conducted at B.P Koirala Lions Center for Ophthalmic Studies, a tertiary-level eye center in Nepal. 80 eyes of 40 subjects (40% male and 60% female) aged 18-35 years with high myopia (Spherical Equivalent (SE) ≥ -6D) were taken as cases. Among them, RE of 39 and LE of 34 myopic subjects were included in the study. Spectral Domain-Optical Coherence Tomography of both the eyes of myopic patients was performed using Glaucoma Module Premiere Edition (GMPE) with Anatomic Positioning System (APS) to measure Bruch’s Membrane Opening (Area and Minimum Rim Width). Axial length in myopic patients was measured using Partial Coherence Interferometry (IOL Master). Results: Among 40 myopic subjects, 16 (40%) were males, whereas 24 (60%) were females. The mean age of myopic subjects was 24.64 ± 5.10 years, with minimum and maximum ages of 18 years and 35 years, respectively. The mean BMO area was 2.28 0.48 mm^2 in right eye and 2.15 0.59 mm^2 in left eye. BMO area in high myopic patient was significantly correlated with axial length. The correlation analysis of BMO area with axial length in RE and LE was found to be statistically significant at ($r=0.465$, $p<0.003$) and ($r=0.374$, $p<0.029$), respectively. Likewise, the mean BMO-MRW was 325.69 ± 96µm in right eye and 339.20 ± 79.50µm in left eye. There was a significant correlation of BMO-MRW with axial length in both the eyes of myopic subjects. Moreover, a significant negative correlation of Inferior temporal, Nasal, and Inferior nasal quadrants ($p<0.05$) of BMO-MRW of right eye was found with axial length of right eye, whereas all the BMO-MRW quadrants of left eye were negatively correlated ($p<0.05$) with axial length in left eye. No significant differences were found between right eye and left eye on comparing means of refractive error, axial length, BMO area, and BMO-MRW. Conclusion: From this study, it can be concluded that BMO area enlarges in high myopia with an increase in axial length. Additionally, BMO-MRW thinning occurs along with the BMO enlargement and increases with axial length. There were no significant differences in refractive error, axial length, BMO area, and BMO-MRW between right eye and left eye.

Keywords : high myopia, Bruch’s membrane opening, Bruch’s membrane opening minimum rim width, spectral domain optical coherence tomography
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