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Schlemm's canal and trabecular meshwork in eyes with primary open angle glaucoma: a comparative study using high-frequency ultrasound bio microscopy

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We investigated in vivo changes in Schlemm's canal and the trabecular meshwork in eyes with primary open angle glaucoma (POAG). Relationships between Schlemm's canal diameter, trabecular meshwork thickness, and intraocular pressure (IOP) were examined. Forty POAG patients and 40 normal individuals underwent 80-MHz ultrasound biomicroscopy examinations. The Schlemm's canal and trabecular meshwork were imaged in superior, inferior, nasal and temporal regions. Normal individuals had an observable Schlemm's canal in 80.3% of sections, a meridional canal diameter of $233.0 \pm 34.5 \mu\text{m}$, a coronal diameter of $44.5 \pm 12.6 \mu\text{m}$ and a trabecular meshwork thickness of $103.9 \pm 11.1 \mu\text{m}$, in POAG patients, Schlemm's canal was observable in 53.1% of sections, a meridional canal diameter of $195.6 \pm 31.3 \mu\text{m}$, a coronal diameter of $35.3 \pm 5.7 \mu\text{m}$, and a trabecular meshwork thickness of $88.3 \pm 13.2 \mu\text{m}$, which significantly differed from normal (both $p < 0.001$). Coronal canal diameter ($r = -0.623$, $p < 0.001$) and trabecular meshwork thickness ($r = -0.663$, $p < 0.001$) were negatively correlated with IOP, but meridional canal diameter was not ($r = -0.160$, $p = 0.156$). Schlemm's canal was observable in 50.5% and 56.6% of POAG patients with normal ($< 21 \text{ mmHg}$) and elevated ($> 21 \text{ mmHg}$) IOP, respectively ($X = 1.159$, $p = 0.282$). Coronal canal diameter was significantly lower in the elevated IOP group ($32.6 \pm 4.9 \mu\text{m}$) than in the normal IOP group ($39.5 \pm 9.3 \mu\text{m}$, $p < 0.001$). This was also true of trabecular meshwork thickness ($81.9 \pm 10.0 \mu\text{m}$ vs. $97.1 \pm 12.0 \mu\text{m}$, $p < 0.001$). In conclusion, eyes with POAG had fewer sections with an observable Schlemm's canal. Canal diameter and trabecular meshwork thickness were also lower than normal in POAG patients. Schlemm's canal coronal diameter and trabecular meshwork thickness were negatively correlated with IOP.

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