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EFFICACY OF PNEUMATIC TRABECULOPLASTY IN PRIMARY OPEN ANGLE GLAUCOMA

Purpose

The main purpose of this study was to determine the efficacy and the safety of pneumatic trabeculoplasty (PNT), a non-invasive treatment to lower intraocular pressure (IOP), in patients with primary open angle glaucoma (POAG), in combination with concomitant antiglaucoma medications. The second aim of the study was to analyse the estimated ocular anatomical changes due to the treatment, using ultrasound biomicroscopy (UBM), so as to demonstrate the possible mechanisms of the PNT lowering effect, which is believed to act by improving aqueous outflow.

Methods

A total of 14 patients with POAG were enrolled in a prospective, single-centre study to determine the IOP lowering effects of PNT. Comprehensive ophthalmic examination, including tonometry, gonioscopy, computerized perimetry was performed. Only one eye for each patient was chosen to receive PNT, while the fellow eye was used as an intrasubject control. All patients underwent a single PNT treatment on day 0 (baseline) and after 7 days. The combination of a PNT vacuum application of 60 seconds and a 5 minutes rest period followed by another PNT application constituted a single PNT treatment. All patients underwent an UBM examination of anterior segment anatomical structures (ACD - Anterior Chamber Depth; SCPA - Scleral Ciliary Process Angle; CBT - Ciliary Body Thickness, measured at 1000, 1500, 2000 and 2500 µm from the scleral spur) during the screening visit and the day after the second treatment. The whole sample was followed for 120 days.

Results

The mean baseline IOP was 22.8 ± 1.8 mmHg in the eye which underwent the treatment and 22.6 ± 1.8 mmHg in the fellow eye. A statistically significant ($p < 0.05$) mean IOP reduction from the baseline, tested using an Independent Samples T-Test, was observed in the treated eye on days 2 (- 12.3%),14 (- 14%), 30 (- 16.6%), 60 (- 19.3%), 120 (- 15.8%), with the greater significant mean IOP reduction on day 8 (- 21%) (Fig. 1). Surprisingly the fellow eye showed a contemporary – not statistically significant – reduction of the mean IOP value from the baseline, which explanation is not clear. No adverse events occurred after all the treatments. The UBM examination didn't show any significant changes after the PNT treatments from the baseline, either on anterior chamber depth (ACD) or angle width (SCPA). The CBT, on the contrary, grew thin after the treatments, with the higher significant reduction at 1000 µm from the scleral spur ($p < 0.05$) (Fig. 2 CBT baseline; Fig. 3 CBT after PNT). Besides the uveal reflectivity under the scleral tissue appeared to be increased after the vacuum application, probably due to the compression induced by the suction ring (Fig. 4 Uveal reflectivity Baseline; Fig. 5 Uveal reflectivity after PNT).

Fig. 1

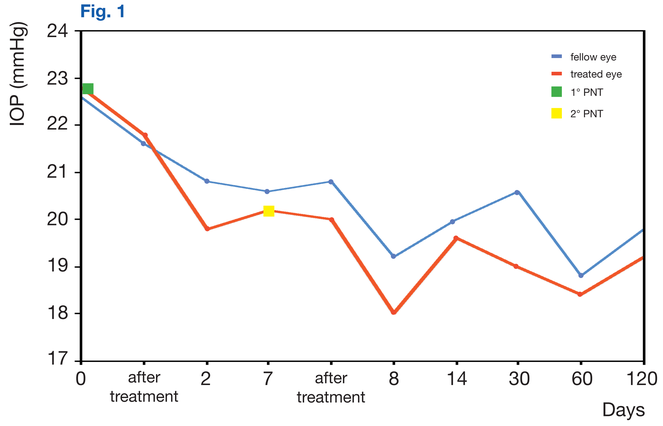


Fig. 2

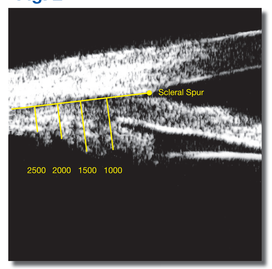


Fig. 3

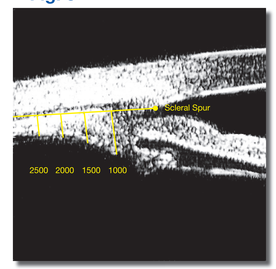


Fig. 4

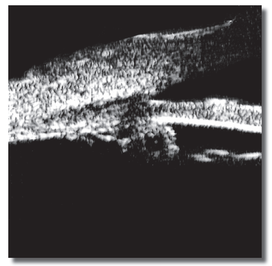
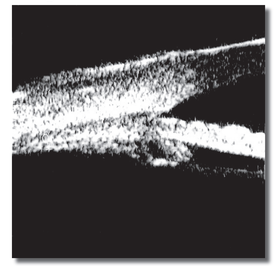


Fig. 5



Conclusion

The PNT seems to be a safe and effective treatment capable to guarantee, in combination with concomitant antiglaucoma medications, a significative IOP lowering effect which duration appears to dwindle after a mean period of 4 months. Our experience showed a mean IOP reduction of 15.8% from the baseline after 120 days. Therefore, further studies will be able to define how many times the treatment needs to be repeated to achieve a steady effect. The UBM analysis seems to confirm a possible improvement due to PNT treatment of the aqueous outflow through the trabecular meshwork, without widening of the uveoscleral pathways.

*Commercial Relationship: NONE