

Long term outcomes of micropulse cyclophotocoagulation in eyes with and without prior tube shunt surgery

Samantha Ayoub¹, Soshian Sarrafpour, M.D.¹, Danish Saleh², Nathan M Radcliffe, M.D.^{1, 3}

¹New York University Department of Ophthalmology, ²Medical Scientist Training Program, Tufts University School of Medicine, Boston, MA, USA, ³Ophthalmology, Weill Cornell Medical Center., New York, NY, United States

PURPOSE

Micropulse Transscleral Cyclophotocoagulation (mCPC), a variation of CPC, delivers energy in a pulsated manner and has emerged as an alternative to the classical cycloablative procedure in the treatment of glaucoma. Unlike CPC, mCPC delivers short-bursts of energy units to achieve photocoagulation of the melanin producing cells or pigmented epithelia of the ciliary body. MCPC is a procedure that has been shown to lower IOP in patients with severe glaucoma. The efficacy of mCPC in patients who have previously received Ahmed glaucoma valves (AGV) (New World Medical, Rancho Cucamonga, CA, USA) remains unknown. Since many AGVs in patients with elevated IOPs may be partially functioning, mCPC could be potentiated in these eyes. We investigated long-term outcomes in eyes undergoing MCPC, comparing IOP and medication usage in patients who did not receive AGV or who received an AGV before or concurrently with mCPC.

METHODS

IRB approval for a retrospective study examining glaucoma surgical and medical care was obtained from NYUMC. Records from a glaucoma practice in New York City where MCPC was performed for at least 3 years were de-identified and retrospectively analyzed. Patients who had undergone MCPC with at least 1 year of follow-up were identified through billing records. Records were reviewed for demographics, IOP, medication use, visual acuity, and complications. The average age of patients was 74 years (range 43-93), 38 patients were female and 22 were male. Macular edema determined with optical coherence tomography through imaging records (available for all patients). Main data points included intraocular pressure and concomitant eye drops. Groups were compared with 2 tailed unpaired t-tests using StatPlus.

FIGURES

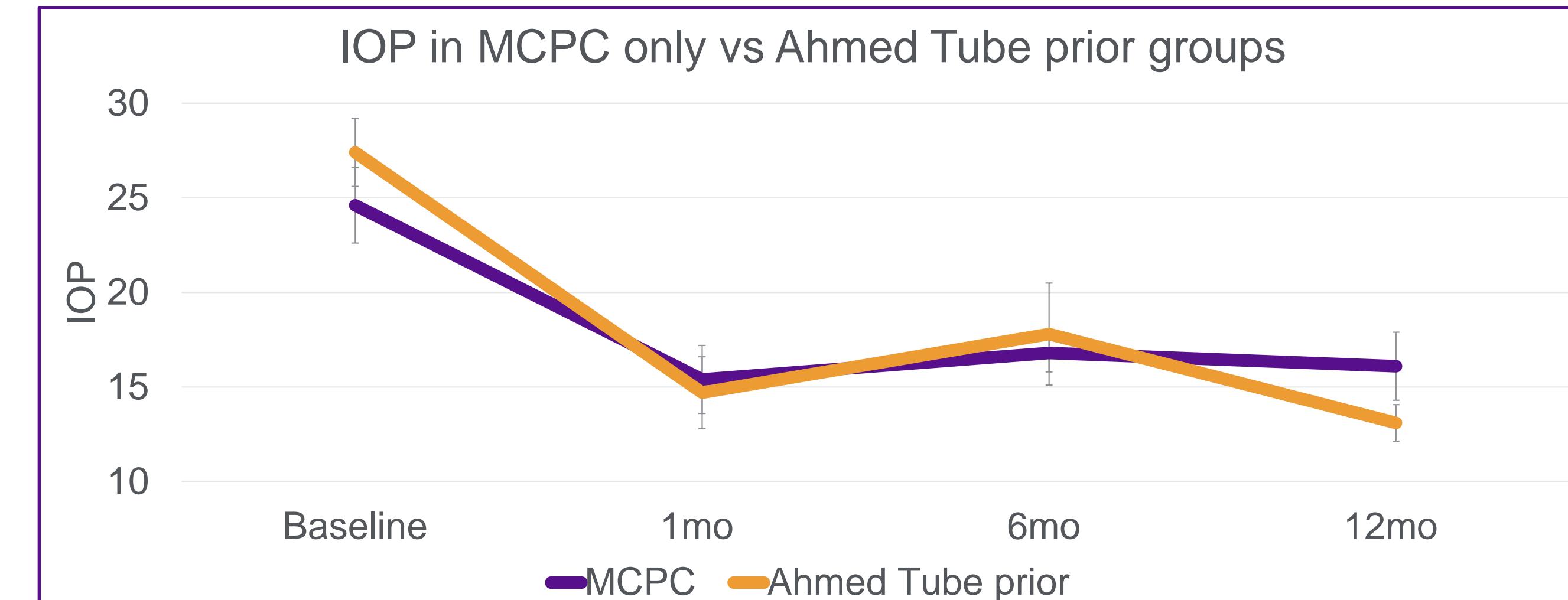


Figure 1: Linear plot comparing pressure outcomes over 12 months in patients with MCPC treatment and patients with Ahmed tubes placed before MCPC treatment.

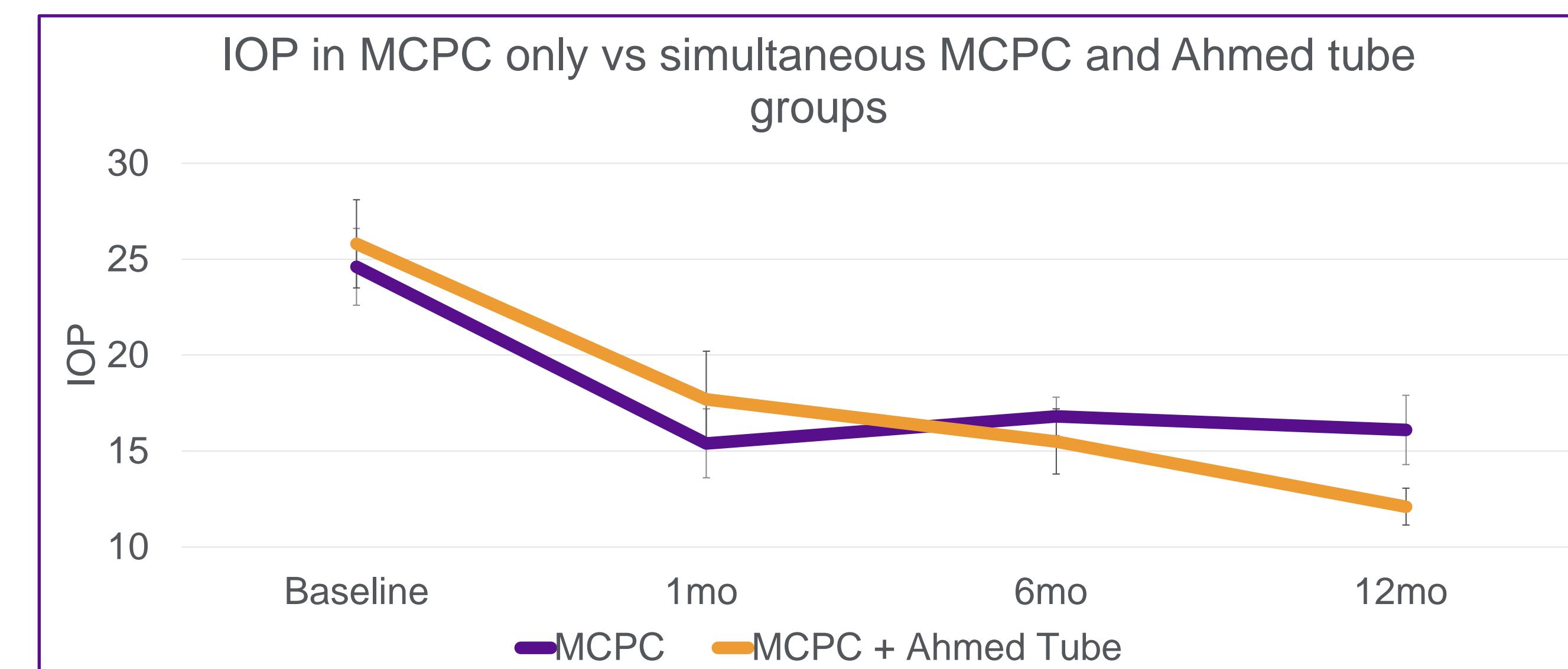


Figure 2: Linear plot comparing pressure outcomes over 12 months in patients with MCPC treatment and patients with Ahmed tubes placed simultaneously with MCPC treatment.

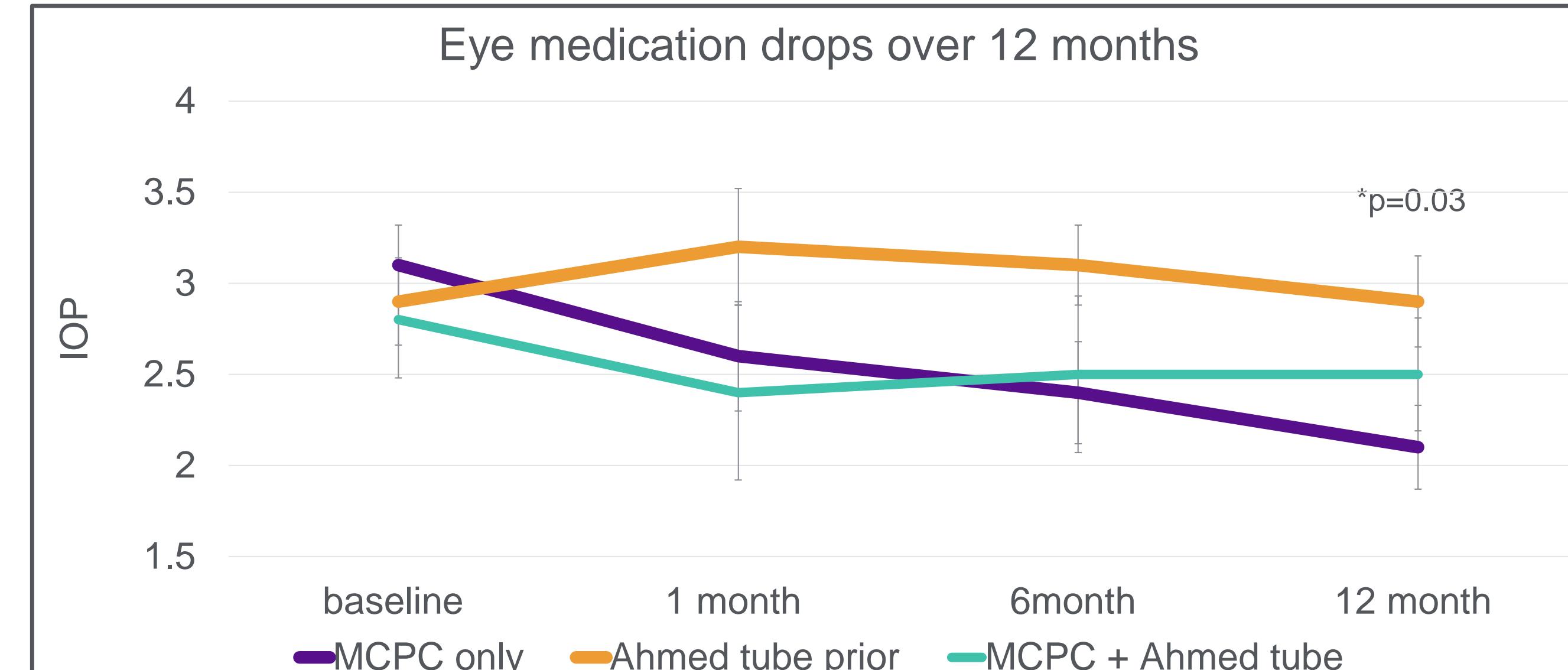


Figure 3: Linear plot comparing average number of medication drops over 12 months in patients with MCPC treatment, patients with Ahmed tubes placed prior to MCPC, and patients with Ahmed tubes placed simultaneously with MCPC treatment.

RESULTS

60 patients meeting inclusion criteria were identified and categorized into groups that received MCPC only (n=27), AGV prior to MCPC (n=20), or AGV and MCPC simultaneously (n=13). The average IOP prior to treatment was 25.9 ± 8.9 mmHg and the average medication eye drop usage was 3.0 ± 1.1 . At 12 months after MCPC treatment, the average IOP was 14.3 ± 7 mmHg (45% reduction) and average eye drop usage was 2.5 ± 1.2 (17% reduction). In the AGV prior to MCPC group compared to the MCPC only group, there was no significant difference in IOP's at 12 months ($p=.15$). The MCPC only group had significantly lower eye drop usage than the AGV prior to MCPC group at 12 months ($p=.03$). There was no significant difference between IOP's at 12 months between the simultaneous MCPC and AGV placement group and the MCPC only group ($p=.06$). There was no significant difference in eye drop usage at 12 months between the simultaneous MCPC and AGV placement group and the MCPC only group ($p=.33$). Of note, there were no incidents of cystoid macular edema or phthisis that were attributable to the use of MCPC within 1 year after the procedure.

CONCLUSIONS

MCPC significantly reduced ocular pressure over 12 months in glaucoma patients with no instances of cystoid macular edema or phthisis as a result of the procedure in this study. In patients with prior or simultaneous AGV placements, there were no significant differences in IOP's at 12 months compared to patients who received MCPC only. These results suggest that AGV placement prior to or concurrent with MCPC likely does not influence the efficacy of MCPC in patients with severe glaucoma.

REFERENCES

- Aquino, M. C. D. et al. Micropulse versus continuous wave transscleral diode cyclophotocoagulation in refractory glaucoma : a randomized exploratory study. *Clin. Exp. Ophthalmol.* 43, 40–46 (2015).
- Kuchar, S., Moster, M. R., Reamer, C. B. & Waisbourd, M. Treatment outcomes of micropulse transscleral cyclophotocoagulation in advanced glaucoma. 393–396 (2016).
- Toyos, M. M. & Toyos, R. *Journal of Clinical & Experimental Clinical Outcomes of Micropulsed Transscleral Cyclophotocoagulation in Moderate to Severe Glaucoma.* 7, 7–9 (2016).
- Emanuel, M. E. et al. Micropulse Cyclophotocoagulation : Initial Results in Refractory Glaucoma. *J. Glaucoma* 26, 726–729 (2017).