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Comparison of Long-term Clinical Outcomes between Micropulse Transscleral Cyclophotocoagulation and Endoscopic Cyclophotocoagulation-Plus

Behzad BA. Amoozgar, MD, University of California, San Francisco, San Francisco, CA, United States

Max Feinstein, BS, University of California, San Francisco, San Francisco, CA, United States

Travis Porco, PhD MPH, UCSF, San Francisco, CA, United States

Jun Hui Lee, B.A., University of California, San Francisco, New Haven, CT, United States

Jay M. Stewart, M.D., University of California, San Francisco - Ophthalmology, San Francisco, CA, United States

Ying Han, MD, PhD, University of California San Francisco, San Francisco, CA, United States

Purpose/Relevance:

To compare the clinical outcomes between Micropulse Transscleral Cyclophotocoagulation (MP-TCP) and posterior Endoscopic Cyclophotocoagulation or ECP-plus.

Methods:

In this retrospective study, we compared the outcomes of 40 eyes of glaucoma patients who underwent MP-TCP with 25 eyes that underwent ECP-plus treatment. For MP-TCP we implemented the Cyclo G6 laser system (Iridex Corporation) with P3 probe. For MP-TCP a power of 2000 mW was used with 31.33% duty cycle; treatment was applied over 180 degrees for 80-160 seconds on each hemisphere. For ECP-plus a 19-gauge endolaser was used with power set at 0.2-0.4 mW. Through a pars plana approach, the ciliary bodies were treated to the point of whitening and shrinkage. The primary outcomes were change in intraocular pressure (IOP) and rate of failure. The secondary outcomes were rate of complication and best corrected visual acuity (BCVA). Data were collected at the last visit prior to the procedure and in different follow up periods: 1, 3, 6, 12, and 18 months. Treatment failure was defined as: 1) IOP > 21 mm Hg, IOP < 6 mm Hg, or IOP reduced less than 20% from pre-op value for 2 consecutive visits at least 1 month apart; 2) loss of light perception; 3) additional glaucoma procedure(s); or

4) necessary use of oral anti-glaucoma medication(s).

Results:

Forty eyes of 33 patients (mean age 69) who received MP-TCP were compared with 26 eyes of patients underwent ECP-plus (mean age 61). Both the MP-TCP and ECP-plus approaches significantly reduced IOP compared to the baseline (Figure 1). When we compared the two groups via a linear mixed model while adjusting for the number of pre-op ocular medications, pre-op IOP value, BCVA (in LogMAR), and time from the procedure, ECP-plus had a significantly greater effect of reducing IOP compared to MP-TCP for all time points (Effect estimate=5.49, $P<0.001$). Survival analysis showed a greater cumulative failure rate at 6 months in the ECP-plus group when compared to the MP-TCP ($P<0.001$). However, during the 18 months follow up, 23 eyes in MP-TCP failed vs 6 eyes in ECP-plus and there was a significant difference in rate of failure between two groups ($P=0.01$). Using the mix model, we did not find any difference between the two procedures in regards to changes in BCVA ($P=0.63$) (Figure 2). During the same follow up period, 6 patients in ECP-plus group had complications (2 shallow anterior chamber, 1 hypotony, 1 choroidals and 2 vitreous hemorrhage) while 4 of patient in MP-TCP group showed complications (1 choroidals, 2 hypotony, and 1 uveitis). Nonetheless, the rate of complication was not significant between the two groups ($P=0.1$).

Discussion:

This is the first study to directly compare postoperative outcomes between MP-TCP and ECP-plus. Both procedures are relatively new for glaucoma treatment^{1,2}. ECP-plus is more invasive in nature while MP-TCP is less invasive and well-tolerated by patients. Our results show that ECP-plus is more effective in lowering IOP during the 18-months follow up.

Conclusion:

Compared to MP-TCP, ECP-plus better controls IOP and associated with lower rate of failure in the long-term follow-up. Nevertheless, when we compared the rate of complication and BCVA, there were no significant differences between the two modalities.

References:

1. Tan, J. C. H. et al. Endoscopic Cyclophotocoagulation and Pars Plana Ablation (ECP-plus) to Treat Refractory Glaucoma. J. Glaucoma 25, e117–122 (2016).

2. Aquino MC, Barton K, Tan AM, et al. Micropulse versus continuous wave transscleral diode cyclophotocoagulation in refractory glaucoma: a randomized exploratory study. Clin Exp Ophthalmol. 2015;43:40-6.

Category:
Surgery