Clinical outcomes of micropulse transscleral cyclophotocoagulation in post-keratoplasty patients

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Purpose
Uncontrolled glaucoma is an important risk factor for vision loss in post-keratoplasty patients. Management of such cases poses a challenge when patients are refractory to medical therapy. Previous studies have shown that both incisional glaucoma surgeries and traditional cyclodestructive laser procedures are associated with higher incidence of graft failure. Micropulse transscleral cyclophotocoagulation (MP-TSCPC) is a newer treatment for glaucoma that may offer IOP control with fewer complications in these patients. The purpose of this study was to evaluate the surgical outcomes and graft condition after MP-TSCPC in post-keratoplasty patients requiring better IOP control.

Methods
This was a retrospective observational study of patients with a history of penetrating keratoplasty (PKP) or Descemet's Stripping Automated Endothelial Keratoplasty (DSAEK) who underwent MP-TSCPC from 09/2015 to 09/2017. IOP, number of glaucoma medications, visual acuity (VA), and central corneal thickness (CCT) were collected from the preoperative and postoperative month (POM) 1, 3, 6, and 12 visits. Postoperative complications, additional surgeries and graft failures were also recorded. Success of MP-TSCPC was defined as: 1) 5 mmHg ≤ IOP ≤ 21 mmHg OR reduction ≥20% from baseline at POM 12; 2) no use of oral carbonic anhydrase inhibitors, 3) no loss of light perception vision and 4) no reoperation for glaucoma within the 12-month follow up period.

Results
Thirty eyes from 28 patients (16 eyes post-PKP, 14 eyes post-DSAEK) were followed for average 10.5±2.79 months. The median time between the most recent corneal transplant and MP-TSCPC was 15.2 months. IOP was significantly decreased from pre-op at all follow up points ($p<0.001$). The number of glaucoma medications was significantly reduced only at POM 3 ($p=0.002$). There was no significant change in VA or CCT over the follow up period. At 12 months, 24 of the 30 eyes met the definition of success and only one underwent repeat PKP due to graft rejection.

Conclusions
MP-TSCPC achieved good IOP control success rates for post-keratoplasty patients with uncontrolled glaucoma. Patients maintained stable VA and had minimal rates of graft failure. Based on 12-month follow up, MP-TSCPC appears to be a safe and effective procedure following corneal transplant and may serve as an alternative to incisional surgery or traditional cyclodestructive laser procedures.

Layman Abstract (optional): Provide a 50-200 word description of your work that non-scientists can understand. Describe the big picture and the implications of your findings, not the study itself and the associated details.

After corneal transplants, glaucoma can pose a risk of vision loss if uncontrolled. If glaucoma is not controlled with medicines, incisional surgeries or traditional cyclodestructive lasers can be used to obtain additional intraocular pressure control (IOP), but these procedures have been shown to be associated with higher risk of corneal transplant failure. This retrospective observational study looked at the efficacy of a newer glaucoma laser, micropluse transscleral cyclophotocoagulation (MP-TSCPC), as a method of controlling IOP. Results showed that MP-TSCPC provided good IOP control. Additionally, patients maintained stable vision and only 1 of 30 eyes required a repeat corneal transplant for graft failure. MP-TSCPC may provide an effective and safer alternative to incisional surgery or traditional laser procedures to control IOP in patients who have had a prior corneal transplant.