

MLT (Micropulse Laser Trabeculoplasty) or Not?

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Purpose/Relevance

MLT has been shown to be a relatively safe treatment for reducing IOPs in small studies^{1,2}. We wished to determine the efficacy and safety of MLT as an adjunctive therapy in a large diverse patient population with medically uncontrolled mild, moderate, and severe primary open angle glaucoma (POAG) and how patient characteristics may influence outcomes.

Methods

In an IRB-approved single surgeon, retrospective study, 102 patients who received MLT were reviewed. One eye was randomly selected per patient. Patients were excluded if they were <18 years old, had secondary glaucoma, only one functional eye, intraocular surgery three months prior to MLT, or laser trabeculoplasty one year prior to MLT.

Over 50 variables were collected including: age, sex, race, BMI, family history (FHx) of glaucoma, C/D, visual field defect (VFD), CCT, logmar visual acuity (vision), complications from MLT, additional glaucoma treatments after MLT, pre and post-op IOP, etc.

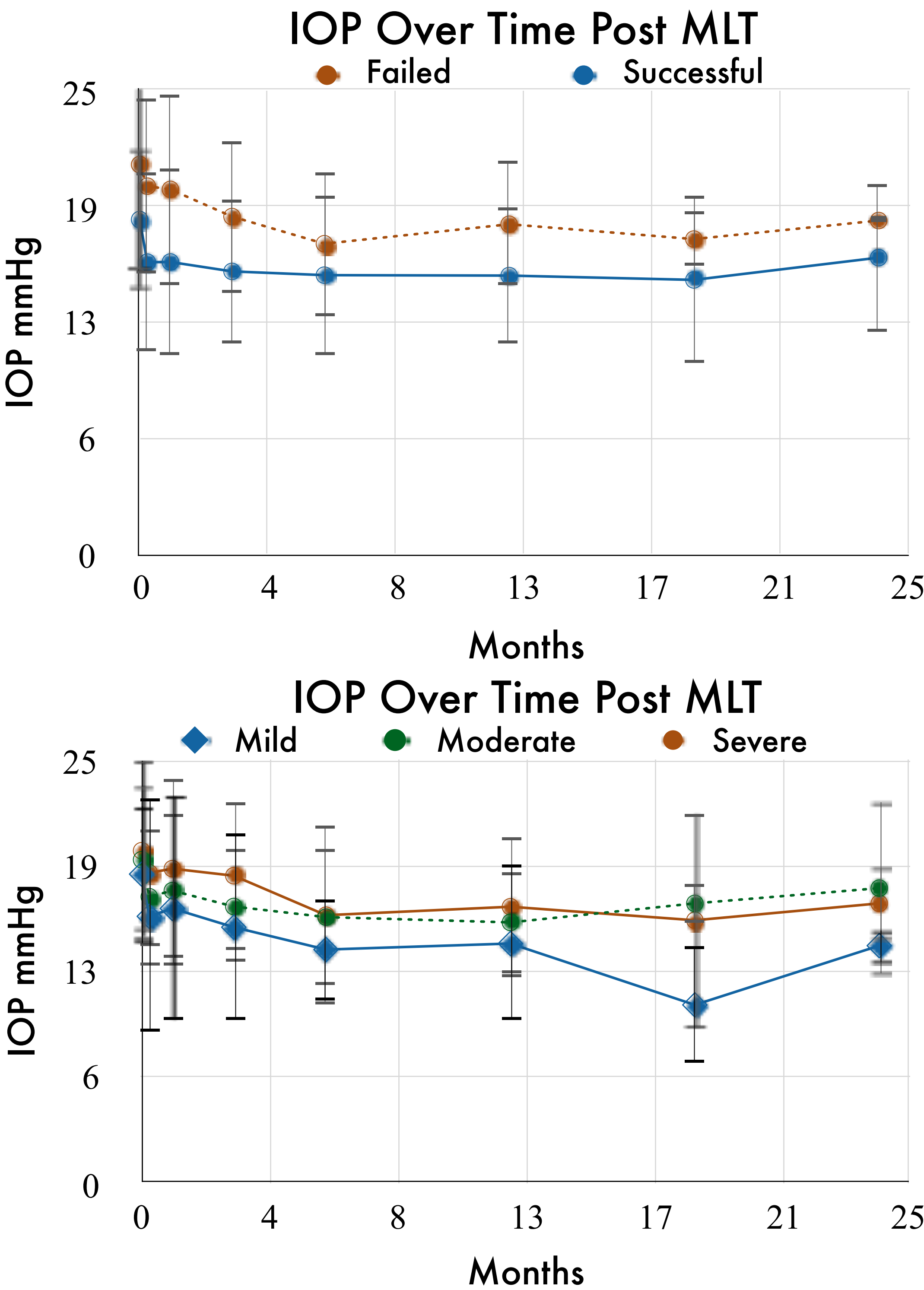
Chi square goodness of fit and one-way ANOVA tests were used to determine any differences in characteristics between patient groups. Multivariate regression analysis was performed amongst candidates who had not failed treatment at six months.

Results

Demographics of the 102 eyes and IOP changes overtime for failure, non-failure, mild, moderate, and severe glaucoma groups are summarized in adjacent tables and figures. Average IOP reduction at 1 year post MLT (n=41) was 17.24% (p<.001). Thirty-six patients (35.3%) failed treatment.

Positive family history; increased BMI, age, CCT, pre-op medications; East Indian race; and worse pre-op vision were significantly correlated with lower IOP reductions (respectively, p<.001.) While, mild VFD, female gender, black race, and increased pre-op IOP were significantly correlated with greater IOP reductions (respectively, p<.001.)

Figures



Demographics

Variables	Mild (n=22)	Moderate (n=42)	Severe (n=35)	Total (n=102)	P-Value
Sex (%F)	45.45	57.14	51.43	52.00	0.665
Age (Yrs) ± SD	68.59 ± 9.40	72.29 ± 9.75	63.37 ± 10.72	68.65 ± 10.71	0.001
Race					
White (%)	31.82	54.76	34.29	43.10	0.008
Black (%)	54.55	26.19	48.57	40.20	0.461
Hispanic (%)	4.55	11.90	8.57	8.80	0.264
Other (%)	9.09	7.14	8.57	7.80	0.882
BMI (kg/m ²) ± SD	32.01 ± 10.07	28.79 ± 7.46	31.28 ± 7.56	30.49 ± 8.15	0.242
HTN + (%)	72.73	64.29	60.00	65.70	0.618
DM + (%)	36.36	28.57	34.29	33.30	0.780
Fhx of Glaucoma + (%)	55.56	60.00	56.67	57.50	0.946
Visual Field Defect					
Mild (%)	100.00	0.00	0.00	23.20	<.001
Moderate (%)	0.00	92.86	0.00	41.10	<.001
Severe (%)	0.00	0.00	97.14	35.80	<.001
Myopia (%)	40.00	47.22	30.00	39.08	0.956
Hyperopia (%)	5.00	8.33	10.00	8.05	0.302
Vision (Median)	0.00	0.20	0.20	0.10	0.312
CCT (μ) ± SD	545.80 ± 35.00	545.13 ± 39.97	534.33 ± 43.17	541.11 ± 39.81	0.511
C/D ± SD	0.58 ± .20	0.75 ± .18	0.82 ± .17	0.74 ± .20	<.001
Phakic (%)	95.45	71.43	82.86	19.61	0.063
Pre-op IOP (mmHg) ± SD	17.96 ± 3.26	19.07 ± 4.37	19.18 ± 5.32	19.93 ± 4.54	0.570
Pre-op Number of Medications ± SD	2.05 ± 1.0	2.10 ± 1.06	2.71 ± .86	2.29 ± 1.01	0.010
Pre-op Oral CAI Use (%)	9.09	16.67	11.43	12.75	0.649
Prior ALT/SLT (%)	18.18	26.19	20.00	22.55	0.709
Prior LPI (%)	0.00	0.00	2.86	0.98	0.397
Prior Filtering Device (%)	0.00	7.14	20.00	10.78	0.036
Complications* (%)	0.00	7.14	5.71	4.90	0.353
Requiring Additional Medications (%)	22.73	19.05	14.29	18.63	0.71
Requiring Additional Surgery (%)	9.09	19.05	20.00	16.67	0.519

*Complications were three cases of transient IOP rise < 5 mmHg and two cases of self reported pain

Discussion

Our analysis indicates MLT is a safe, effective adjunctive treatment for POAG. Patients who are younger, have low BMI, black race, female gender, no family history, having thin CCT, better vision, or less advanced glaucoma appear to have greater IOP reduction from MLT. Patients with less advanced glaucoma may have more intact outflow facilities allowing for better response to MLT.

Conclusion

Our study has shown MLT at one year is a safe procedure that may offer additional IOP reduction (17.24%) for patients with medically uncontrolled POAG. Predictors for better response are: younger age, lower BMI, black race, female gender, no family history, thin CCT, better vision, and less advanced glaucoma.

References

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2. Fea AM, Bosone A, Rolle T, et al. Micropulse diode laser trabeculoplasty (MDLT): a phase II clinical study with 12 months follow-up. *Clin Ophthalmol* 2008; 2:247-252.

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