ENDOCYCLOPHOTOCOAGULATION (ECP) AS AN EFFECTIVE SUSTAINING IOP REDUCER IN ADVANCING STAGES OF GLAUCOMA

AUTHORS:

KRISTEN HAWTHORNE, MD

DANIEL GODOY, BS

APURVA CHAVALI, MS

EUNICE BAJOMO, BS, OSC

HOWERTON EYE
howertoneye.com

Austin, TX

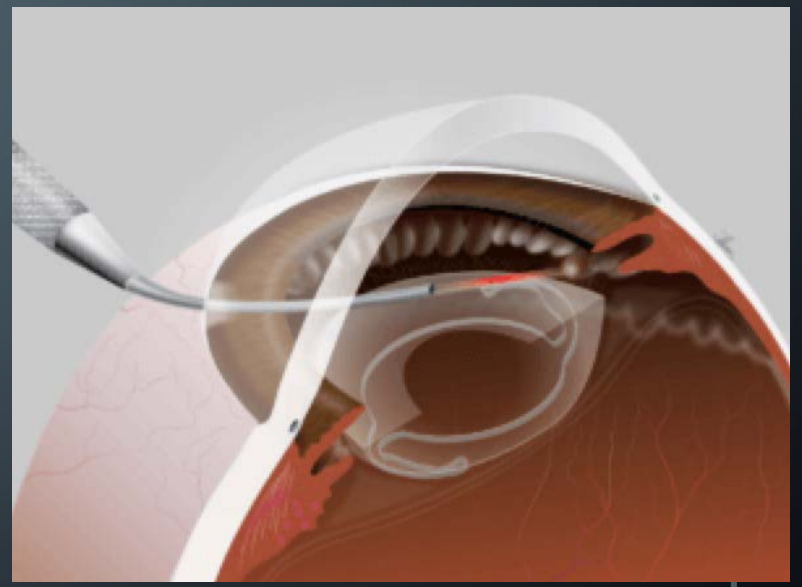
FINANCIAL DISCLOSURES

THE AUTHORS HAVE NO FINANCIAL INTERESTS IN THE SUBJECT MATTER OF THIS PRESENTATION

PURPOSE

To evaluate surgical outcomes in chronic glaucoma patients who were treated with endocyclophotocoagulation (ECP) with or without additional MIGS procedures (iStent, goniotomy) at the time of cataract surgery.

Determination of whether ECP is a MIGS tool that offers sustained efficacy with a minimal side effect profile in surgical glaucoma patients.



STUDY DESIGN

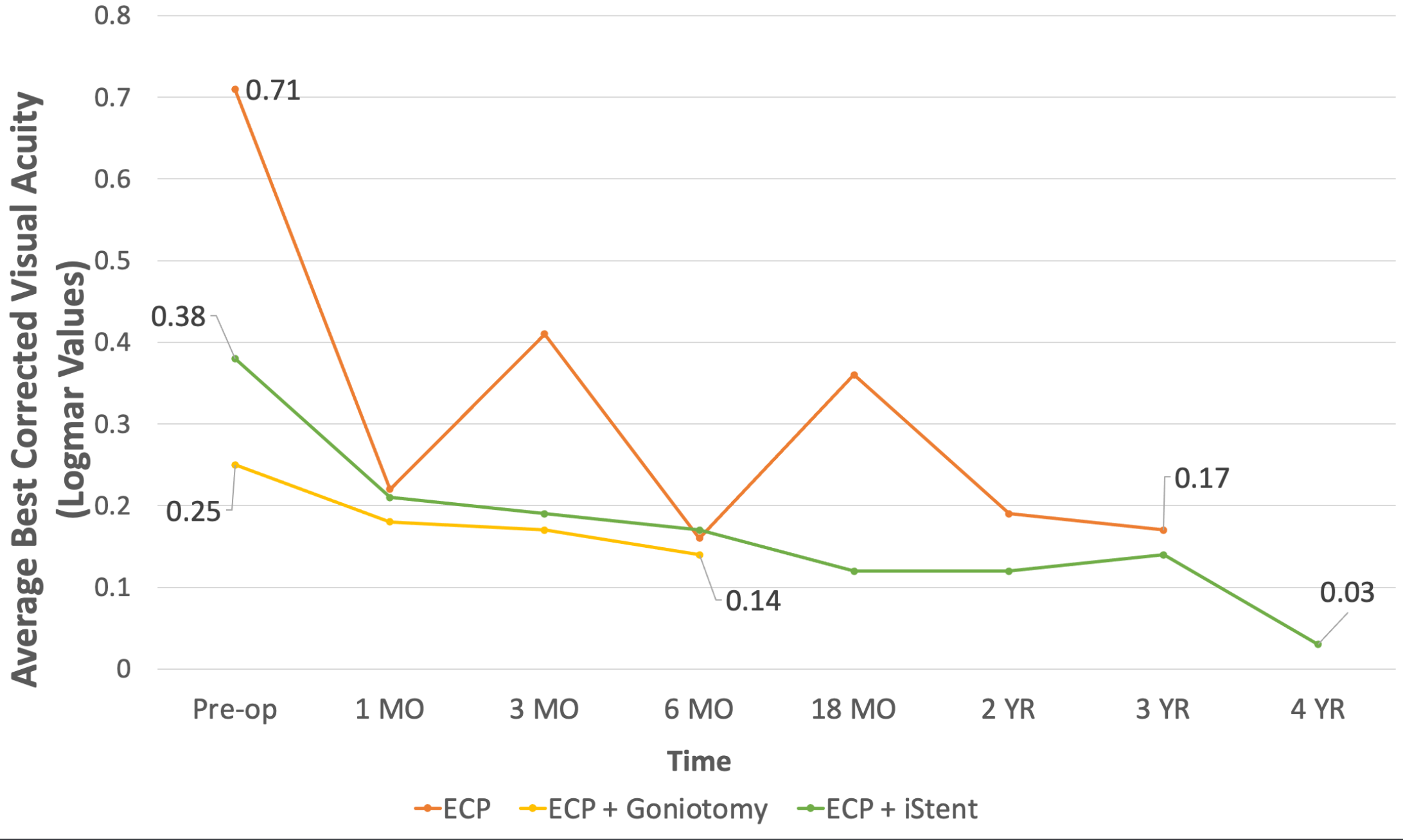
- Retrospective chart review of 98 eyes with glaucoma treated by a single surgeon (2014-2020)
  - ECP (n=10)
  - ECP + iStent (n=55)
  - ECP + goniotomy (n=33)
- Stage of glaucoma (89% moderate or severe glaucoma)
- Side effect profile
- Complications and need for additional procedures
- Visual acuity improvement sustained?
- Efficacy of intraocular pressure (IOP) lowering effect
- Reduction of medication burden

- 35 eyes with data > 24 months
- Maximum follow up time of 68 months

PROCEDURE PROFILE

Procedure	Side Effects (% Occurrence)	Complications (% Occurrence)	Addition Procedures (% Occurrence)
ECP	1-day Post-Operative Elevated IOP 30% Inflammation 20% Vitreous Hemorrhage 10%	No complications	SLT 20%
ECP + Goniotomy	1-day Post-Operative Elevated IOP 12.1% Episcleritis 3.03% Hyphema 6.06% Iritis 3.03%	Tear at iris root 3.03%	Tube Shunt 3%
ECP + iStent	1-day Post-Operative Elevated IOP 9.09% Corneal Edema 3.64% Hyphema 3.64% Inflammation 9.09%	Posterior pressure preventing complete ECP 1.82%	SLT 9.1% Trabeculectomy 3.6% YAG PI 1.8%

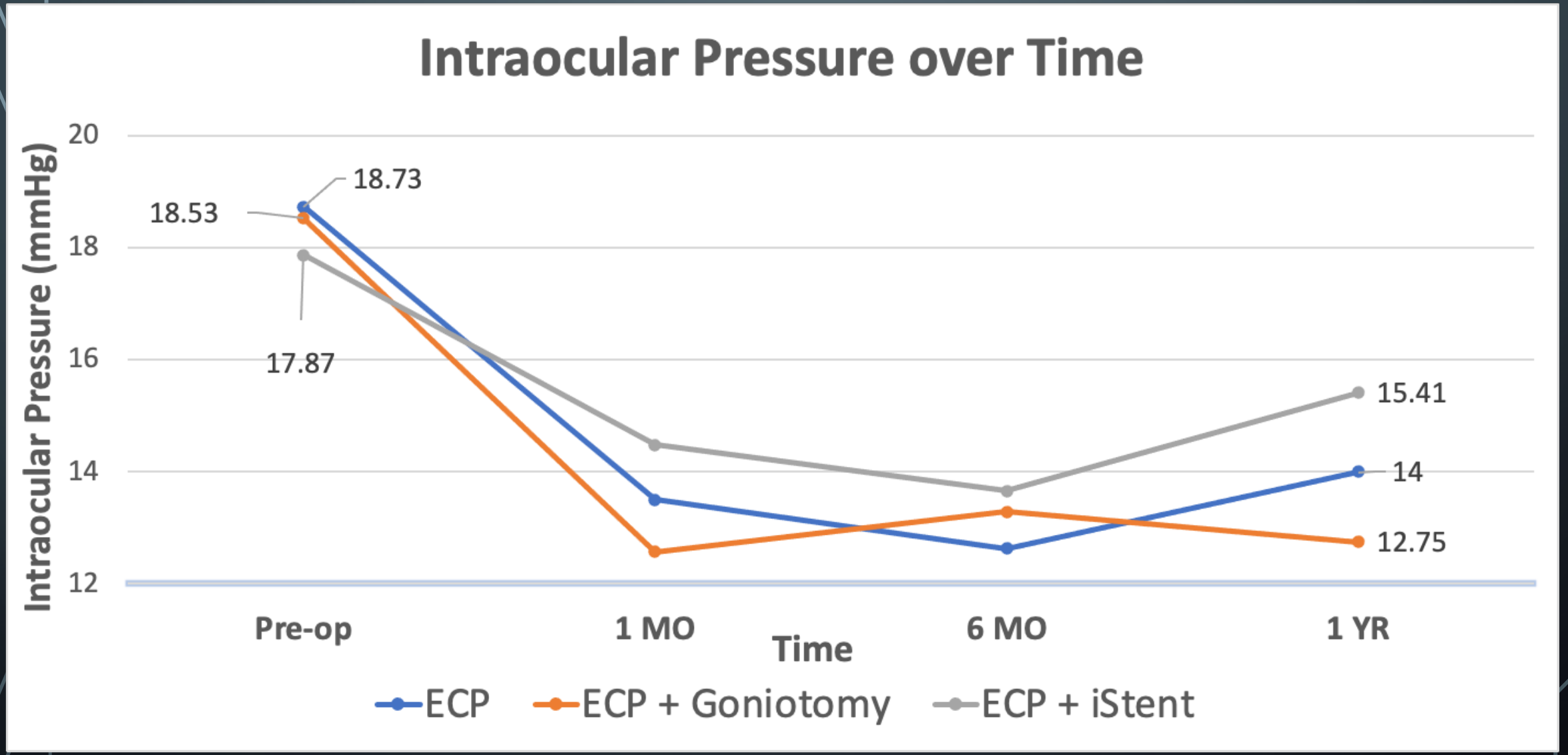
Best Corrected Visual Acuity over Time



RESULTS – IOP REDUCTION AFTER 1 YEAR

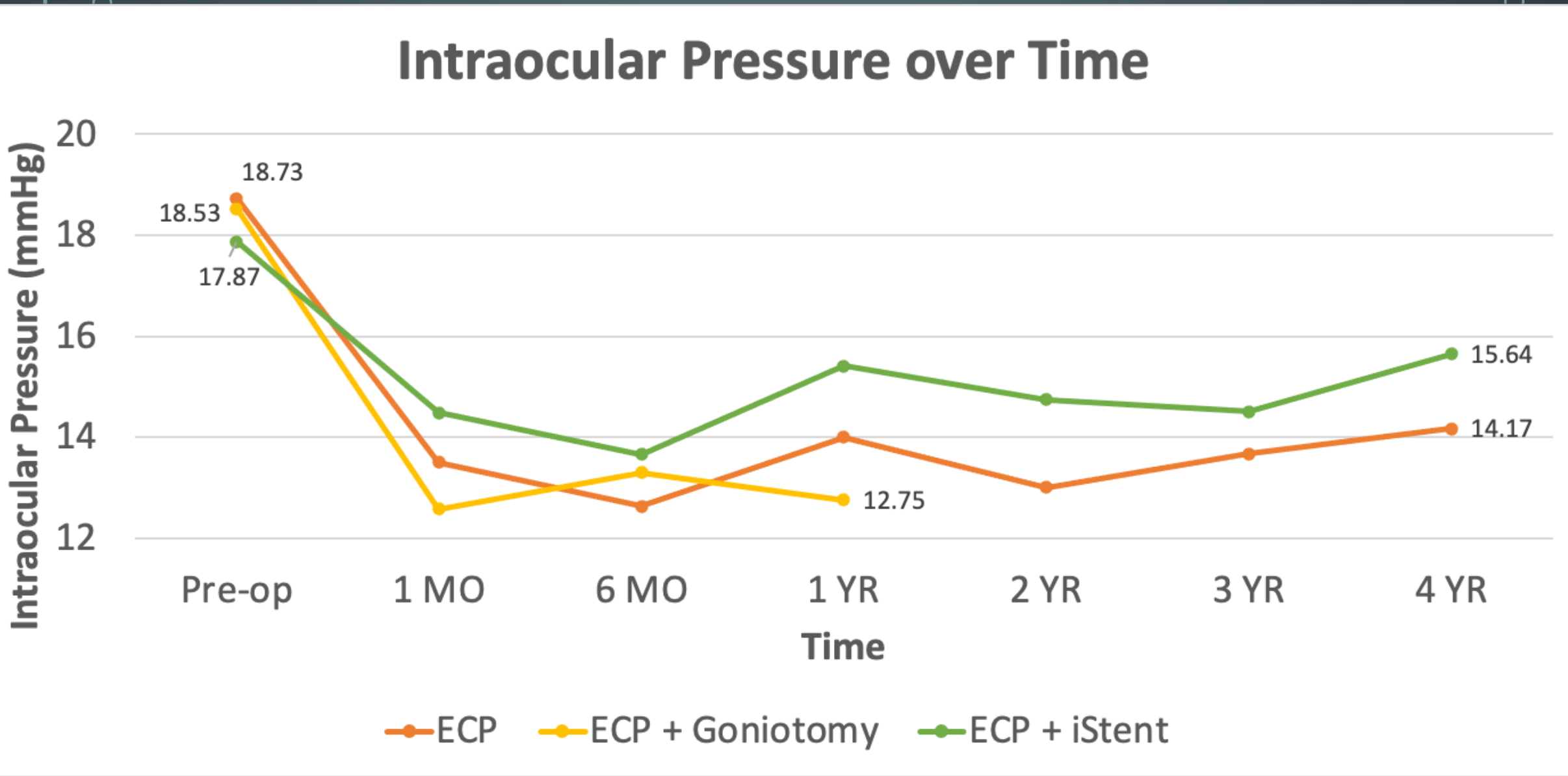
Procedure Average IOP with Standard deviation	1 month post op IOP Percent decrease in IOP Average IOP with SD Number of cases	6 months post op IOP Percent decrease IOP Average IOP with SD Number of cases	1 year post op IOP Percent decrease in IOP Average IOP with SD Number of cases
ECP 18.73±7.55mmHg	27.94% 13.50 +/- 3.46mmHg n=8	32.61% 12.36 +/- 4.34mmHg n=8	25.27% 14±3.07mmHg n=8
ECP+Goniotomy 18.53±4.21mmHg	32.14% 12.57 +/- 3.73mmHg n=28	28.29% 13.29 +/- 4.43mmHg n=21	29.06% 12.75±2.92mmHg n=8
ECP+iStent 17.87±3.95mmHg	18.96% 14.48 +/- 4.84mmHg n=54	23.57% 13.65 +/- 3.35mmHg n=38	13.78% 15.41±4.12mmHg n=27

- All procedures yielded a statistically significant decline in IOP at all time points
- ECP + Goniotomy showed the most significant decrease in IOP at 1 year


Intraocular Pressure over Time
Intraocular Pressure (mmHg)
20
18
16
14
12
18.53
18.73
17.87
15.41
14
12.75
Pre-op
1 MO
6 MO
1 YR
Time
ECP
ECP + Goniotomy
ECP + iStent

RESULTS – STATISTICAL DECREASE IN IOP AT ALL TIME POINTS UP TO 4 YEARS

Procedure Preoperative IOP and Standard deviation	1 MO Post-op IOP Statistical significance Number of cases	6 MO Post-op IOP Statistical significance Number of cases	1 YR Post-op IOP Statistical significance Number of cases	2 YR Post-op IOP Statistical significance Number of cases	3 YR Post-op IOP Statistical significance Number of cases	4 YR Post-op IOP Statistical significance Number of cases
ECP **18.73±7.55mmHg**	13.50 +/- 3.46mmHg Yes ($p = 0.05$) n=8	12.36 +/- 4.34mmHg Yes ($p = 0.03$) n=8	14±3.07mmHg Yes ($p = 0.04$) n=8	13.00 +/- 3.29mmHg Yes ($p = 0.02$) n=6	13.67 +/- 2.94mmHg Yes ($p = 0.05$) n=6	14.17 +/- 3.87 mmHg Yes ($p = 0.04$) n=6
ECP+Goniotomy **18.53±4.21mmHg**	12.57 +/- 3.73mmHg Yes ($p < 10^{-6}$) n=28	13.29 +/- 4.43mmHg Yes ($p = 2 \times 10^{-4}$) n=21	12.75±2.92mmHg Yes ($p = 0.05$) n=8	Insufficient data	Insufficient data	Insufficient data
ECP+iStent **17.87±3.95mmHg**	14.48 +/- 4.84mmHg Yes ($p < 10^{-6}$) n=54	13.65 +/- 3.35mmHg Yes ($p < 10^{-6}$) n=38	15.41±4.12mmHg Yes ($p = 0.01$) n=27	14.74 +/- 3.66mmHg ($p = 1.4 \times 10^{-4}$) n=27	14.50 +/- 3.58mmHg Yes ($p = 4 \times 10^{-5}$) n=24	15.64 +/- 5.31mmHg Yes ($p = 2 \times 10^{-5}$) n=14


Intraocular Pressure over Time
Intraocular Pressure (mmHg)
20
18
16
14
12
18.73
18.53
17.87
15.64
14.17
12.75
Pre-op
1 MO
6 MO
1 YR
2 YR
3 YR
4 YR
Time
ECP
ECP + Goniotomy
ECP + iStent

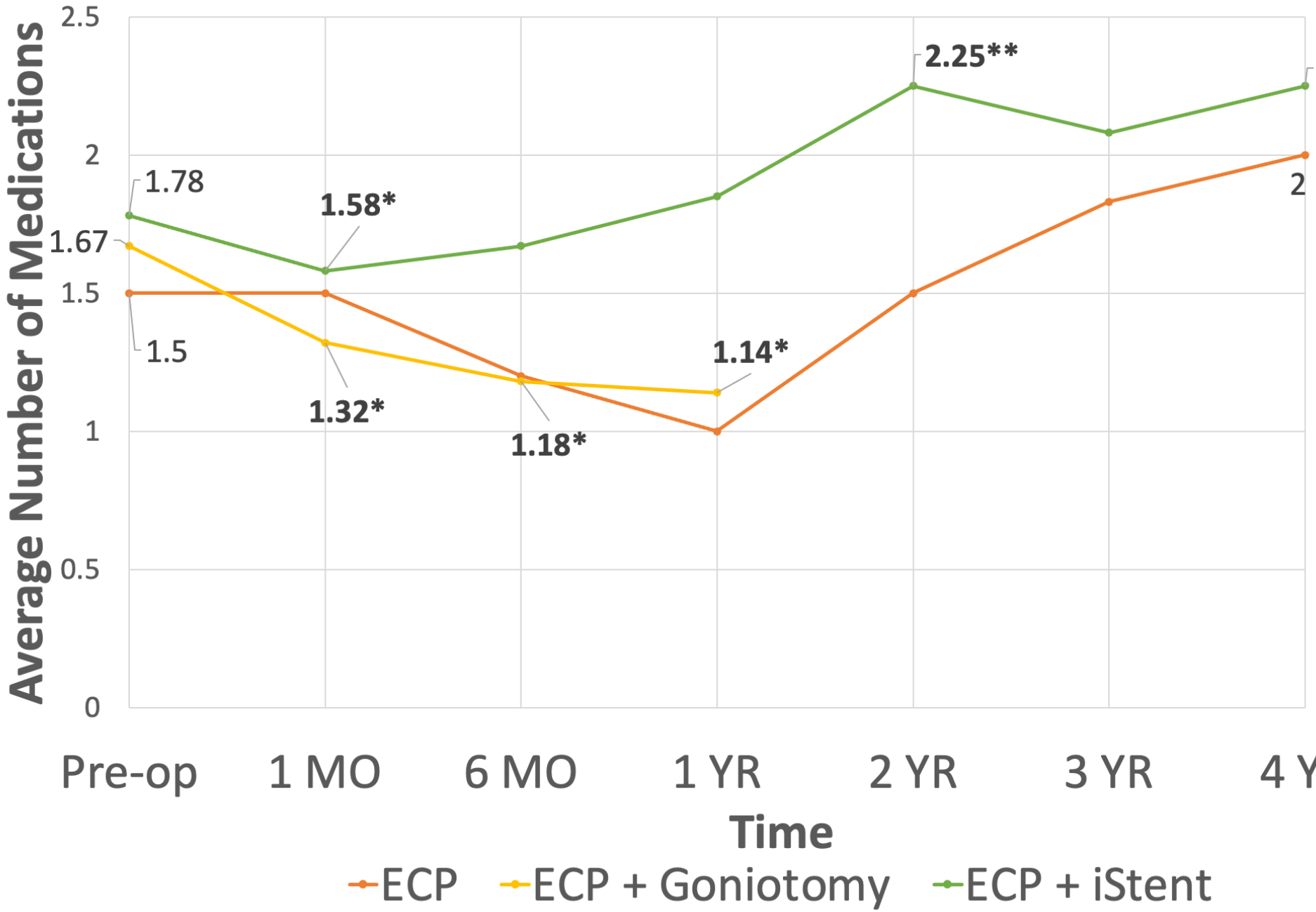
RESULTS – MEDICATION BURDEN

Procedure Avg medications with standard deviation	1 MO Post-op Meds Avg IOP with SD	6 MO Post-op Meds Avg IOP with SD	1 YR Post-op Meds Avg IOP with SD	2 YR Post-op Meds Avg IOP with SD	3 YR Post-op Meds Avg IOP with SD	4 YR Post-op Meds Avg IOP with SD
ECP **1.50 +/- 0.85**	No (p = 0.68)	No (p = 0.10)	No (p = 0.07)	No (p = 0.61)	No (p = 0.70)	No (p = 0.47)
ECP+Goniotomy **1.67 +/- 0.98**	No (p = 0.13)	No (p = 0.16)	Yes (p = 0.05) Decrease	Insufficient data	Insufficient data	Insufficient data
ECP+iStent **1.78 +/- 0.94**	Yes (p = 0.01) 1.58 +/- 0.83 Decrease	Yes (p = 0.01) 1.67 +/- 0.90 Decrease	No (p = 0.33)	Yes (p=0.0037) 2.25 +/- 1.03 Increase	No (p = 0.06) 2.08 +/- 1.08	Yes (p=0.02) 2.25 +/- 0.86 Increase

At most time points there was not a statistically significant change in medications

Decreases noted in the first year with increases noted in subsequent years

Medication Burden over Time



* Shows a statisttically significant *decrease* in medication burden

** Shows a statistically significant *increase* in medication burden.

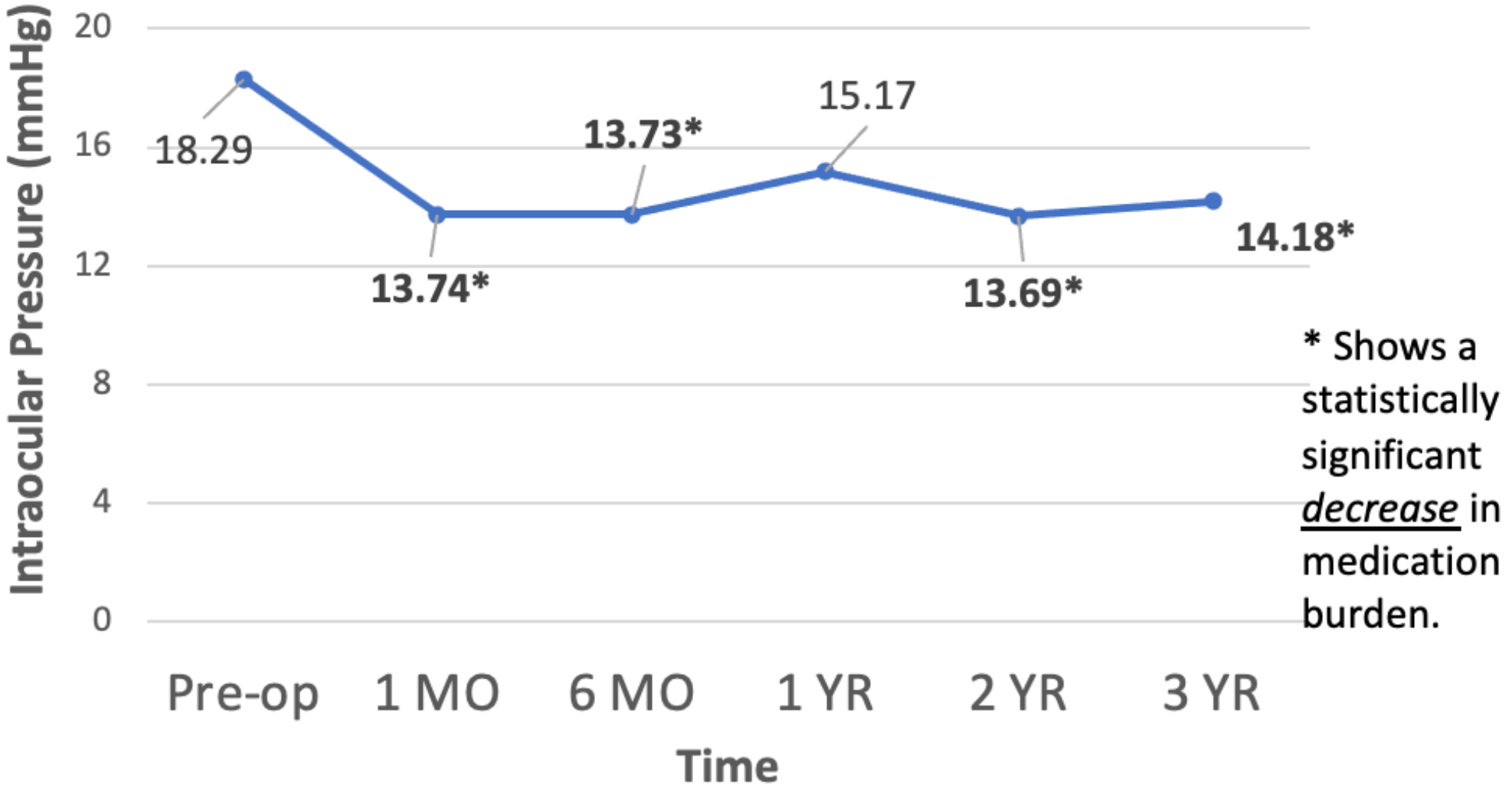
RESULTS

In SEVERE glaucoma patients who received an ECP procedure (ECP, ECP + iStent, ECP + Goniotomy), was there a statistically significant decrease in IOP?
(n=32)

Pre-op IOP average value with Standard deviation	Pre-op IOP to 1 MO Post-op IOP Statistical significance	Pre-op IOP to 6 MO Post-op IOP Statistical significance	Pre-op IOP to 1 YR Post-op IOP Statistical significance	Pre-op IOP to 2 YR Post-op IOP Statistical significance	Pre-op IOP to 3 YR Post-op IOP Statistical significance
18.29 +/- 4.45mmHg	13.74 +/- 3.57mmHg Yes ($p = 2 \times 10^{-5}$) N=31	13.73 +/- 3.65mmHg Yes ($p = 10^{-6}$) N=22	15.17 +/- 4.95mmHg No ($p = 0.07$)* N=12	13.69 +/- 2.39mmHg Yes ($p = 5.4 \times 10^{-4}$) N=13	14.18 +/- 3.16mmHg Yes ($p = 0.03$) N=11

*This p-value is close to statistical significance and with additional subjects may reach statistical significance. One extreme outlier was removed in this data set.

Intraocular Pressure over Time in Severe Glaucoma Patients with ECP Procedures



* Shows a statistically significant *decrease* in medication burden.

CONCLUSIONS – ECP IN ADVANCING GLAUCOMA

Excellent visual outcomes with CE/IOL

ECP offers a prolonged IOP lowering effect for at least 4 years

Data beyond 1 year may help compare goniotomy vs iStent combined with ECP

Changes in medication burden

- Decrease in meds year 1
- May have increase in meds year 2 and beyond

ECP effective in lowering IOP in severe glaucoma for years

ECP with or without combined MIGS procedures may delay conjunctival incisional therapy in advancing glaucoma for years and should be considered

Apurva Chavali, MS

Daniel Godoy, BS

THANK YOU

Eunice Bajomo, BS

HOWERTON EYE
howertoneye.com

Contact:
khawthorne00@yahoo.com

Kristen Hawthorne, MD