



Glaucoma Surgery Calculator: Limited Additive IOP Effect of Phacoemulsification on Ab Interno Trabeculectomy



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Objectives

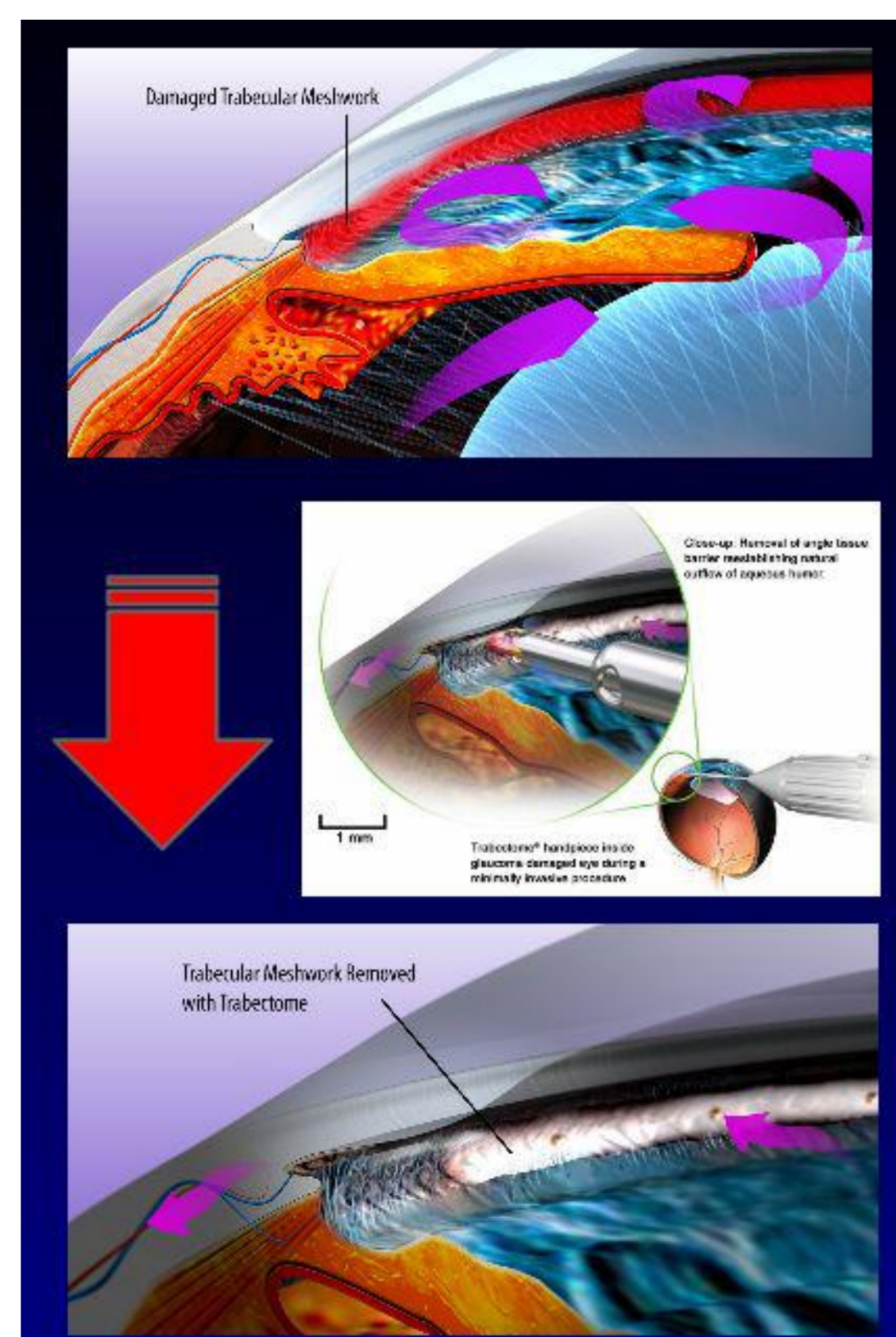
- Matched comparison of intraocular pressure (IOP) reduction between trabectome-mediated ab interno trabeculectomy (AIT) in pseudophakic patients vs phacoemulsification combined with trabectome-mediated ab interno trabeculectomy (phaco-AIT) in phakic patients
- Develop predictive surgery calculator to compare sequential (phaco -> AIT) vs combined (phaco+AIT) approach

Patients and Methods

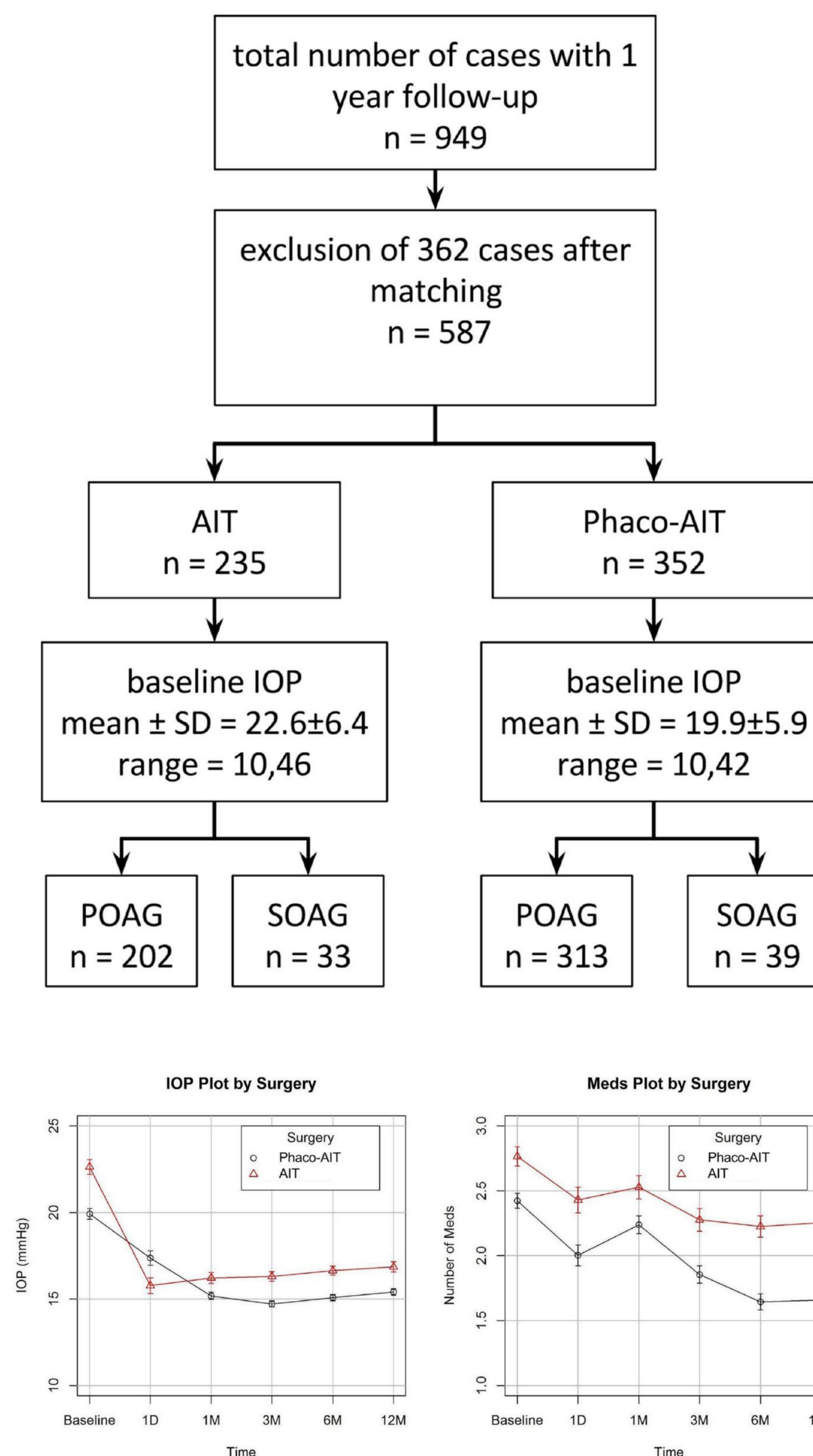
- Prospective interventional cohort study
- Cases were excluded if patients were followed for less than 12 months, diagnosed with neovascular glaucoma, or required additional glaucoma surgery within 12 months after trabectome or phaco-trabectome
- Missing data such as type of glaucoma, gender, or age was imputed by generating 5 similar but non-identical datasets.
- Groups were matched using Coarsened Exact Matching (CEM) based on age, gender, type of glaucoma, race, preoperative number of glaucoma medications and baseline IOP
- Linear regression was used to examine IOP reduction after surgery
- Statistical analysis performed using R-Software (R-Package)

Coarsened Exact Matching

- Open-source statistical package available in R-Software for making optimal causal inferences from observational data¹
- Qualified for scientific use by U.S. Food and Drug Administration
- Method of preprocessing data to control for the potential confounding influence of pretreatment control variables by reducing imbalance between the treated and control groups



Results



	AIT (n=235)	Phaco-AIT (n=352)	p-value
Age			0.04*
Mean±SD	76±9	75±8	
Range	(51,96)	(56,94)	
Gender			0.15
Female	156 (66%)	212 (60%)	
Male	79 (34%)	140 (40%)	
Types of Glaucoma			0.34
ACG	0 (0%)	0 (0%)	
POAG	202 (86%)	313 (89%)	
SOAG	33 (14%)	39 (11%)	
Race			0.77
African Americans	7 (3%)	7 (2%)	
Asians	48 (20%)	78 (22%)	
Caucasians	176 (75%)	263 (75%)	
Others	4 (2%)	4 (1%)	
Baseline IOP			<0.01*
Mean±SD	22.6±6.4	19.9±5.9	
Range	(10, 46)	(10, 42)	
Baseline Meds			<0.01*
Mean±SD	2.8±1.1	2.4±1.1	
Range	(1,6)	(1,5)	

UNIVARIATE	Coefficient	Standard Error	p-value
Phaco	-1.35	0.50	<0.01*
Baseline IOP	0.74	0.03	<0.01*
SOAG	4.17	0.74	<0.01*
Age	0.10	0.03	<0.01*
Baseline Meds	0.56	0.22	<0.01*
Race			
Asian	1.10	2.30	0.64
Caucasian	1.94	2.19	0.39
Other	4.84	3.47	0.18
Male	-0.75	0.50	0.14

MULTIVARIATE	Coefficient	Standard Error	p-value
Intercept	-13.54	1.67	<0.01*
Phaco	0.73	0.32	0.02*
Baseline IOP	0.73	0.03	<0.01*
SOAG	0.59	0.50	0.24
Age	0.03	0.02	0.10
Baseline Meds	0.09	0.14	0.55

Glaucoma Surgery Calculator

$$-13.54+0.73*(\text{phaco; yes:1, no:0})+0.73*(\text{baseline IOP})+0.59*(\text{SOAG; yes:1, no:0})+0.03*(\text{age})+0.09*(\text{medications})$$

Clinical Example

75-year-old patient with POAG with a baseline IOP of 21 mm Hg and 2 different medications:

- Pseudophakic -> AIT:
 - 4.22 mm Hg IOP decrease
 - postop IOP 16.78 mm Hg
- Phakic -> phaco-AIT:
 - 4.95 mm Hg IOP decrease,
 - postop IOP 16.05 mm Hg

Strengths

- Use of novel and robust statistical method for matching groups to maximize sample size and minimize bias

Limitations

- Relative short-term follow-up (1 year)
- Different indications for AIT vs phaco-AIT
- Calculator based on adults with POAG and SOAG

Conclusions

- Novel predictive MIGS calculator developed to help clinicians predict the potential IOP reduction between a sequential (phaco -> AIT) versus combined (phaco+AIT) approach
- Matched comparison study demonstrates that same session phaco has only a small additional IOP lowering effect
- Higher baseline IOP had a greater IOP reduction

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Disclosures

NAL: trabectome trainer