A 3-Month Retrospective Analysis of Ab-Interno Canaloplasty with Phacoemulsification in Primary Open Angle Glaucoma

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Glaucoma Treatments

- **Goal:** Intraocular pressure (IOP) reduction
  - IOP reduction is the only treatment that slows glaucomatous disease progression.
  - Initial IOP target(s) are:
    - ≥ 20% to 50% reduction, or more if there is continued progression[1], or
    - an IOP ≤ 14 mmHg[2]

- **Goal:** Achieve target IOP with least adverse effects and least medications using 3 key modalities:

  1. Medications
    - Key limitation: adverse effects, adherence (only 10% used drops without gaps over 1 year)[3]

  2. Laser (e.g., Selective Laser Trabeculoplasty)
    - Key limitation: efficacy decreases over time[4]

  3. Surgery (e.g., Trabeculectomy or Minimally Invasive Glaucoma Surgery (MIGS):
    - Trabs are the traditional gold standard surgery of creating an alternative aqueous outflow pathway
    - Angle-based MIGS attempt to improve the trabecular outflow pathway.
    - Key limitation: Trab complications, including blebitis (1.5%), endophthalmitis (1.1%) or hypotony (1.5%)[5]

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Minimally Invasive Glaucoma Surgery (MIGS)

Q: Do newer techniques such as ab-interno canaloplasty (ABiC) work to achieve IOP targets and reduce medication burden for all stages of POAG?

- Preliminary studies suggest IOP lowering efficacy with ABiC:
  - 25.4% decrease at 12 months [Gallardo, 2018][6]
  - 30.3% decrease at 12 months [Davids, 2019][7]

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Recent ABiC Studies

- 12 months post ABiC + gonioscopy-assisted transluminal trabeculotomy (GATT) [Habash, 2020][8]
  - 20 eyes w/ POAG
  - 32.7% reduction in mean IOP
  - 67.6% reduction in anti-glaucoma medications

- 18 months post ABiC [Hughes, 2020][9]
  - 89 eyes w/ POAG
  - 36% reduction in mean IOP ($p<0.001$)
  - 32% reduction in anti-glaucoma medications ($p<0.05$)

- 24 months post ABiC [Kazerounian, 2020][10]
  - 25 eyes w/ POAG
  - 32.5% reduction in mean IOP
  - 80% of patients were off anti-glaucoma medications

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Purpose

- To compare the efficacy of Ab-Interno Canaloplasty and phacoemulsification (ABiC+IOL) performed on patients with well-controlled mild primary open angle glaucoma (POAG) to those with well-controlled moderate to severe or indeterminate (M+S) POAG.

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Methods

- A retrospective chart review was conducted using medical records of well-controlled mild POAG eyes (n=31) and moderate to severe (M+S) POAG eyes (n=20) that underwent ABiC+IOL performed by the same surgeon.
- Patients with 3 months of follow-up data were reviewed.
- Adverse events including IOP elevation and hyphema were recorded.
- Paired Samples T-Test and Pearson’s Chi-square test used for statistical analysis.

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Results

- **Mean well-controlled baseline IOP in**:
  - Mild POAG cohort: 15.2 ± 4.2 mmHg
  - M+S POAG cohort: 13.9 ± 3.4 mmHg

- **Mean IOP reduction 3 months post ABiC+IOL in**:
  - Mild POAG cohort: ↓ 1.5 mmHg (p=0.045)
  - M+S POAG cohort: ↓ 1.0 mmHg (p=0.15)
  - IOP drop ≥ 20%: 35.5 % of mild vs 30 % of M+S (p=0.69)
  - IOP ≤ 14 mmHg: 67.7 % of mild vs 60 % of M+S (p=0.57)

- **Mean medications reduced in:**
  - Mild POAG cohort: 0.9 meds (p=3E-5)
  - M+S POAG cohort: 1.7 meds (p=2E-5)
  - ≥ 1 med reduction: 61.3 % of mild vs 80 % of M+S (p=0.22)

- No adverse events in either group w/in first 3 months.

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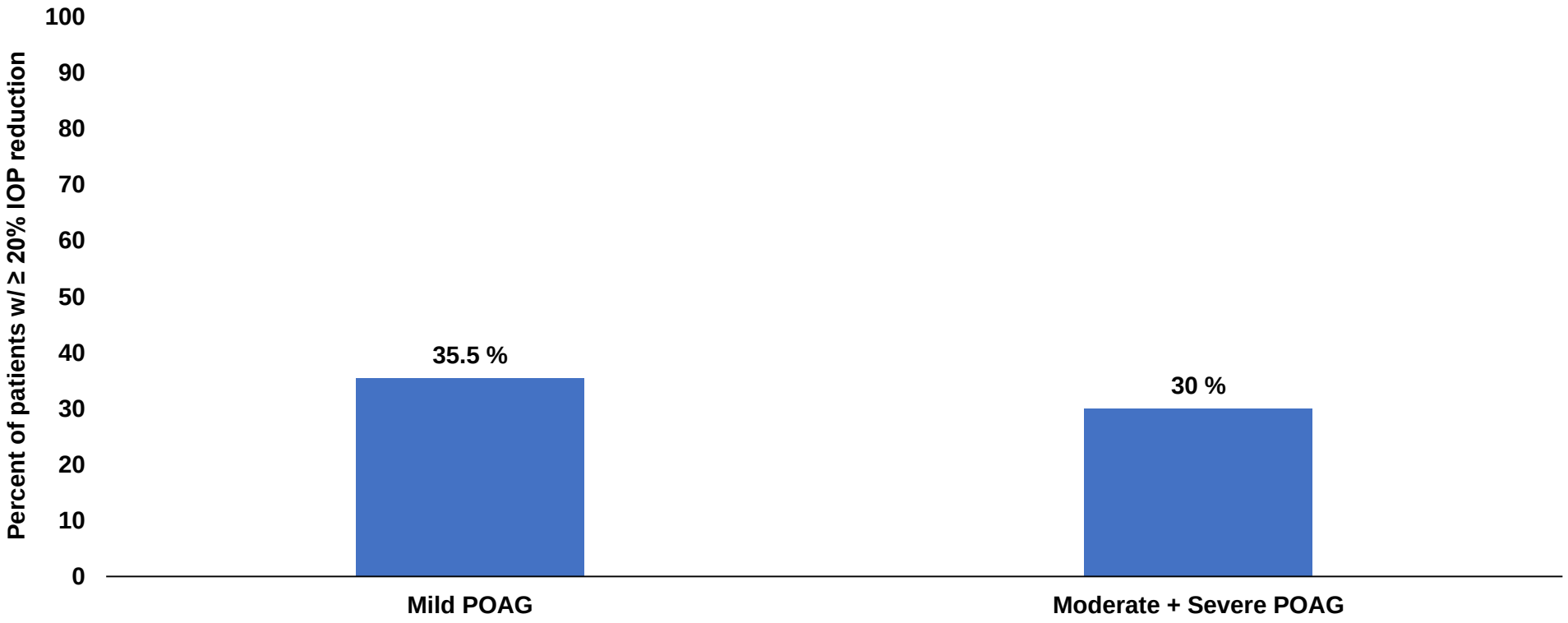
Of well-controlled POAG patients undergoing IOL+ABiC,

30-35% achieved ≥ 20% further IOP reduction



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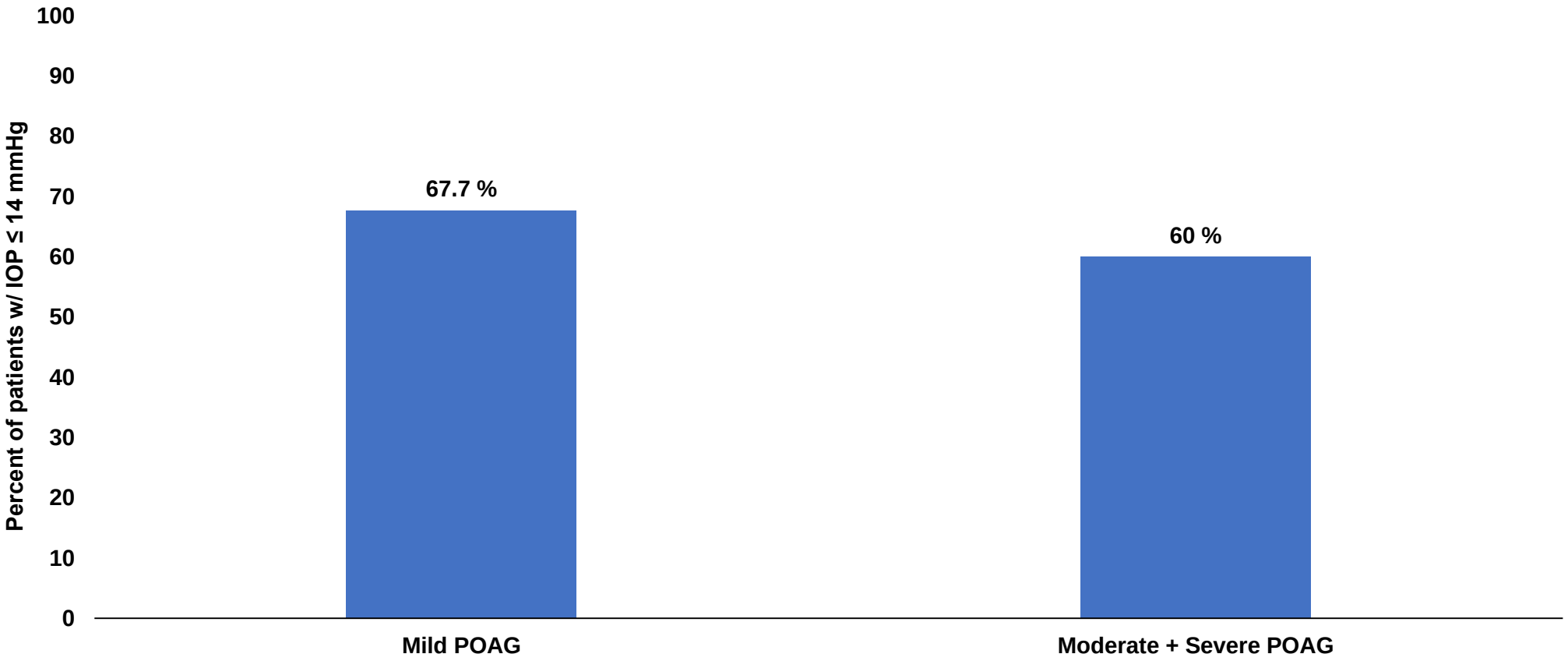
Of well-controlled POAG patients undergoing IOL+ABiC,

60-68% achieved or maintained an IOP ≤ 14 mmHg



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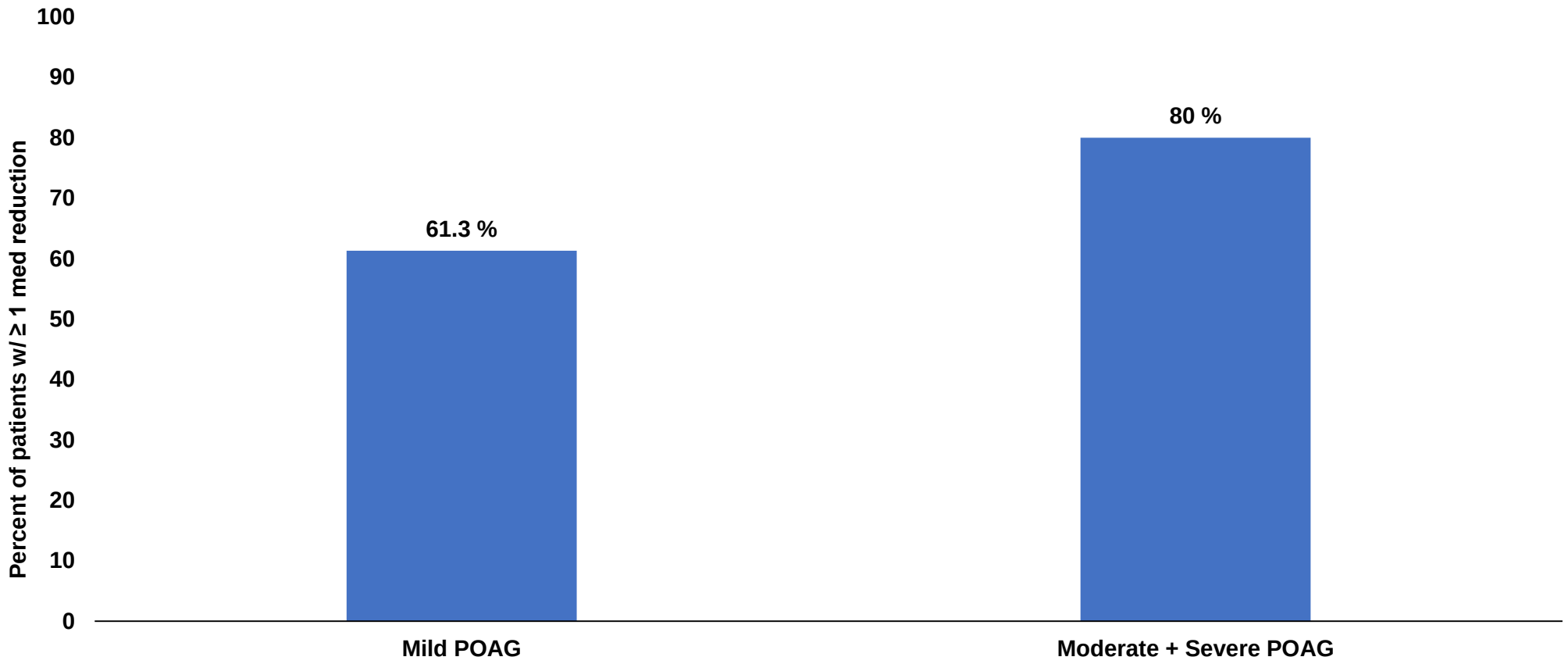
Of well-controlled POAG patients undergoing IOL+ABiC,

61-80% reduced anti-glaucoma medication burden (by ≥ 1 med)



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Conclusions

- After 3 months, well-controlled POAG patients (regardless of severity) undergoing ABiC+IOL experienced:
  - No adverse events,
  - 30-35% achieved ≥ 20% further IOP reduction,
  - 60-68% achieved or maintained IOP ≤ 14 mmHg, and
  - 61-80% achieved ≥ 1 anti-glaucoma medication reduction (“reduced medication burden”) *statistically significant
- After 3 months, ABiC+IOL significantly reduced IOP in patients with mild POAG (1.5 mmHg, p=0.045, n=31).
- After 3 months, ABiC+IOL reduced IOP in patients with M+S POAG (1.0 mmHg, p=0.15, n=20).
  - While arguably *clinically* significant for M+S POAG patients, this IOP reduction did not achieve *statistical* significance.
  - However, the well-controlled M+S POAG cohort had a lower baseline IOP (13.9 ± 3.4 mmHg, vs 15.2 ± 4.2 mmHg) and smaller sample size.
- ABiC+IOL significantly lowered anti-glaucoma med burden (mild, 0.9 meds, p=3E-5; M+S, 1.7 meds, p=2E-5)
  - Minimizing issues of cost, toxicity, and non-adherence to topical glaucoma therapy.
- IOP reductions and lowered med burdens were achieved without pre-op anti-glaucoma medication washouts.
- 3-month study results suggests that IOL+ABiC is safe and highly effective for well-controlled POAG patients.
- Limitations: small sample size, short-term efficacy data, well-controlled POAG, no medication washout, w/ phaco

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