Outcomes of the Baerveldt Glaucoma Implant and Transscleral Cyclophotocoagulation in Neovascular Glaucoma

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Introduction

- Neovascular glaucoma (NVG) is a secondary form of glaucoma that often presents with refractory disease.
- Etiology: Ischemic insults to the retina leading to expression of VEGF and subsequent neovascularization of the retina and anterior angle.
- Mainstays of treatment include 1) medical therapy 2) valved and non-valved tubes 3)CPC
- BGI has demonstrated effective IOP-lowering ability and surgical success rates ranging from 56-79% [1].
- CPC is a procedure usually seen as a last option to preserve vision in patients with refractory glaucoma[2].

Purpose

The aim of this study was to:

1. Compare the outcomes of BGI and CPC in the setting of NVG.

Patients and Methods

- **Design:**

  Retrospective single center comparative case series.

- **Inclusion Criteria:**

  1. BGI and NVG patients
  2. Age ≥ 18 years
  3. Follow-up ≥ 6 months
  4. Vision better than NLP at baseline
  5. IOP ≥ 21 mmHg

- **Main outcome measures**:

  1. Surgical Failure at 6 Months: IOP >21 mmHg, <5 mmHg with hypotony-related maculopathy on 2 consecutive visits, progression to NLP, or glaucoma reoperation.

- **Secondary outcome measures**:

  1. Visual acuity, IOP, and medication requirements at 6 months.

Results

- **113** eyes (61 BGI and 52 CPC) of **106** patients (55 BGI and 51 CPC) with a mean follow-up duration of **24.5 ± 22.5** months **(p=.004)** were included. Baseline characteristics including age, race, sex, and medication requirements were comparable between groups. (Table 1).

Table 1. Baseline Patient Characteristics in BGI and CPC Eyes

Patients		Total N=113	Baerveldt N=61	CPC N=52	P-value
Age (Years)		67.2 ± 14.7	66.1 ± 14.1	68.4 ± 15.3	0.426
Sex: (% Females)		46 (43.4)	21 (38.2)	25 (49.0)	0.327
Race (%)	White	51 (48.1)	29 (52.7)	22 (43.1)	0.864
	Black	24 (22.6)	12 (21.8)	12 (23.5)	
	Asian	4 (3.8)	2 (3.6)	2 (3.9)	
	Hispanic	8 (7.5)	4 (7.3)	4 (7.8)	
	Unknown	19 (17.9)	8 (14.5)	11 (21.6)	

Eyes	Total N=113	Baerveldt N=61	CPC N=52	P-value
Laterality (% Right Eyes)	50.4	50.8	50	1.00
Bilateral Retinal Pathology (%)	51.3	62.3	38.5	**.014**
PRP within 2 weeks of tube shunt surgery (%)	36.3	63.9	3.8	**<.001**
IVI within 2 weeks of tube shunt surgery (%)	50.4	65.6	32.7	**.001**
VA (LogMAR)	2.07 ± .92	1.87 ± 0.97	2.30 ± .80	**.011**
IOP (mmHg)	38.5 ± 11.1	39.5 ± 10.7	37.4 ± 11.5	0.321
Medications (Number)	3.4 ± 0.9	3.3 ± 0.8	3.5 ± 1.1	0.307
Hyphema (%)	13.3	16.4	9.6	0.406
Follow-up Duration (Months)	24.5 ± 22.5	29.8 ± 26.1	18.2 ±15.5	**0.004**

Abbreviations: PRP: panretinal photocoagulation, IVI: intravitreal injection, VA: visual acuity, IOP: intraocular pressure.

Results

Main Outcomes:

- At 6 Months: Surgical failure was comparable between groups (26.2% vs. vs. 42.3%, p=.0777).

Secondary Outcomes:

- BGI eyes had a higher VA compared to CPC eyes at 6 months.
- IOP significantly decreased in both treatment groups (p=.988).
- BGI eyes required less medications at 6 months (1.4 ± 1.3 vs. 2.5 ± 1.5, **p<.001**)

Table 2. Results at Month 6

	Total	Baerveldt	CPC	P-value
Surgical Failure (%)	33.6	26.2	42.3	.077
VA (LogMAR)	2.05 ± 1.01	1.67 ± 1.1	2.47 ± .69	**<.001**
IOP (mmHg)	16.4 ± 8.9	16.4 ± 7.7	16.4 ± 10.1	0.988
Medications (Number)	1.9 ± 1.5	1.4 ± 1.3	2.5 ± 1.5	**< 0.001**
Progression to NLP (%)	16.8	14.8	19.2	0.617
Time to NLP (Months)	18.7 ± 24.4	25.1 ± 25.0	12.2 ± 23.3	0.275
IOP at NLP Visit (mmHg)	18.4 ± 11.8	18.1 ± 12.9	18.7 ± 11.5	0.928

Results

Postoperative Complications

- At Month 6, postoperative complications were comparable between treatment groups.
- The most common complication observed was suprachoroidal hemorrhage seen in 4 BGI eyes and 0 CPC eyes (p=.123), followed by hypotony seen in 1 CPC eye and 1 BGI eye. (p=1.00)
  - Suprachoroidal hemorrhages were managed by either comfort care, drainage, or medications.
  - No cases of phthisis bulbi were observed in either group.

Glaucoma Reoperations

- At Month 6, CPC eyes had significantly more reoperations than BGI eyes; 11.5% vs. 0% (**p=.008**)
  - Reoperations included repeat CPC and tube placement.

Abbreviations: VA: visual acuity, IOP: intraocular pressure, NLP: no light perception.

Conclusion

- BGI and CPC had comparable surgical failure outcomes, but BGI was associated with higher visual acuity and less dependence on IOP-lowering medications.
- Similar surgical failure rates were seen in Yildirim et. al, in which compared AGV and CPC at 12 and 24 months[3].
- BGI and CPC eyes had a similar complication profile.
- Limitations of this study include its retrospective nature and possible treatment selection bias.

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Thank you!

Questions?

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