

# Endocyclophotocoagulation vs BANG: Outcomes in mild-to-moderate Primary Open Angle glaucoma

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## Introduction

- Endoscopic cyclophotocoagulation (ECP) and Bent Ab-interno Needle Goniectomy (BANG) are both Minimally Invasive Glaucoma Surgery (MIGS) procedures.
- ECP is an ab-interno procedure, reduces aqueous production, effect of which is independent of the ocular surface (OS) and angle status
- BANG is a cost-effective alternative to procedures that un-roof the Schlemm's canal (eg. KDB Glide trabeculotomy)
- A 26-G needle is bent and used for this purpose; an open angle is essential, efficacy depends on the OS
- Both can be combined with cataract surgery; or even standalone in pseudophakes and aphakes

## Aim

To investigate the comparative efficacy and safety of ocular surface independent MIGS ECP and ocular surface dependent MIGS BANG in mild-to-moderate Open Angle Glaucoma (POAG/ JOAG/ PXFG) with chronic usage of anti-glaucoma medication (AGM).

## Methods

Design: Retrospective, interventional, comparative

Participants:

- Consecutive subjects with POAG on AGM for at least 1 year, who underwent ECP or BANG, with or without phaco
- Aged 30 years or more

**Primary Outcome Measure:**  
Intra-ocular Pressure (IOP)

**Secondary Outcome Measures:**  
Anti-Glaucoma medication (AGM)  
Complete success\*  
Serious complications\*\*

\*Complete success was defined as an IOP > 5 and ≤ 18 mmHg without medication  
Qualified success was defined as meeting these criteria with medication  
Failure to meet these criteria and/or requirement for reoperation was defined as failure  
\*\*Serious complications - defined as sight threatening complications like CD, RD, Hypotony - and NLP vision.

### ECP procedure with phaco

- After IOL is in the bag, cohesive viscoelastic is injected into the sulcus
- 19G curved probe is introduced through the phaco wound and CB visualised
- Laser is delivered under direct vision (Figure 1.) – endpoint is whitening and shrinkage
- Laser parameters 250-500 mw at fixed 2 second duration; 'pops' are avoided
- Viscoelastic is washed

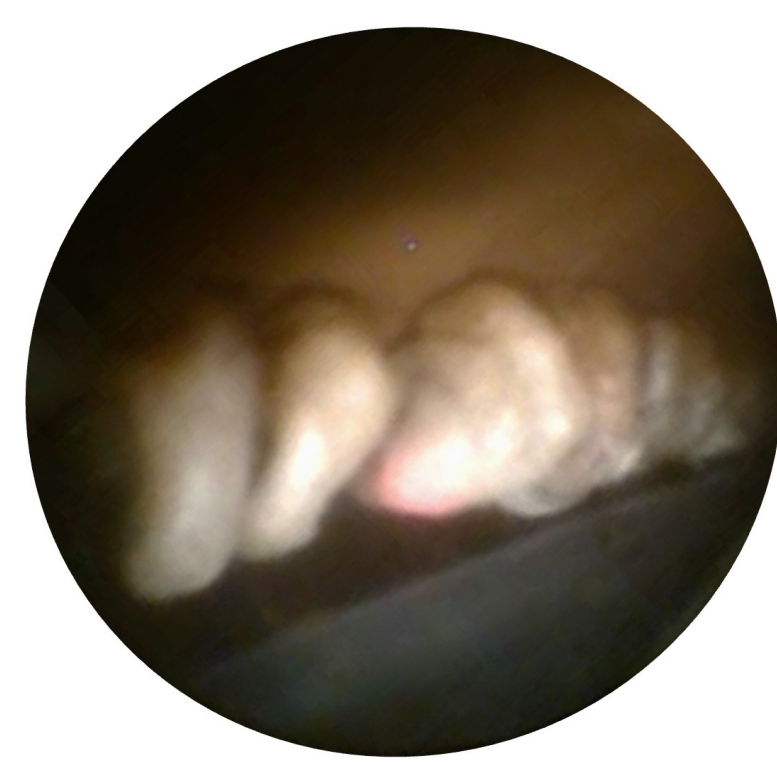


Figure 1. Laser delivered to ciliary body under direct view

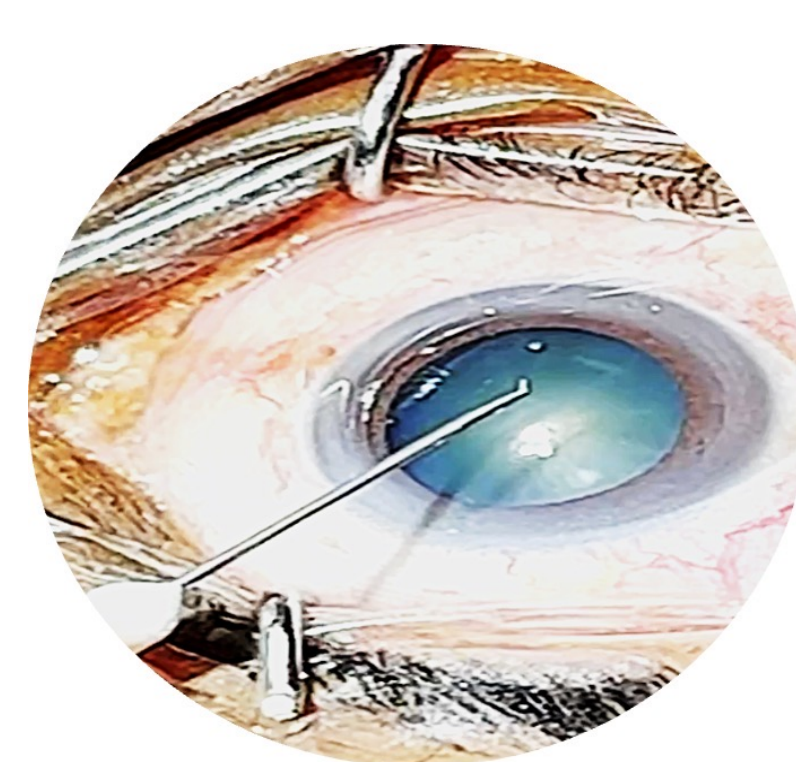


Figure 2. 26-G hypodermic needle bent 45°

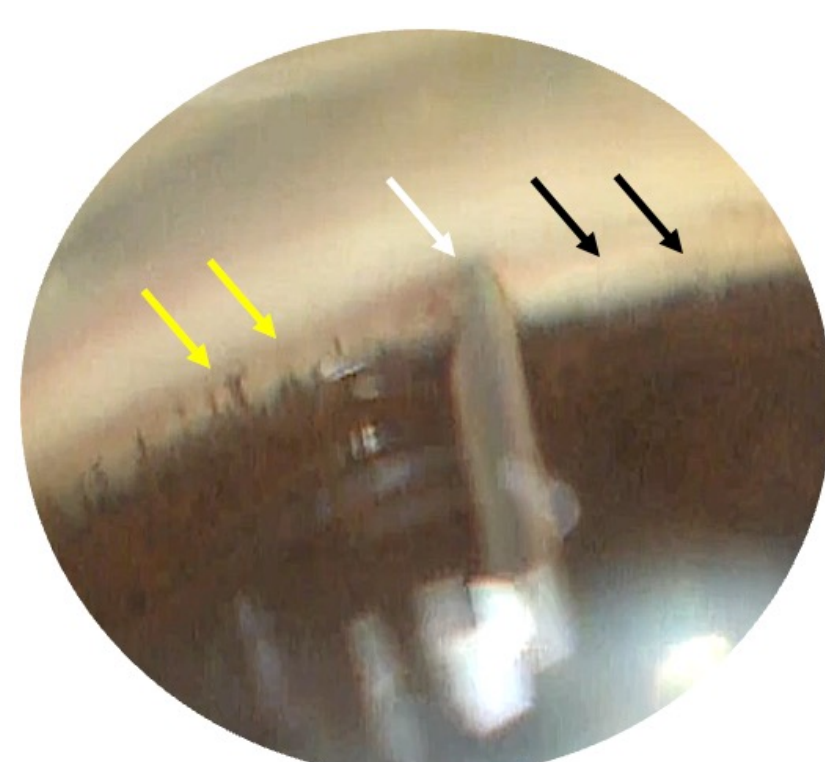


Figure 3. BANG: White arrow – bent needle  
Black arrows – unroofed Schlemm's canal  
Yellow arrows – Posterior Trabecular meshwork

### BANG procedure with phaco

- After IOL is in the bag, cohesive viscoelastic is injected in the AC
- Patient's head is turned 35° away and the microscope is tilted 35° towards the surgeon seated temporally
- Cohesive viscoelastic is used as a coupling gel for the intra-operative gonioscope and the trabecular meshwork is visualised 'en face'
- 26-G hypodermic needle is bent 45° (Fig. 2) and Schlemm's canal is unroofed for 90° (Fig. 3)
- Viscoelastic is washed

## Results

	ECP	BANG	p
<b>N</b>	<b>21</b>	<b>16</b>	
<b>Follow up in months (Mean±SD)</b>	<b>11.3 ± 4.8</b>	<b>12.6 ± 4.8</b>	<b>.569</b>
<b>Age in years (Mean±SD)</b>	<b>61.5 ± 14.7</b>	<b>63.7 ± 6.2</b>	<b>.944</b>
<b>Pre IOP in mmHg (Mean±SD)</b>	<b>22.9 ± 6.9</b>	<b>18.7 ± 5.2</b>	<b>.05</b>
<b>Last IOP in mmHg (Mean±SD)</b>	<b>15.0 ± 2.8</b>	<b>15.8 ± 3.1</b>	<b>.354</b>
<b>% reduction of IOP</b>	<b>34.8%</b>	<b>14.6%</b>	
<b>Pre AGM (Mean±SD)</b>	<b>3.2 ± 1.5</b>	<b>2.4 ± 1.2</b>	<b>.05</b>
<b>Last AGM (Mean±SD)</b>	<b>1.2 ± 1.3</b>	<b>1.0 ± 1.6</b>	<b>.522</b>
<b>% reduction of AGM</b>	<b>62.5%</b>	<b>58.3%</b>	
<b>Complete success (N, %)</b>	<b>9, 43%</b>	<b>8, 50%</b>	<b>.117</b>
<b>Qualified success (N, %)</b>	<b>11, 52.4%</b>	<b>7, 43.7%</b>	<b>.093</b>
<b>Total success (N, %) (Complete + Qualified)</b>	<b>20, 95%</b>	<b>15, 93.75%</b>	<b>.393</b>
<b>Failure (N, %)*</b>	<b>1, 4.8%</b>	<b>1, 6.25%</b>	<b>.393</b>
<b>Serious complications (N, %)</b>	<b>Nil</b>	<b>Nil</b>	

\*Failure in both groups were only on IOP criterion

## Conclusion

Both types of MIGS, ECP and BANG, are effective and safe procedures in controlling IOP with significant reduction in AGM in POAG in mild-to-moderate glaucoma with chronic usage of topical medications.

Longer-term study with larger sample size is recommended to check for validity of the results.

## References

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