

Argon Laser Peripheral Iridoplasty (ALPI) versus Systemic Intraocular Pressure (IOP) Lowering Medications as the Immediate Management for Acute Phacomorphic Angle Closure

Dr. Jacky W.Y. Lee, Professor Jimmy S.M. Lai
The Eye Institute, The University of Hong Kong

Purpose: To compare the efficacy and safety of **ALPI versus systemic IOP lowering medications** in the immediate management of acute phacomorphic angle closure (a secondary angle closure caused by the anterior protrusion of an intumescent cataract resulting in pupil block and irido-trabecular angle closure).

Patients and Methods: This was a **prospective randomized controlled study** conducted in Hong Kong, China from 2009 to 2010. Patients were randomized to receive **intravenous (IV) and oral carbonic anhydrase inhibitor** or **ALPI** as the initial treatment. IV mannitol was administered in both groups for presenting IOP>60mmHg or IOP>40mmHg 2 hours post treatment. All cases received topical Timolol, Atropine, and steroids prior to definitive cataract extraction.

Results:

ALPI offered better results in:

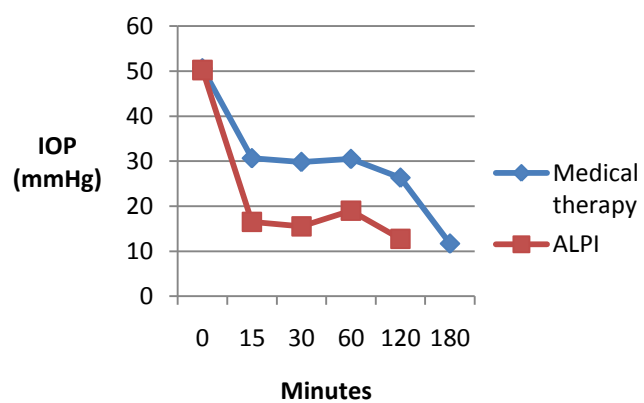
- 1) **The time taken to lower IOP to 25mmHg** (115.0±97.0 mins in the medical group vs. 18.8±7.5 mins in the ALPI group; t test p=0.06, **F test p=0.001**)
- 2) **The reduction of IOP within the first 30 minutes** (20.8±13.5mmHg in the medical group vs. 34.8±3.2mmHg in the ALPI group; t test p=0.06, **F test p=0.04**)
- 3) **The post attack CDR** (0.60±0.20 in the medical group and 0.50±0.02 ALPI group; t test p=0.2, **F test=0.002**)

The following parameters were comparable in both groups: the degree of peripheral anterior synechiae (PAS) formation, angle, retinal nerve fibre layer, endothelial cell count, post-op visual acuity and post-op IOP

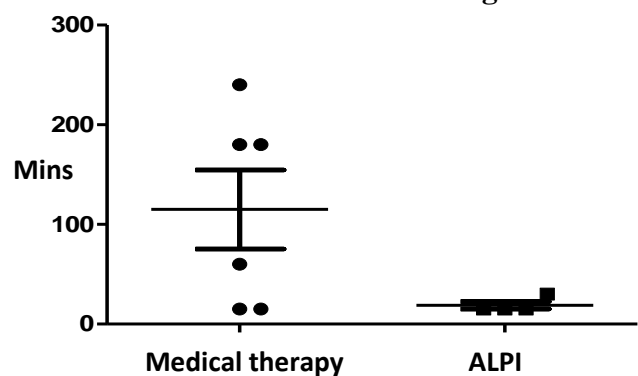
Comparison between medical therapy vs. ALPI

| | Medical therapy (n=6) | ALPI (n=4) |
|---|------------------------------------|------------------------------------|
| Age | 79.7±7.2 years | 78.3±11.0 years |
| Presenting IOP (mmHg) | 50.7±8.4 mmHg | 50.25±6.9 mmHg |
| Presenting VA | HM to LP | HM to LP |
| Duration of phacomorphic angle closure | 2.8±3.5 days | 0.9±0.25 days |
| IOP 15 mins after treatment | 30.1±15.6mmHg | 16.5±11.4mmHg |
| IOP 30 mins after treatment | 29.8±13.5mmHg | 15.5±5.3mmHg |
| IOP 60 mins after treatment | 30.5±14.4mmHg | 19±1.7mmHg |
| IOP 120 mins after treatment | 26.3±13.4mmHg | 12.8±7.5mmHg |
| IOP 180 mins after treatment | 11.7±5.9mmHg | Not recorded (all IOP<25mmHg) |
| Percent requiring IV mannitol | 50% | 0 |
| IOP at Day 1 after treatment | 15.8±4.2mmHg | 16.7±9.0mmHg |
| Time from treatment to cataract extraction | 1.7±0.8 days | 1.3±0.5 days |
| IOP at 3 months after attack | 11.2±4.2 | 9.5±2.3mmHg |
| IOP at 9 months after attack | 11.2±3.3mmHg | 11.5±3.1mmHg |
| Percent requiring topical glaucoma medication | 16.7% | 0 |
| BCVA at 1 months after attack (Snellen) | 0.4±0.2 | 0.4±0.2 |
| Angle at 3 months after attack | 35.9±4.6° | 38.8±3.6° |
| PAS at 3 months after attack | 45±45.3° | 22.5±45° |
| Endothelial count at 3 months after attack | 1928.5±529.1 cells/mm ² | 2379.3±573.3 cells/mm ² |
| RNFL at 3 months after | 88.7±21.6um | 102.9±24.4um |
| RNFL at 9 months after | 78.3±20.5um | 96.1±19.1um |
| VCDR by OCT 3 months after attack | 0.6±0.2 | 0.5±0.02 |

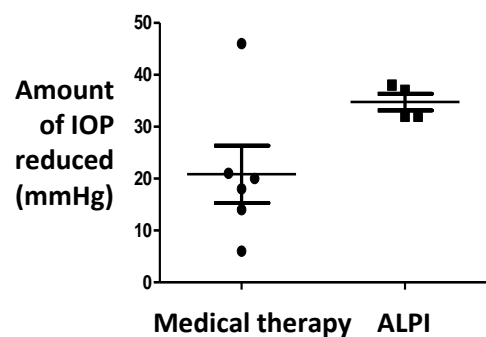
Change in IOP: medical vs. ALPI



Time to IOP < 25mmHg



The amount of IOP reduction within the first 30 minutes of treatment



Conclusion:

ALPI is **more consistent, safer, and more effective** than systemic carbonic anhydrase inhibitor and hyperosmotic agents in lowering the IOP during an acute attack of **phacomorphic angle closure**.