



Controversies in Angle Closure Glaucoma Treatment

By

Tarek Ragaiey MD

Professor Of Ophthalmology
Tanta University

Controversies in Angle Closure Glaucoma Treatment

Controversies in AACG Treatment

Controversies in CACG Treatment

Controversies in AACG Treatment

LPI alone Vs LPI & ALPI

ALPI Vs GT after LPI failure

Phaco Vs LPI after AACG abortion



- **Conclusions:**
- 1. In eyes with PACG, both iridotomy alone or combined with iridoplasty provide a significant and **equivalent** reduction in IOP.
- 2. There is also a possible reduction in peripheral anterior synechiae, more so in the **iridoplasty** group.

Laser Peripheral Iridotomy With and Without Iridoplasty for Primary Angle-Closure Glaucoma: 1-Year Results of a Randomized Pilot Study

SHI SUN, YUAN-BO HANG, MENG-LI SHANG, SU-BE PAN, JIAN-PING SUN, XI-ZHEN LI, AND WEN-BU LI

OBJECTIVE: To compare the efficacy and safety of laser peripheral iridotomy with or without laser iridoplasty in the treatment of eyes with uncontrolled primary angle-closure or primary angle-closure glaucoma.

DESIGN: Randomized controlled clinical trial.

SETTING: Comprehensive eye clinic.

PATIENTS: Twenty-one patients (eyes) with uncontrolled primary angle-closure or primary angle-closure glaucoma were recruited. Eighty patients were randomized to 1 of 2 treatment options: iridotomy or iridotomy plus iridoplasty, and were followed up for 1 year. Main outcome measures were intraocular pressure (IOP), peripheral anterior synechiae (PAS), and visual field (VF).

RESULTS: Twenty-seven eyes (17 patients) were randomized to the iridotomy group and 10 eyes (10 patients) were randomized to the iridotomy plus iridoplasty group. Mean IOP at baseline was 27.2 ± 3.2 mm Hg in the iridotomy and 29 patients (90.7%) had the iridotomy plus iridoplasty group. Mean IOP at 1 year (9 months) was 19.2 ± 2.1 mm Hg in the iridotomy group (P < .001) and 19.2 ± 2.1 mm Hg in the iridotomy plus iridoplasty group (P < .001). There was no significant difference in IOP between the two groups at 1 year (P = .99). Mean PAS at baseline was 1.0 ± 0.5 in the iridotomy group and 1.0 ± 0.5 in the iridotomy plus iridoplasty group (P = .99). Mean VF at baseline was 10.0 ± 1.0 in the iridotomy group and 10.0 ± 1.0 in the iridotomy plus iridoplasty group (P = .99). There was no significant difference in PAS or VF between the two groups at 1 year (P = .99).

CONCLUSIONS: In eyes with uncontrolled primary angle-closure or primary angle-closure glaucoma, both iridotomy alone or combined with iridoplasty provide a significant and equivalent reduction in IOP. There is also a possible reduction in peripheral anterior synechiae.

ALPI Vs GT after LPI failure

- **Conclusions:**
- After 1 year, ALPI was associated with higher failure rates and lower IOP reduction compared with PGA therapy in eyes with **persistent appositional angle closure and raised IOP after LI.**

Argon Laser Peripheral Iridoplasty for Primary Angle-Closure Glaucoma
A Randomized Controlled Trial

Ann Intern Med. 2014;160(12):803-810. doi:10.7554/ajph.2013.014833

OBJECTIVE: To determine the effectiveness of argon laser peripheral iridoplasty (ALPI) in primary angle-closure glaucoma (PACG) and primary angle-closure glaucoma (PACG).

DESIGN: Randomized controlled trial.

SETTING: Comprehensive eye clinic.

PATIENTS: Eighty PACG or PACG subjects who underwent laser iridotomy 18 to 24 hours before random assignment to argon laser peripheral iridoplasty (ALPI) or trabeculectomy (T) 1 month after iridotomy.

MEASUREMENTS AND MAIN RESULTS: At baseline, mean IOP was 27.2 ± 3.2 mm Hg in the ALPI group and 29.2 ± 3.2 mm Hg in the T group. At 1 year, mean IOP was 19.2 ± 2.1 mm Hg in the ALPI group and 19.2 ± 2.1 mm Hg in the T group (P = .99). Mean PAS at baseline was 1.0 ± 0.5 in the ALPI group and 1.0 ± 0.5 in the T group (P = .99). Mean VF at baseline was 10.0 ± 1.0 in the ALPI group and 10.0 ± 1.0 in the T group (P = .99). There was no significant difference in IOP, PAS, or VF between the two groups at 1 year (P = .99).

CONCLUSIONS: After 1 year, ALPI was associated with higher failure rates and lower IOP reduction compared with T in eyes with persistent appositional angle closure and raised IOP after LI.



• **Conclusions:**

1. Early phaco. appeared to be **more effective** in preventing IOP rise than LPI in patients after abortion of APAC.

Randomized Trial of Early Phacoemulsification versus Peripheral Iridotomy to Prevent Intraocular Pressure Rise after Acute Primary Angle Closure

Dennis S. C. Lam, MD, FRCS(ophth),¹ Oscar Y. L. Loong, FRCS, DRCS(ophth),¹ Cheng C. Y. Tham, FRCS,² Felix C. H. Li, MBChB,¹ Jialun Y. F. Wong, MBChB,¹ Thomas Y. H. Chan, FRCS,² Dorothy C. F. Fan, FRCS²

Purpose: To compare the efficacy of early phacoemulsification versus laser peripheral iridotomy (LPI) in the prevention of intraocular pressure (IOP) rise in patients after acute primary angle closure (APAC).

Design: Prospective randomized controlled trial.

Participants: Sixty-two eyes of 62 Chinese subjects, with 37 eyes in each arm.

Methods: Subjects were randomized to receive either early phacoemulsification or LPI after aborting APAC by medications. Patients were followed up on day 1, week 1, and months 1, 3, 6, 12, and 18. Predictors for IOP rise were studied.

Main Outcome Measures: Prevalence of IOP rise above 21 mmHg (primary) and number of glaucoma medications, IOP, and Shaffer gonioscopy grading (secondary).

Results: Prevalence of IOP rise for the LPI group were 16.7%, 32.3%, 41.9%, and 48.7% for the follow-up at 3, 6, 12, and 18 months, respectively. There was only one eye (2%) in the phacoemulsification group that had IOP rise at all follow-up time points ($P < 0.0001$). Treatment by LPI was associated with significantly increased hazard of IOP rise (hazard ratio [HR], 14.9; 95% confidence interval [CI], 1.8–142.3; $P = 0.008$). In addition, a maximum IOP at presentation > 55 mmHg was associated with IOP rise (HR, 4.1; 95% CI, 1.3–13.2; $P = 0.017$).

At 18 months, the mean number of medications required to maintain IOP ≤ 21 mmHg was significantly higher in the LPI group (0.86 \pm 1.14) than in the phacoemulsification group (0.52 \pm 0.76; $P = 0.002$). Mean IOP for phacoemulsification group (2.6 \pm 1.9 mmHg) was consistently lower than that of the LPI group (5.0 \pm 3.4 mmHg; $P = 0.009$). Mean Shaffer grading for the phacoemulsification group (2.13 \pm 0.78) was consistently greater than that of the LPI group (0.72 \pm 0.64; $P = 0.0001$).

Conclusions: Early phacoemulsification appeared to be more effective in preventing IOP rise than LPI in patients after abortion of APAC. High presenting IOP of > 55 mmHg is an added risk factor for subsequent IOP rise. For patients with coexisting cataract and presenting IOP of > 55 mmHg, early phacoemulsification can be considered as a definitive treatment to prevent IOP rise. *Ophthalmology* 2008;115:1134–1140 © 2008 by the American Academy of Ophthalmology.



2. High presenting IOP of **55 mmHg** is an added risk factor for subsequent IOP rise. For patients with coexisting cataract and presenting IOP of 55 mmHg, early phaco. can be considered as a definitive treatment to prevent IOP rise.

Randomized Trial of Early Phacoemulsification versus Peripheral Iridotomy to Prevent Intraocular Pressure Rise after Acute Primary Angle Closure

Dennis S. C. Lam, MD, FRCS(ophth),¹ Oscar Y. L. Loong, FRCS, DRCS(ophth),¹ Cheng C. Y. Tham, FRCS,² Felix C. H. Li, MBChB,¹ Jialun Y. F. Wong, MBChB,¹ Thomas Y. H. Chan, FRCS,² Dorothy C. F. Fan, FRCS²

Purpose: To compare the efficacy of early phacoemulsification versus laser peripheral iridotomy (LPI) in the prevention of intraocular pressure (IOP) rise in patients after acute primary angle closure (APAC).

Design: Prospective randomized controlled trial.

Participants: Sixty-two eyes of 62 Chinese subjects, with 37 eyes in each arm.

Methods: Subjects were randomized to receive either early phacoemulsification or LPI after aborting APAC by medications. Patients were followed up on day 1, week 1, and months 1, 3, 6, 12, and 18. Predictors for IOP rise were studied.

Main Outcome Measures: Prevalence of IOP rise above 21 mmHg (primary) and number of glaucoma medications, IOP, and Shaffer gonioscopy grading (secondary).

Results: Prevalence of IOP rise for the LPI group were 16.7%, 32.3%, 41.9%, and 48.7% for the follow-up at 3, 6, 12, and 18 months, respectively. There was only one eye (2%) in the phacoemulsification group that had IOP rise at all follow-up time points ($P < 0.0001$). Treatment by LPI was associated with significantly increased hazard of IOP rise (hazard ratio [HR], 14.9; 95% confidence interval [CI], 1.8–142.3; $P = 0.008$). In addition, a maximum IOP at presentation > 55 mmHg was associated with IOP rise (HR, 4.1; 95% CI, 1.3–13.2; $P = 0.017$).

At 18 months, the mean number of medications required to maintain IOP ≤ 21 mmHg was significantly higher in the LPI group (0.86 \pm 1.14) than in the phacoemulsification group (0.52 \pm 0.76; $P = 0.002$). Mean IOP for phacoemulsification group (2.6 \pm 1.9 mmHg) was consistently lower than that of the LPI group (5.0 \pm 3.4 mmHg; $P = 0.009$). Mean Shaffer grading for the phacoemulsification group (2.13 \pm 0.78) was consistently greater than that of the LPI group (0.72 \pm 0.64; $P = 0.0001$).

Conclusions: Early phacoemulsification appeared to be more effective in preventing IOP rise than LPI in patients after abortion of APAC. High presenting IOP of > 55 mmHg is an added risk factor for subsequent IOP rise. For patients with coexisting cataract and presenting IOP of > 55 mmHg, early phacoemulsification can be considered as a definitive treatment to prevent IOP rise. *Ophthalmology* 2008;115:1134–1140 © 2008 by the American Academy of Ophthalmology.



- 3. The optimal timing for performing phaco. is **yet unclear**. It would be optimal to have the phaco done after the eye has become quiet but before the setting in of significant PAS with or without IOP rise.
- Approximately **1 month** after the abortion of the APAC may be a good time, but further studies are needed..

Randomized Trial of Early Phacoemulsification versus Peripheral Iridotomy to Prevent Intraocular Pressure Rise after Acute Primary Angle Closure

Diana S. C. Lam, MD, FRCOphth,¹ Daisy Y. E. Liang, FRCO, FRCOphth,¹ Cheng C. F. Tsai, FRCO,¹ Rita C. H. Li, MBChB,¹ Jialun Y. F. Wong, MBChB,¹ Thomas Y. H. Chan, FRCO,² Stanley C. F. Fan, FRCO²

Purpose: To compare the efficacy of early phacoemulsification versus laser peripheral iridotomy (LPI) in the prevention of intraocular pressure (IOP) rise in patients after acute primary angle closure (APAC).

Design: Prospective randomized controlled trial.

Participants: Sixty-two eyes of 32 Chinese subjects, with 37 eyes in each arm.

Methods: Subjects were randomized to receive either early phacoemulsification or LPI after aborting APAC by medications. Patients were followed up on day 1, week 1, and months 1, 3, 6, 12, and 18. Predictors for IOP rise were studied.

Main Outcome Measures: Prevalence of IOP rise above 21 mmHg (primary) and number of glaucoma medications, IOP, and Shaffer gonioscopy grading (secondary).

Results: Prevalence of IOP rise for the LPI group were 10.7%, 22.3%, 41.9%, and 48.7% for the follow-up at 3, 6, 12, and 18 months, respectively. There was only one eye (3.2%) in the phacoemulsification group that had IOP rise at all follow-up time points ($P < 0.0001$). Treatment by LPI was associated with significantly increased hazard of IOP rise (hazard ratio [HR], 14.9; 95% confidence interval [CI], 1.8–142.2; $P = 0.008$). In addition, a maximum IOP at presentation > 55 mmHg was associated with IOP rise (HR, 4.1; 95% CI, 1.3–12.2; $P = 0.017$). At 18 months, the mean number of medications required to maintain IOP ≤ 21 mmHg was significantly higher in the LPI group (3.8) \pm 1.16 than in the phacoemulsification group (3.0) \pm 0.90 ($P = 0.0002$). Mean IOP for phacoemulsification group (2.0) \pm 0.19 mmHg was consistently lower than that of the LPI group (5.0) \pm 3.4 mmHg, $P = 0.009$. Mean Shaffer grading for the phacoemulsification group (2.12) \pm 0.76 was consistently greater than that of the LPI group (3.72) \pm 0.64, $P < 0.0001$.

Conclusions: Early phacoemulsification appeared to be more effective in preventing IOP rise than LPI in patients after abortion of APAC. High presenting IOP of > 55 mmHg is an added risk factor for subsequent IOP rise. For patients with coexisting cataract and presenting IOP of > 55 mmHg, early phacoemulsification can be considered as a definitive treatment to prevent IOP rise. *Ophthalmology* 2008;115:1134–1140 © 2008 by the American Academy of Ophthalmology.



- **Conclusion:**
- Performed **within 1 week** in patients with APAC and coexisting cataract, phaco/IOL resulted in lower rate of IOP failure at 2 years compared with LPI.

Initial Management of Acute Primary Angle Closure

A Randomized Trial Comparing Phacoemulsification with Laser Peripheral Iridotomy

Bala Hoon, MBChB, FRCOphth,¹ Gae Givens, MD, FRCOphth,^{1,2} Yu Any, MD, FRCOphth,^{1,3} Yanyan Chen, MD,¹ Oshvinn Pichayon, FRCOphth,¹ Francis T. S. Tan, FRCS(Ed), FRCOphth,¹ Ivan S. L. Seah, FRCS(Ed), FRCOphth,¹ and Tan JHA, FRCOphth¹

Purpose: To compare the 2-year efficacy of phacoemulsification and vitreous lens resection (phaco/VLR) with laser peripheral iridotomy (LPI) in the early management of acute primary angle closure (APAC) and coexisting cataract.

Design: Randomized, controlled trial.

Participants: We included 37 subjects presenting with APAC who had responded to medical treatment but had intraocular pressure (IOP) > 35 mmHg within 24 hours, and had cataract with visual acuity of < 0.15 .

Main Outcome Measures: The primary outcome measure was failure of LPI control defined as IOP > 20 mmHg 12 to 24 hours after LPI. Secondary outcome measures were complications, degree of angle opening, amount of peripheral anterior synechiae, visual acuity, and central corneal thickness (CCT) 2 years postoperatively.

Methods: Subjects were randomized to receive either LPI or phaco/VLR in the affected eye within 1 week of presentation and were observed at least intervals over 24 months. Patients underwent a standardized examination that included gonioscopy, applanation tonometry, gonioscopy, and CCT measurements. Logistic regression was used to estimate the effect of treatment on failure of IOP control. Time to failure was calculated using the Kaplan-Meier technique and Cox regression was used to estimate the relative risk of failure.

Results: There were 18 patients randomized to LPI and 19 to phaco/VLR. The average age of subjects was 68.1 (SD 10.5) years (mean IOP after medical treatment was 16.3 (SD 3.9) mmHg). The 2-year cumulative survival rate (91.1% and 98.1% for the LPI and phaco/VLR groups, respectively) ($P = 0.38$). There was no change in CCT for either group from baseline to month 6. There was 1 postoperative complication in the phaco/VLR group compared with 0 in the LPI group ($P = 0.166$).

Conclusions: Performed within 1 week in patients with APAC and coexisting cataract, phaco/VLR resulted in lower rate of IOP failure at 2 years compared with LPI.

Financial Disclosures: The authors have no proprietary or commercial interest in any of the materials discussed in this article. *Ophthalmology* 2012;121:2274–2281 © 2012 by the American Academy of Ophthalmology.

Controversies in CACG Treatment

Phaco .Vs trab. in medically uncontrolled CACG without cataract

Phaco. Vs Phacotrab. in medically controlled CACG with cataract

Phaco. Vs Phacotrab. in medically uncontrolled CACG with cataract

Phaco

Trab

- **Conclusions:**
 1. Both phaco. and trab. are effective in reducing IOP in medically uncontrolled CACG eyes without cataract.
 2. Trabe. is more effective than phaco. in reducing dependence on glaucoma drugs, but is associated with more complications.

Phacoemulsification versus Trabeculectomy in Medically Uncontrolled Chronic Angle-Closure Glaucoma without Cataract

Geens C. Y. Tham, FRCO, ^{1,2,3} Iskand T. T. Eang, FRCO, ^{1,2,3} Ngai Jap, FRCO, ^{1,2,3}
Duan T. L. Loo, FRCO, ^{1,2} Fdn C. H. Si, FRCO, ^{1,2} Dwan S. C. Lam, FRCO, FRCOphd ^{1,2,3}

Objective: To compare phacoemulsification versus trabeculectomy with adjunctive mitomycin C in medically uncontrolled chronic angle-closure glaucoma (CACG) without cataract.

Design: Prospective, randomized clinical trial.

Participants: Fifty medically uncontrolled CACG eyes without cataract of 50 patients.

Interventions: Patients were randomized into undergoing either phacoemulsification or trabeculectomy with adjunctive mitomycin C. After surgery, patients were followed up every 3 months for 2 years.

Main Outcome Measures: Intraocular pressure (IOP) and requirement for glaucoma drugs.

Results: Twenty-six CACG eyes were randomized to receive phacoemulsification, and 24 eyes underwent trabeculectomy with mitomycin C. Phacoemulsification and trabeculectomy resulted in significant and comparable IOP reduction at 24 months after surgery (median of 6.4 mmHg or 34% for phacoemulsification vs. 8.5 mmHg or 38% for trabeculectomy; $P = 0.76$). Over 1st 24 months, trabeculectomy-treated eyes required an average 1.5 fewer drugs than phacoemulsification-treated eyes ($P < 0.001$). However, trabeculectomy was associated with significantly more surgical complications than phacoemulsification (46% vs. 4%; $P = 0.001$). Eight (33%) of 24 trabeculectomy eyes demonstrated cataract during follow-up.

Conclusions: Both phacoemulsification and trabeculectomy are effective in reducing IOP in medically uncontrolled CACG eyes without cataract. Trabeculectomy is more effective than phacoemulsification in reducing dependence on glaucoma drugs, but is associated with more complications.

Financial Disclosures: The authors have no proprietary or commercial interest in any materials discussed in this article. Ophthalmology 2012;121:62-67 © 2012 by the American Academy of Ophthalmology.





- 3. Phaco. may be even more favorable in patients who are prone to, or cannot accept, the complications of trab. and mitomycin C. However, in situations where drug reduction is a high priority, trabeculectomy may be more suitable.
- 4. The surgical decision has to be based on individual circumstances and preferences of each patient.

Phacoemulsification versus Trabeculectomy in Medically Uncontrolled Chronic Angle-Closure Glaucoma without Cataract

Chen C. T. Tam, FRCS,^{1,2} Fakhri Y. F. Saegh, MRCS,^{1,2} Dwan Y. L. Loag, FRCS,^{1,2}
 Chan F. L. Liang, FRCS,^{1,2} Fu C. M. Li, FRCS,^{1,2} Dwan Y. L. Loag, FRCS, FRCS(Ed)^{1,2}

Objective: To compare phacoemulsification versus trabeculectomy with adjunctive mitomycin C in medically uncontrolled chronic angle-closure glaucoma (CACG) without cataract.
Design: Prospective, randomized clinical trial.
Participants: Fifty medically uncontrolled CACG eyes without cataract of 25 patients.
Intervention: Patients were randomized into undergoing either phacoemulsification or trabeculectomy with adjunctive mitomycin C. After surgery, patients were followed up every 3 months for 2 years.
Main Outcome Measures: Intraocular pressure (IOP) and requirement for glaucoma drugs.
Results: Twenty-six CACG eyes were randomized to receive phacoemulsification, and 24 eyes underwent trabeculectomy with mitomycin C. Phacoemulsification and trabeculectomy resulted in significant and comparable IOP reduction at 24 months after surgery (reduction of 8.4 mmHg or 34% for phacoemulsification vs. 8.9 mmHg or 36% for trabeculectomy; $P = 0.76$). Over the 24 months, trabeculectomy-treated eyes required an average 1.1 more drugs than phacoemulsification-treated eyes ($P = 0.001$). However, trabeculectomy was associated with significantly more ocular complications than phacoemulsification (46% vs. 18%; $P = 0.001$). Eighty-two percent of 24 trabeculectomy eyes demonstrated cataract during follow-up.
Conclusions: Both phacoemulsification and trabeculectomy are effective in reducing IOP in medically uncontrolled CACG eyes without cataract. Trabeculectomy is more effective than phacoemulsification in reducing dependence on glaucoma drugs, but is associated with more complications.
Financial Disclosures: The authors have no proprietary or commercial interest in any materials discussed in this article. *Ophthalmology* 2012;121:63-67 © 2011 by the American Academy of Ophthalmology.



- Conclusions:
- 1. Combined phacotrab. with adjunctive mitomycin C may be marginally more effective than phaco. alone in controlling IOP in medically controlled CACG eyes with coexisting cataract.
- 2. Combined surgery may be associated with more complications and additional surgery in the postoperative period..

Phacoemulsification Versus Combined Phacotrabeulectomy in Medically Controlled Chronic Angle Closure Glaucoma with Cataract

Chen C. T. Tam, FRCS,^{1,2} Fakhri Y. F. Saegh, MRCS,^{1,2} Dwan Y. L. Loag, FRCS,^{1,2}
 S. W. Lam, MRCS,^{1,2} Fu C. M. Li, MRCS,^{1,2} Thomas Y. H. Chea, FRCS,^{1,2} Jonathan C. H. Chan, FRCS,^{1,2}
 Catherine H. Y. Chan, FRCS,^{1,2} Agnes S. Y. Poon, FRCS,^{1,2} Dwan Y. L. Loag, FRCS,^{1,2}
 C. C. Chea, FRCS,^{1,2} Dwan Y. L. Loag, FRCS, FRCS(Ed),^{1,2} Jerry S. M. Lee, MD, FRCS(Ed)^{1,2}

Objective: To compare phacoemulsification alone versus combined phacotrabeulectomy in medically controlled chronic angle closure glaucoma (CACG) with coexisting cataract.
Design: Randomized clinical trial.
Participants: Seventy-five medically controlled CACG eyes with coexisting cataract.
Intervention: Recruited patients were randomized into group 1 (phacoemulsification alone) or group 2 (combined phacotrabeulectomy with adjunctive mitomycin C). Postoperatively, patients were reviewed every 2 months for 2 years.
Main Outcome Measures: Intraocular pressure (IOP) and requirement for topical glaucoma drugs.
Results: Thirty-five CACG eyes were randomized into group 1, and 39 CACG eyes were randomized into group 2. There were no statistically significant differences ($P < 0.05$) in mean IOP between the 2 treatment groups preoperatively and postoperatively, except at 9 months ($P = 0.001$) and 24 months ($P = 0.008$). Combined phacotrabeulectomy with adjunctive mitomycin C resulted in 0.93 less topical glaucoma drugs ($P = 0.002$) in the 24-month postoperative period compared with phacoemulsification alone. The differences in IOP control were, however, not associated with differences in glaucoma drug progression. Combined surgery was associated with more postoperative ($P < 0.001$) complications compared with phacoemulsification alone.
Conclusions: Combined phacotrabeulectomy with adjunctive mitomycin C may be marginally more effective than phacoemulsification alone in controlling IOP in medically controlled CACG eyes with coexisting cataract. Combined surgery may be associated with more complications and additional surgery in the postoperative period. Further study is needed to determine whether the marginally better IOP control of combined surgery offsets the potential additional risk of complications and further surgery.
Financial Disclosures: The authors have no proprietary or commercial interest in any materials discussed in this article. *Ophthalmology* 2008;115:2167-2172 © 2008 by the American Academy of Ophthalmology.





• **Conclusions:**

1. Combined phacotrab. with adjunctive mitomycin C is more effective than phaco. alone in controlling IOP in **medically uncontrolled** CACG eyes with coexisting cataract.
2. Combined phacotrab. is associated with more postoperative complications

Phacoemulsification versus Combined Phacotrabeculectomy in Medically Uncontrolled Chronic Angle Closure Glaucoma with Cataracts

Chen C. Y. Tian, FRCS,^{1,2} Galda Y. F. Kwong, MBChB,^{1,2} Doris T. L. Ling, FRCS,^{1,2} S. W. Lau, MBChB,^{1,2} Fok C. H. Li, MBChB,^{1,2} Tanna T. H. Che, FRCS,^{1,2} Jonathan C. H. Chan, FRCS,^{1,4} Doris S. C. Lam, FRCS, FRCOphth,^{1,2} Jimmy S. M. Lu, MD, FRCOphth¹

Objective: To compare phacoemulsification alone versus combined phacotrabeculectomy in medically uncontrolled chronic angle closure glaucoma (CACG) with coexisting cataract.

Design: Prospective randomized clinical trial.

Participants: Fifty-one medically uncontrolled CACG eyes with coexisting cataract of 51 patients.

Intervention: Recruited patients were randomized into group 1 (phacoemulsification alone) or group 2 (combined phacotrabeculectomy with adjunctive mitomycin C). Postoperatively, patients were reviewed every 3 months for 2 years.

Main Outcome Measures: Intraocular pressure (IOP) and requirement for topical glaucoma drops.

Results: Twenty-seven CACG eyes were randomized into group 1, and 24 CACG eyes were randomized into group 2. Combined phacotrabeculectomy resulted in lower mean postoperative IOP than phacoemulsification alone at 3 months (14.3 vs. 17.6 mmHg, $P = 0.01$), 12 months (13.2 vs. 15.4 mmHg, $P = 0.02$), and 18 months (13.6 vs. 15.3 mmHg, $P = 0.01$). Combined phacotrabeculectomy resulted in 1.23 fewer topical glaucoma drops ($P = 0.001$) in the 24-month postoperative period, compared with phacoemulsification alone. Cataract surgery was associated with more postoperative complications ($P < 0.001$) and more progression of optic neuropathy ($P = 0.03$), compared with phacoemulsification alone.

Conclusions: Combined phacotrabeculectomy with adjunctive mitomycin C is more effective than phacoemulsification alone in controlling IOP in medically uncontrolled CACG eyes with coexisting cataract. Combined phacotrabeculectomy is associated with more postoperative complications.

Financial Disclosures: The authors have no proprietary or commercial interest in any materials discussed in this article. Ophthalmology 2008;116:725-731 © 2008 by the American Academy of Ophthalmology



SURVEY OF OPHTHALMOLOGY VOLUME 54 • NUMBER 2 • MARCH-APRIL 2009



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Tarongoy, MD,¹ Ching Lin Ho, FRCSEd,² and David S. Walton, MD³

¹Associated Cebu Eye Specialists (ACES), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- Traditional treatment modalities for APAC include the use of IOP lowering medications and relief of pupillary block by laser peripheral iridotomy (LPI).

SURVEY OF OPHTHALMOLOGY VOLUME 63 NUMBER 4 APRIL 2018



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Taveggia, MD,¹ Chiang Lin Ho, FRCSEd,² and David S. Walton, MD³

¹Assisted Care Eye Specialist (ACES), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- Despite initial successes, 38% to 58% of these patients had persistently raised IOP subsequently.
- This may be due to:
 1. extensive residual appositional closure after LPI.

SURVEY OF OPHTHALMOLOGY VOLUME 63 NUMBER 4 APRIL 2018



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Taveggia, MD,¹ Chiang Lin Ho, FRCSEd,² and David S. Walton, MD³

¹Assisted Care Eye Specialist (ACES), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

2. direct trabeculum damage.
3. development of PAS as a result of the inflammatory response or prolonged angle closure during the acute attack.

SURVEY OF OPHTHALMOLOGY VOLUME 54 • NUMBER 2 • MARCH-APRIL 2009



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Tarougov, MD,¹ Ching Lin Ho, FRCSEd,² and David S. Walton, MD³

¹Associated Glaucoma Specialists (AGS), Gulu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- The lens plays an essential role in the pathogenesis of primary ACG.
- Clinical studies suggest that lensectomy and PCIOL implantation for ACG patients may offer **successful IOP control**.

SURVEY OF OPHTHALMOLOGY VOLUME 54 • NUMBER 2 • MARCH-APRIL 2009



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Tarougov, MD,¹ Ching Lin Ho, FRCSEd,² and David S. Walton, MD³

¹Associated Glaucoma Specialists (AGS), Gulu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- Lensectomy eliminates pupillary block,
- widens the angle to lessen angle crowding thus reducing the iridotrabecular proximity,
- and is the only treatment alternative that reduces if not corrects the responsible anatomic predisposition to angle closure.

SURVEY OF OPHTHALMOLOGY VOLUME 54 • NUMBER 2 • MARCH-APRIL 2009



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Tarongoy, MD,¹ Ching Lin Ho, FRCSed,² and David S. Walton, MD³

¹Associated Glaucoma Specialists (AGS), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- The phaco. procedure offers the advantages of,
 1. faster postoperative visual rehabilitation,
 2. preservation of the superior conjunctiva for future trab. if needed.

SURVEY OF OPHTHALMOLOGY VOLUME 54 • NUMBER 2 • MARCH-APRIL 2009



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Tarongoy, MD,¹ Ching Lin Ho, FRCSed,² and David S. Walton, MD³

¹Associated Glaucoma Specialists (AGS), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- avoidance of **anesthetic complications**: Phaco alone can often be performed under topical anesthesia, whereas a combined procedure may require peribulbar or retrobulbar anesthesia.

SURVEY OF OPHTHALMOLOGY VOLUME 53 NUMBER 1 • WINTER 2008



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Taravogis, MD,¹ Chiang Liu Ho, FRCSEd,² and David S. Walton, MD³

¹Assisted Clinician Specialist (ACS), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- Intraocular surgery in patients with angle closure **is more challenging** than regular surgery because of the shallow AC, atonic pupil from the acute attack, and residual corneal edema.

SURVEY OF OPHTHALMOLOGY VOLUME 53 NUMBER 1 • WINTER 2008



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Taravogis, MD,¹ Chiang Liu Ho, FRCSEd,² and David S. Walton, MD³

¹Assisted Clinician Specialist (ACS), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- The reviewed studies of lensectomy for treatment of ACG reported that lensectomy, by either ECCE or PHACO, to be potentially safe in the hands of a **skilled cataract surgeon**

SURVEY OF OPHTHALMOLOGY | VOLUME 58 | NUMBER 1 | MARCH/APRIL 2018



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Taravogis, MD,¹ Chiang Lin Ho, FRCSEd,² and David S. Walton, MD³

¹Assisted Care Eye Specialist (ACE), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- The complication causing the most frequent concern was **the immediate postoperative pressure spike**, which occurred in 9–60% of eyes.

SURVEY OF OPHTHALMOLOGY | VOLUME 58 | NUMBER 1 | MARCH/APRIL 2018



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Taravogis, MD,¹ Chiang Lin Ho, FRCSEd,² and David S. Walton, MD³

¹Assisted Care Eye Specialist (ACE), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- Corneal edema as endothelial cell damage is common after acute angle closure and elevated IOP
- Significant postoperative inflammation was seen in 16--40% of eyes reported in at least four studies.

SURVEY OF OPHTHALMOLOGY VOLUME 54 • NUMBER 3 • MARCH-APRIL 2009



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Tarongoy, MD,¹ Ching Lin Ho, FRCSed,² and David S. Walton, MD³

¹Associated Glaucoma Specialists (AGS), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

The lens in ACG

- The addition of GSL may be associated with increased rates of hyphema, fibrinoid anterior chamber reaction, IOP spikes, and cystoid macular edema postoperatively, secondary to the iris manipulation.

SURVEY OF OPHTHALMOLOGY VOLUME 54 • NUMBER 3 • MARCH-APRIL 2009



MAJOR REVIEW

Angle-closure Glaucoma: The Role of the Lens in the Pathogenesis, Prevention, and Treatment

Pamela Tarongoy, MD,¹ Ching Lin Ho, FRCSed,² and David S. Walton, MD³

¹Associated Glaucoma Specialists (AGS), Cebu City, Philippines; ²Singapore National Eye Centre, Singapore, Republic of Singapore; and ³Department of Ophthalmology, Harvard Medical School, Boston, Massachusetts, USA

