



Demonstrating Long-Term Efficacy in SLT

Lawrence F. Jindra, MD
Columbia University
Winthrop University Hospital



Disclosure

- Speaker has independently conducted and financed original clinical research studies presented
- Speaker has previously served as a speaker for Lumenis and Ellex
- Speaker was not compensated to present data contained in this presentation



Learning Objectives

Columbia Presbyterian Medical Center
NewYork-Presbyterian Hospital

- **New Treatment Paradigms**
- **Independent Clinical Research**
- **Clinical Efficacy**



Introduction

➤ **Selective Laser Trabeculoplasty (SLT)** uses a Q-Switched frequency-doubled (532 nm) Nd:YAG laser which selectively targets melanocytes in the pigmented trabecular meshwork^{1,2}

1. Latina MA, et al. Selective targeting of trabecular meshwork cells: in vitro studies of pulsed and cw laser interactions. *Exp Eye Res.* 1995;60:359-372.

2. Latina MA, et al. Q-switched 532-nm Nd:YAG laser trabeculoplasty (selective laser trabeculoplasty): a multicenter, pilot, clinical study. *Ophthalmology.* 1998;105:2082-2090.



Introduction

- A biologic response is induced, which involves release of cytokines and triggers macrophage recruitment, leading to an ultimate reduction in intraocular pressure¹

1. Latina MA, et al. Q-switched 532-nm Nd:YAG laser trabeculoplasty (selective laser trabeculoplasty): a multicenter, pilot, clinical study. *Ophthalmology*. 1998;105:2082-2090.



Background

- Method of action is thought to be selective photothermolysis¹
- There is no thermal or coagulative damage to surrounding tissue^{1,2}
- Only pigmented cells are targeted^{1,2} – no peripheral anterior synechiae

1. Latina MA, et al. Selective targeting of trabecular meshwork cells: in vitro studies of pulsed and cw laser interactions. *Exp Eye Res.* 1995;60:359-372.

2. Latina MA, et al. Q-switched 532-nm Nd:YAG laser trabeculoplasty (selective laser trabeculoplasty): a multicenter, pilot, clinical study. *Ophthalmology.* 1998;105:2082-2090.



Background: GLT

- The Glaucoma Laser Trial¹
 - Established efficacy of laser trabeculoplasty, in lowering IOP in patients with previously untreated primary open-angle glaucoma
 - *Arch Ophthalmol.* 1989;107:1135-1142.

1. The GLT Research Group. GLT. 1. *Arch Ophthalmol.* 1989;107:1135-1142.



Background: OHTS

➤ The Ocular Hypertensive Treatment Study¹

- Treated patients had half the risk of developing early glaucoma
- Early treatment prevents/delays onset of glaucoma
- Established efficacy of early treatment to preserve long term vision in glaucoma patients

1. Kass MA, et al. OHTS. *Arch Ophthalmol*. 2002;120:701-713.
▪ *Arch Ophthalmol*. 2002;120:701-713.



Background: EMGT

➤ The Early Manifest Glaucoma Trial¹

- Treatment reduced risk of developing significant glaucoma
- Lowering IOP in newly diagnosed glaucoma patients slows progression of visual field loss
- Established efficacy of effective treatment to preserve long term vision in glaucoma patients

▪ ***Arch Ophthalmol.* 2002;120:1268-1279.**

1. Heijl A, et al. EMGT. *Arch Ophthalmol.* 2002;120:1268-1279.



Background: Current Thought

Columbia Presbyterian Medical Center
NewYork-Presbyterian Hospital

- There does not seem to be any remaining question nor doubt that early treatment is beneficial
- Almost every long-term study shows a measurable and definable benefit to effective treatment
- *Paradigm shift* among glaucoma specialists:
 - Diagnose early
 - Treat effectively
 - Preserve vision

1. *Int Gl Rev.* 10-2 September 2008



Background: SLT

- Cold Laser with $1/6000^{\text{th}}$ flux density of hot laser
- Novel mode of action: does not cut, burn, nor scar
- Suitable for all types of glaucoma (POAG, PEX, PIG)
- Can be used as:
 - Initial therapy Paradigm shift
 - Adjunctive therapy Conventional
 - Repeat therapy Novel action



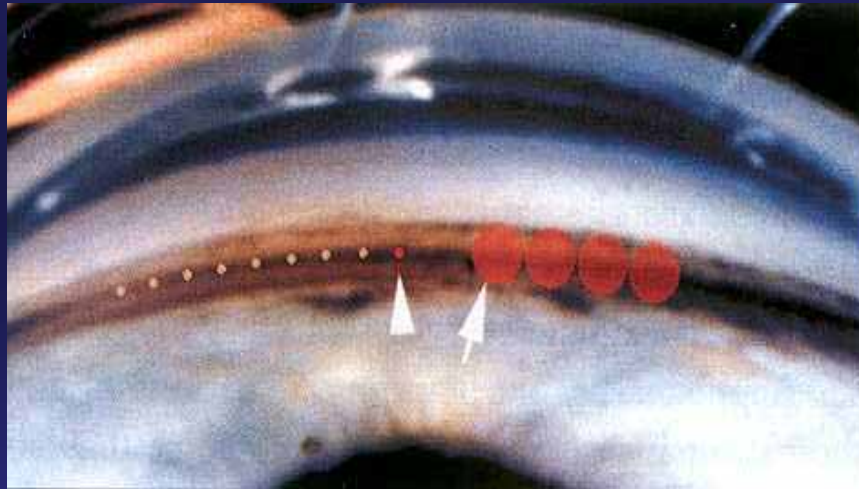
Technique

Energy:	0.8 – 1.6 millijoules
Spot size:	400 micrometers
Total spots:	90 – 110 spots
Angle area:	2–10 o'clock (240 deg)
Endpoint:	<i>Champagne bubbles</i>



Technique

Columbia Presbyterian Medical Center
NewYork-Presbyterian Hospital





Objective and Methods

➤ Objective

- To examine the long-term effectiveness of SLT as primary, secondary, and repeat treatment in patients with glaucoma (presented at ASCRS 2002 - 09, ARVO 2005 - 09, AAO 2004 - 08).

➤ Methods

- In a consecutive case series, five-year retrospective chart review was performed on 2056 eyes from patients treated with SLT between January 2002 and February 2007. Seven-year, 3000 eye review is ongoing at



Statistical Analysis

➤ Statistics:

- Two-tailed paired *t*-tests compared
- Maximum pre- and post-procedure IOP
- Number of pre- and post- procedure glaucoma medications (meds)
- Life Table Analysis was used to determine cumulative probability of success over five years



Data Set: Primary

- **879 eyes were treated with SLT as primary treatment for glaucoma over 5 years**
- **Diagnostic and treatment criteria from latest studies: GLT, OHTS, and EMGT**
- **Pre- and post- procedure IOP were evaluated**

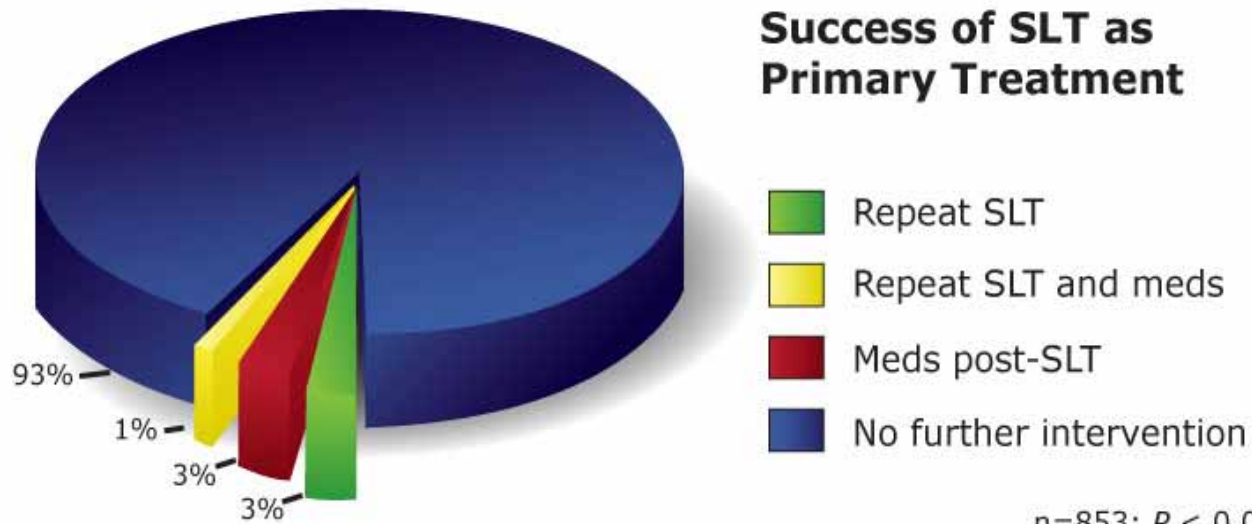


Results: Primary

- IOP decreased from a mean of 19.1 mm Hg \pm 4.0 (range: 12-36) to 13.2 mm Hg \pm 3.3 (range: 6- 32) after primary treatment with SLT over a five -year period
- This represented a 31% mean decrease in IOP or a mean change of 5.9 mm Hg \pm 3.2 (99% CI: 5.7-6.9)
- Results were significant with $P < 0.01$



Results: Primary



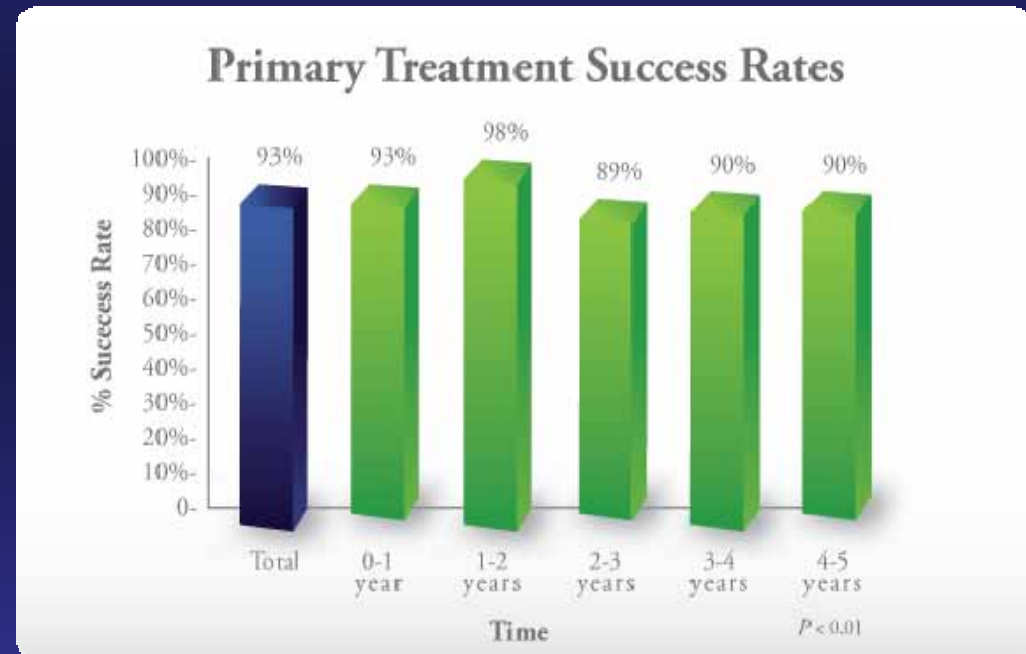
n=853; $P < 0.01$



Results: Primary

➤ Lifetable Analysis : failure defined as repeat SLT or meds

- 5 year 93%
- 0-1 year 93%
- 1-2 years 98%
- 2-3 years 89%
- 3-4 years 90%
- 4-5 years 90%



➤ Results were significant with $P < 0.01$



Data Set: Secondary

- 760 eyes were treated with SLT as secondary treatment for glaucoma over five years
- Patients referred for IOP control and / or reduction in side effects of meds
- Pre- and post- procedure IOP and number of pre- and post-procedure meds were evaluated



Results: Secondary

- IOP decreased from mean of 20.0 mm Hg \pm 6.4 (range: 7-48) to 15.9 mm Hg \pm 5.5 (range: 5-42) after secondary treatment with SLT over a five - year period
- This represented a 21% mean decrease in IOP or a mean change of 4.1 mm Hg \pm 6.2 (99% CI: 3.8-6.3)
- Results were significant with $P < 0.01$

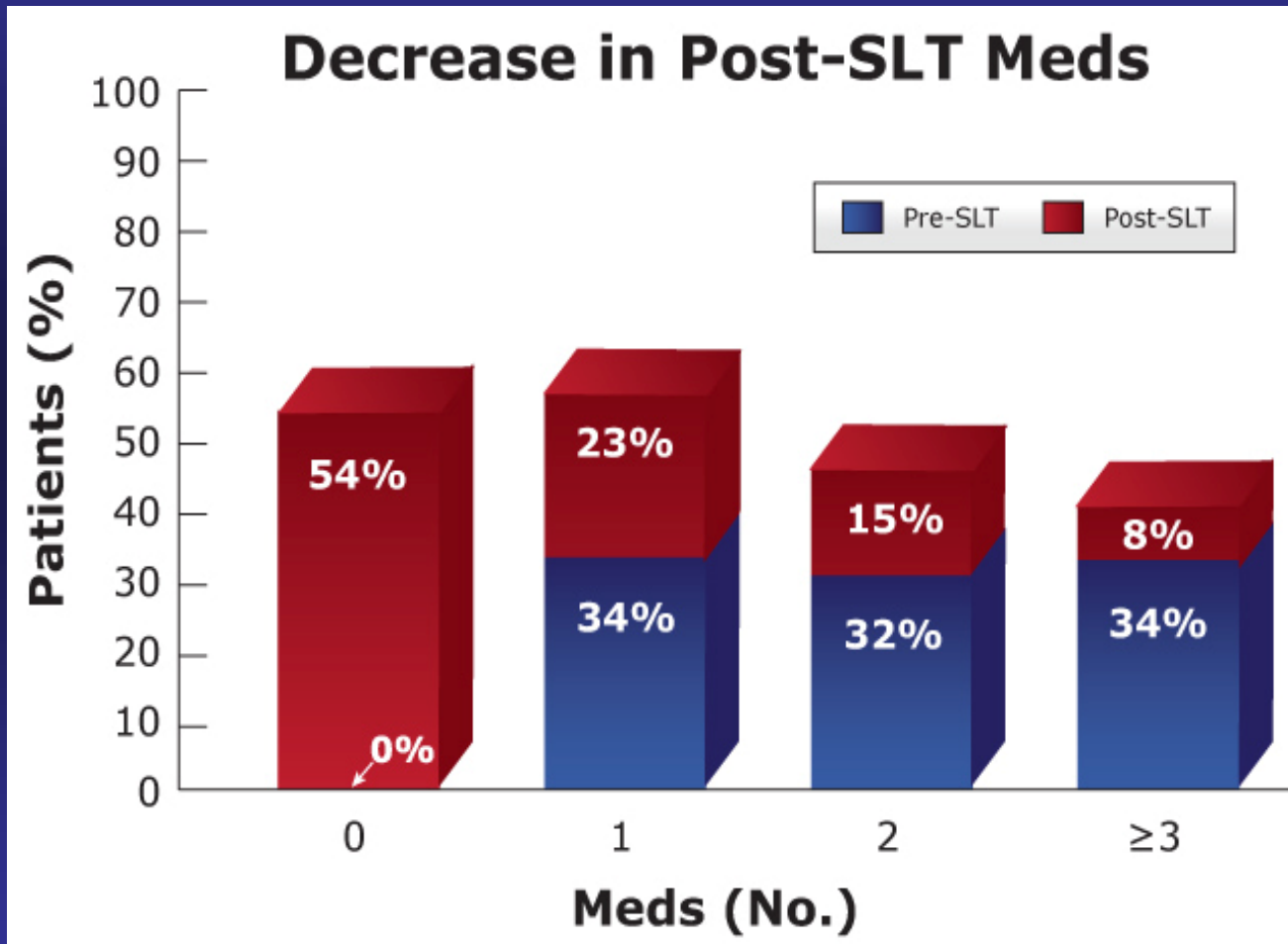


Results: Secondary

- Number of meds decreased from a mean of 2.3 \pm 0.9 (range: 1-6) to 1.3 \pm 1.0 (range: 0-4) after secondary treatment with SLT
- This represented a 44% mean reduction in the number of meds or a mean change of 1.0 med \pm 0.9 (99% CI: 0.9-1.2) over a five-year period
- Results were significant with $P < 0.01$



Results: Secondary





Results: Secondary

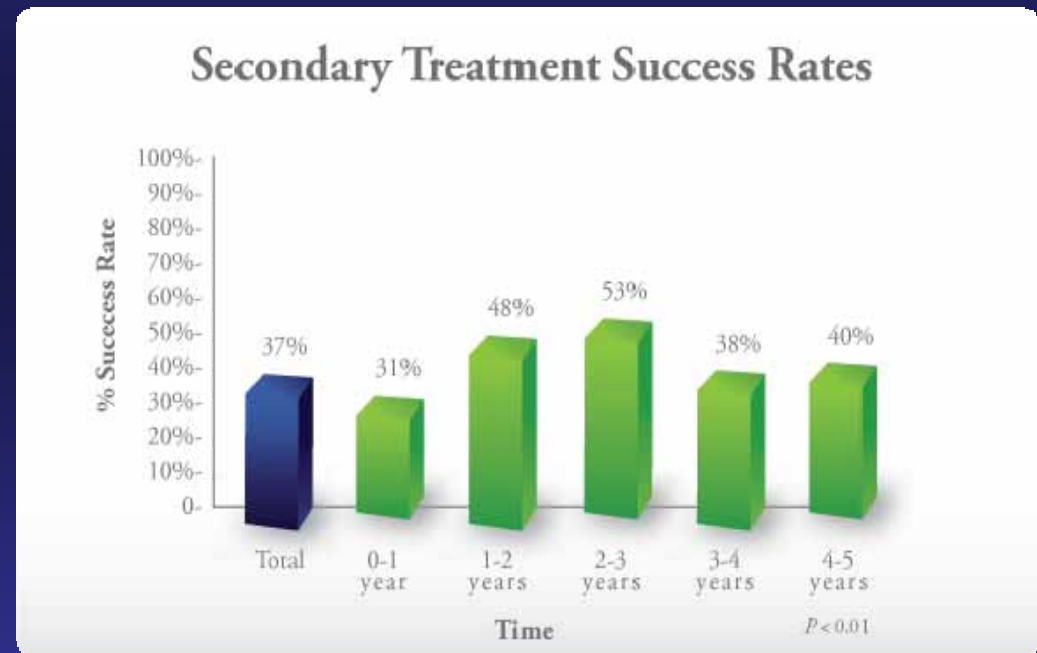
- Post-SLT taper rate (to NO meds)
 - Preop ONE med: 86%
 - Preop TWO meds: 62%
 - Preop THREE meds: 42%
 - Preop FOUR meds: 32%
- Results were significant with $P < 0.01$



Results: Secondary

➤ Lifetable Analysis : failure defined as repeat SLT or meds

- 5 year 37%
- 0-1 year 31%
- 1-2 years 48%
- 2-3 years 53%
- 3-4 years 38%
- 4-5 years 40%



➤ Results were significant with $P < 0.01$



Data Set: Repeat

- **376 eyes out of 1634 eyes initially treated with SLT required repeat treatment**
- **Patients referred for IOP control and / or reduction in side effects**
- **Results were significant with $P < 0.01$**



Results: Repeat

- These data represent a repeat rate of
 - 11% of eyes treated over three years
 - 18% of eyes treated over four years
 - 24% of eyes treated over five years
- Results were significant with $P < 0.01$



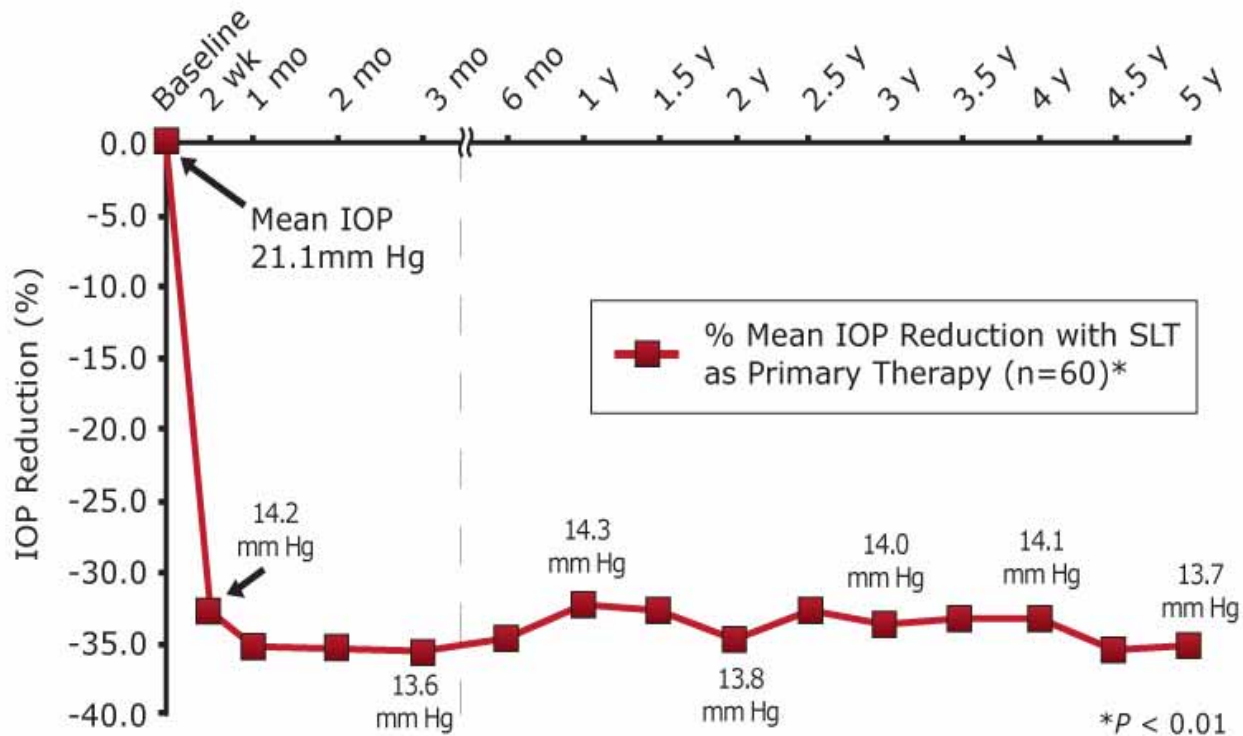
Results: Longevity

- 60 eyes treated with SLT as primary therapy were followed for 6 years
- IOP was retrospectively recorded at various time points up to 6 years



Results: Longevity

SLT as Primary Therapy Maintained Significant Mean IOP Reductions Over 5 Years*





Results: Other

- **Primary Rx eyes respond better than Secondary Rx eyes**
- **Phakic eyes respond better than pseudophakic eyes**
- **Eyes treated with PGs respond worse than other meds**
- **Blue eyes respond better than brown eyes**
- **Younger eyes respond better than older eyes**



Key Points

- Focus of spot not critical; must visualize TM
- Treatment end point is *Champagne* bubbles
- Treatment energy usually 1.0 – 1.8 mJ
- Treatment spots at least 150 spots (total)
- Treatment area at least 240 -360 degrees
- Post-op NSAIDs BID for 3 days (No steroids)
- Remove meds slowly, taper PGs first



Summary

- In this clinical series, treatment with Selective Laser Trabeculoplasty :
 - Significantly lowered intraocular pressure
 - Significantly lowered number of meds
 - Significantly effective repeat rate
 - Significantly effective long term efficacy



Learning Objectives

Columbia Presbyterian Medical Center
NewYork-Presbyterian Hospital

- **New Treatment Paradigms**
- **Independent Clinical Research**
- **Clinical Efficacy**



Demonstrating Long-Term Efficacy in SLT

Lawrence F. Jindra, MD

Columbia University

Winthrop University Hospital