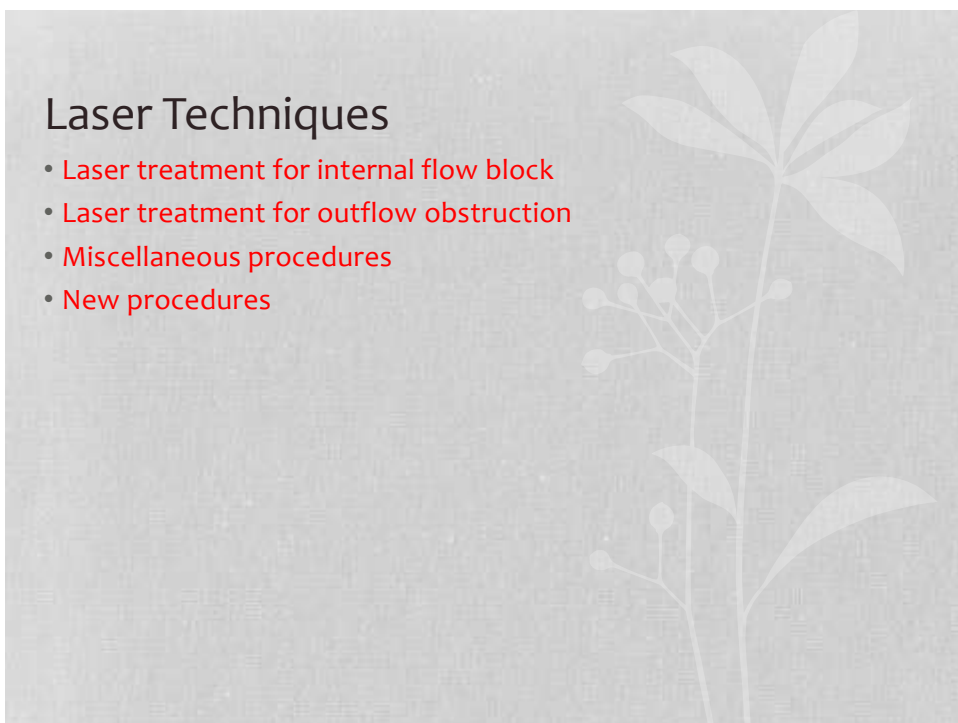


LASER IN GLAUCOMA

Ahmed Hossam Abdalla
Professor of Ophthalmology
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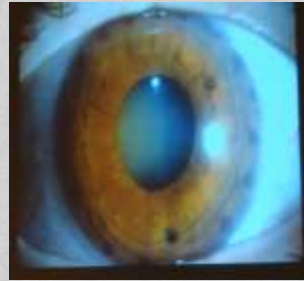


Laser Techniques

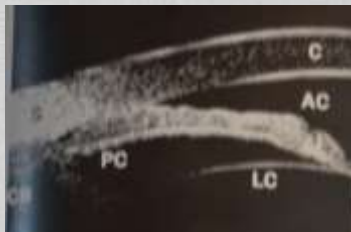
- Laser treatment for internal flow block
- Laser treatment for outflow obstruction
- Miscellaneous procedures
- New procedures

Laser for internal flow block

- Laser peripheral iridotomy
- Laser iridoplasty



Iridectomy in Pupillary block

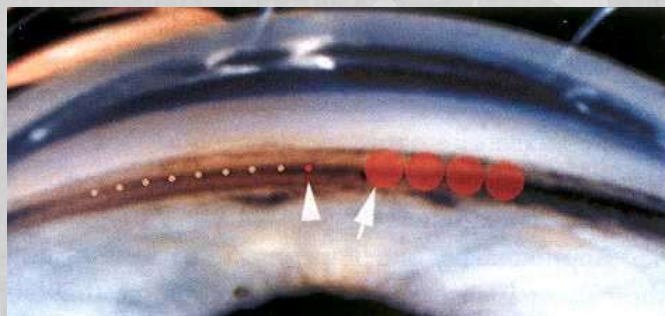


Iridectomy in Pigmentary glaucoma



Laser for outflow obstruction

- ALT
- SLT
- MLT



ARGON LASER TRABECULOPLASTY

- Glaucoma Laser Trial
- 271 patients with previously untreated primary open angle glaucoma randomized to ALT or medication
- Through 2-year follow-up, ALT eyes had lower intraocular pressure (IOP) than medication-treated eyes; 25% did not require Rx
- At 7 years, in 203 of the original 271 patients, ALT-treated eyes had lower IOP, better visual fields and optic disc status than eyes in the medication group

Glaucoma Laser Trial Research Group: The Glaucoma Laser Trial (GLT) and Glaucoma Laser Trial Followup Study: 7. Results. Am J Ophthalmology 120: 718-731, 1995

LIMITATIONS OF ALT

- Post-treatment increase in IOP; PAS
- Limited efficacy of ALT re-treatment
- Coagulative damage to the trabecular meshwork (TM)

SLT

- Selective laser trabeculoplasty
- Non-thermal laser
- Q-switched frequency doubled (532) Nd:YAG laser
- Selectively targets and irradiates only the pigmented cells in the trabecular meshwork with no collateral damage to the underlying structures

MECHANISM OF SLT

- Melanin containing cells are damaged by SLT, without affecting underlying structures
- Macrophages remove damaged cells
- Trabecular meshwork cells divide to replace the lost cells
- A healthier more porous trabecular meshwork restores balanced aqueous outflow

Procedure of SLT

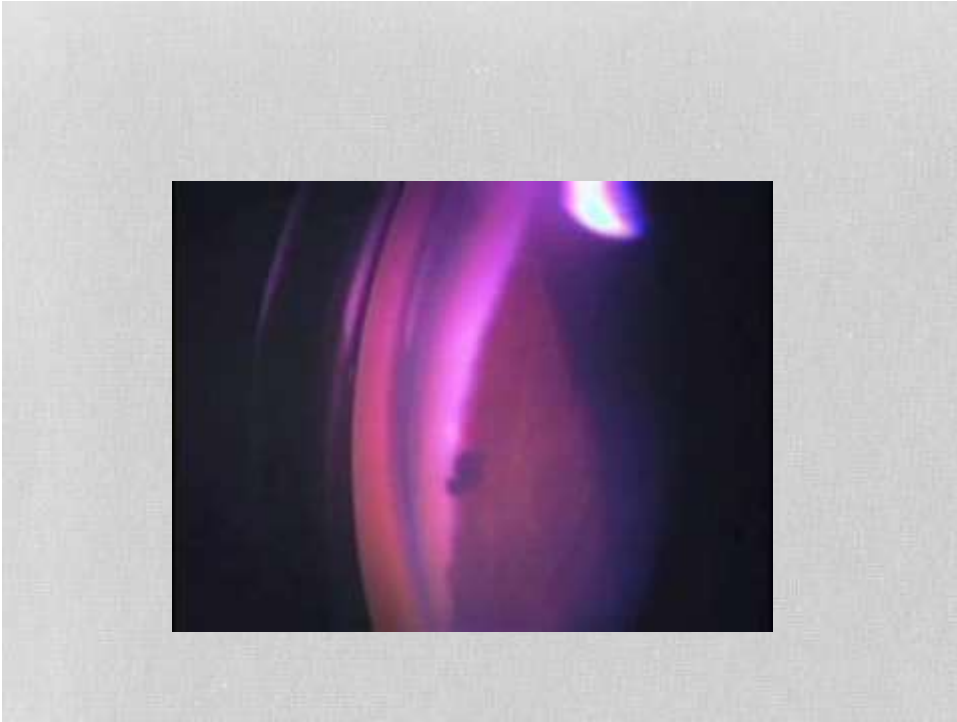
- Use latina laser gonio lens
- Treat 360 or 180 or 90??
- Spot size fixed 400 microns
- Power start with 0.8 mj

Contact Placement



- NO magnification (1X only)
 - Latina SLT
 - Goldmann 3 mirror
 - Ritch
- Changes in magnification will alter beam diameter and energy





Results of SLT?

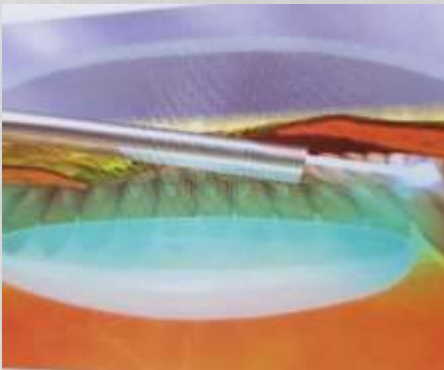
- 20 - 30 % reduction of IOP
- Success rate from 75-80%

Adverse Effects

- Usually are transient and minimal
- Mild discomfort during treatment
- Blurred vision 10 – 15 minutes
- Sore eyes for 2 – 3 days
- Post SLT IOL spike
 - < 10 %
 - Within first 24 hours and disappears in the following 24 hours

Miscellaneous procedures

- Cyclophotocoagulation
 - Contact laser scleral photocoagulation
 - Endocyclophotocoagulation

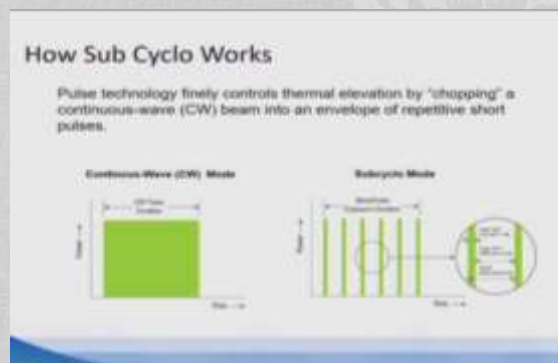


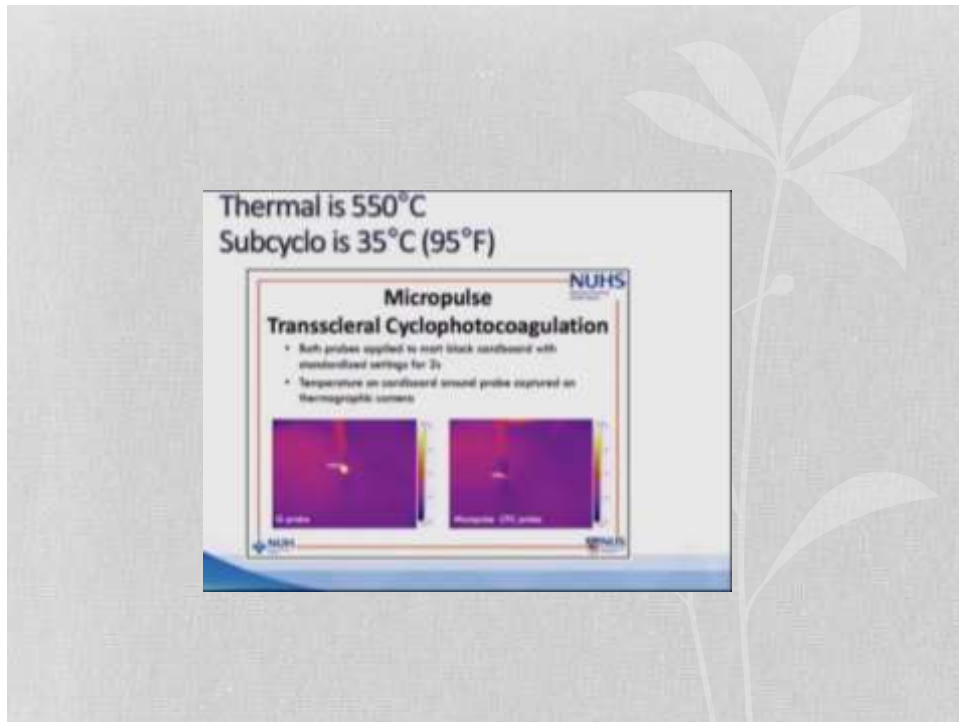
Miscellaneous procedures

- Laser suture lysis
 - After trabeculectomy
- Re-opening filtering sites
 - Pigmented with argon
 - Non pigmented with yag
- Laser goniosynechiolysis
- Laser goniophotocoagulation
- Laser photomydriasis (pupillopasty)

Diode Lasers

- Contact trans-scleral CPC (TSCPC)
- Micropulse CPC (MPCPC)





Contact trans-scleral CPC (TSCPC)

- Using the continuous wave is the common way of delivery.
- It is effective for all the forms of glaucoma.
- Is often used as a treatment of last resort because of the risk of morbidity and hypotony, visual disturbance and even phthisis bulbi.



Success of TCP in lowering IOP is tempered by significant complication rates by ten years:



Visual loss of two or more lines occurred in 75% of eyes

Phthisis occurred in 3% of eyes

5 eyes with initial VA of counting fingers lost light perception (7%)

Lin P, Wollstein G, Glavas IP, Schuman JS: Contact transscleral neodymium:yttrium-aluminum-garnet laser cyclophotocoagulation - Long-term outcome Ophthalmology 2004; 111(11):2137-43

Micropulse CPC (MPCPC)

- An alternative which administers a series of repetitive short pulses of laser energy separated by rest periods, and it is unlike CWPC which delivers continuous high intensity energy to the ciliary body.
- MP is applied using a customized probe that is used to apply the laser in a continuous painting fashion, rather than individual burns, and rather to pars plana rather than pars plicata.



New Procedure

- Micropulse cyclophotocoagulation
- OR
- Subcyclo procedure

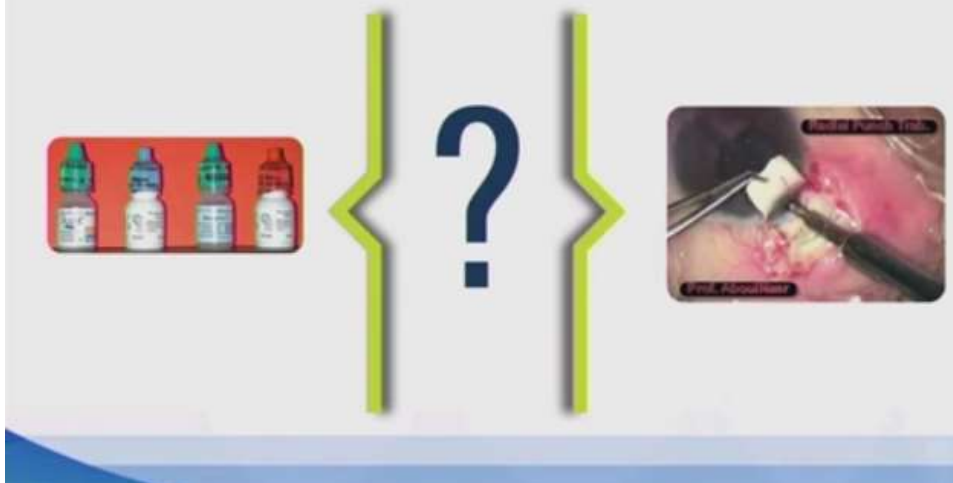
MPCPC

- Mechanism of action still unclear.
- It is hypothesized that inflammation of the ciliary body reduces aqueous formation and possibly enhances uveoscleral outflow.
- UBM after MPC
 - No anatomical damage or visible lesion in ciliary body
 - Thin space between sclera and ciliary body which may correspond to presence of suprachoroidal fluid.

Glaucoma Treatment Landscape



The gap in the care for glaucoma patients
Noncompliance with drugs versus invasive surgery




What is ideal solution for chronic disease management?

- 
- Gives physician control of therapy compliance
 - Efficient
 - Repeatable
 - Leaves future options open

1. Vrijens B. BMJ. 2008;336(7653):1114-1117

MPCPC

- 
- Indicated for most types of glaucoma
 - POAG
 - PACG
 - Pseudoexfoliation
 - NVG
 - Steroid induced glaucoma
 - Uveitis
 - After PKP

Results of the procedure

- Reduction of mean IOP from 27.7 mmHg. To 16.3 mmHg. With 41.2 % reduction
- Reduction of mean medication from 3.3 preop. To 2.3 post op

Micropulse Cyclophotocoagulation: Initial results in Refractory Glaucoma
Emanuel ME, et al. J Glaucoma 2017

Results of the procedure

- Reduction of IOP by 30 % from baseline and below 21 mmHg.
- Reduction of mean number of medications from 3.4% before treatment to 2.9% after treatment

Yves Lockhur and Nassuria Bentrach
Glaucoma institute, Saint Joseph Hospital , Paris

Results of the procedure

- Reduction of IOP from 38 mmHg preoperatively to 23 mmHg postoperatively with 40% reduction
- Reduction of medications from 2.5 to 1.8

Treatment outcomes of micropulse transscleral cyclophotocoagulation in advanced glaucoma
Kucher S, Moster M, Weisbond M. Lasers Med Sci 2016; 31: 393 - 6

