

Nd- Yag Capsulotomy

LASER

- yttrium aluminium garnet is a synthetic crystalline material .
- Neodymium rare earth element is added to YAG to induce atomic excitation and to produce the laser.
- Wavelength is 1064nm
- Switched mode is used which delivers energy pulses of very short nanosecond duration, also energy within the laser cavity is raised several times by making the partially reflective mirror opaque, then suddenly transparent by polaroid filters. This causes rapid depletion of energy in the laser cavity .
- Nd -YAG's second laser light , Helium- neon is an aiming beam used to visualise where the laser gets focused.
- Principle : Photodisruption - power density is so great that molecules are broken apart into their component ions, creating rapidly expanding ion " phase" which creates a shock wave effect to cause disruption of tissue.

LENS USED -

- Abraham lens : 1.8x magnification , planoconvex 66D lens
- Wise lens : 103D planoconvex lens
- Paymen lens : + 30 D convex lens

Advantages of using contact lens -

- increases angle of convergence from 16 to 24 degrees.
- Decreases area of laser from 21 to 14 microns.
- Increases beam diameter and cornea and retina
- Allows lesser energy to be used
- Decreases incidence of corneal burns
- Negates blink reflex

MACHINE BASICS -

- Used here is Zeiss Visuals YAG 3
- Has laser integrated slit lamp
- Precise targeting laser , which uses a 4 point aiming beam.
- Has a movable control panel with a rotating knob.
- Also has a foot pedal and safety goggles are included
- It has 3 modes which are anterior , zero and posterior.

MODES OF LASER AND INDICATIONS -

- Anterior mode - used for anterior capsulotomy for intumescent cataract to decompress the bag , also for anterior capsular contraction syndrome or phimosis . YAG vitreolysis with peaking pupil.
- Zero mode - can be used for YAG sweep , done to remove pigments on IOL. Sweeps the lens surface clear of deposits.
- Posterior mode - used for PCO, capsular distension syndrome , anterior hyaloidotomy for malignant and pupillary block glaucoma .

TIMING -

- After phaco sx as early as 3 wks post sx and 4-6 wks for SICS.

CONTRAINDICATIONS-

Absolute contraindications -

- corneal scar , edema
- Patient can not fixate , (eg nystagmus)

Relative contraindications -

- Cystoid macular edema
- Active ocular inflammation
- High risk of retinal detachment

PRIOR TO PROCEDURE -

Detailed ocular examination and retinal exam documentation .

Prepare the patient -

- explain the procedure , adjust headrest , chair height.
- Pupillary dilation
- Dark room
- Sometimes pre procedure Apraclonidine e/d can be used prophylactically to lower intraocular pressure .
- Fixation of fellow eye .

TECHNIQUE

- 1.5 to 2 mJ per pulse is usually used.
- Start with low energy and gradually increase if needed
- 5 to 10 shots may be sufficient .

SIZE OF OPENING -

- very small/ visual axis - tends to cause glare
- Very large - increases risk of IOL dislocation, posterior shift of optic causing hyperopic refractive shift .
- ideal - size that approximates the scotopic pupil size while maintaining overlap with posterior aspect of optic .

PATTERNS OF CAPSULOTOMY OPENING

- most common is cruciate and circular .
- studies show cruciate has lower incidence of post procedure floaters.
- Circular - total ocular scatter index is slightly lower.
- Cruciate ; start at 12 o clock in the periphery progress to 6 o clock and cut across at 3 and 9 o clock . Advantages of starting in periphery if lens pitting occurs it is peripheral. As flap develops , gravity aids in pulling them to the inferior periphery .
- Other patterns - Christmas tree type , hexagonal , diamond shape .

LENS PITTING -

Tips to avoid -

- pulse mode preferred over burst mode
- Posterior defocus - focus the posterior to posterior capsule slightly , to cause breakdown in the anterior vitreous , shockwave radiates forward and ruptures the posterior capsule.

POST PROCEDURE -

- Antibiotic steroid (dextran -s) eye drops 4 times a day for 1 wk
- Retina follow up 1 wk later.
- Can add IOP lowering agents (Apraclonidine)

POST PROCEDURE COMPLICATIONS -

- Raised intraocular pressure
- Cystoid macular edema
- IOL damage
- Retinal detachment
- Endophthalmitis
- Iritis , vitritis
- Macular hole
- Corneal burns , edema

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