Laser Iridotomy (LI)

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Laser Iridotomy is the creation of full thickness opening in the iris using photodisruptive property of lasers. It has become the procedure of choice in all forms of angle closure due to relative or absolute pupillary block, which permits equalization of pressures in anterior and posterior chambers.

Indications for laser Iridotomy

Therapeutic

- Acute angle closure glaucoma - after termination of attack by medical therapy
- Subacute angle closure glaucoma
- Chronic angle closure glaucoma
- Combined-mechanism glaucoma
- Pupillary block glaucoma including subluxated lens
- Iris bombe due to secclusio pupillae
- Iridovitreal block after cataract surgery
- Imperforate surgical iridectomy
- Before argon laser trabeculoplasty in eyes with narrow angles

Prophylactic

- Occludable angle
- Fellow eye with either acute or chronic angle closure glaucoma
- Fellow eye after complicated surgical iridectomy
- Patient with silicone oil placed in the eye inferior iridectomy is performed
- Pigment Dispersion Syndrome
- Nanophthalmos

Diagnostic

- Plateau iris
- Aqueous misdirection syndrome

Contraindications

- Uncooperative patient and unable to sit at the slit lamp
- Corneal opacities and edema
- Chronic inflammation
- Hazy and flat anterior chamber
- Widely dilated pupil
- Presence of 360° peripheral anterior synechiae
- An eye with active rubeosis iridis risk of bleeding
- Patient taking systemic anticoagulants, including aspirin

Preoperative considerations

- An informed consent
- Well controlled IOP - Pretreatment with apraclonidine 0.5% or brimonidine 0.2% can help blunt IOP spikes.
- Cornea should be clear - Corneal edema may be improved by pretreatment with topical glycerine.
- Pupil must be constricted to stretch and thin the iris - a drop of pilocarpine 1% is instilled two to three times at 10 minutes interval.
- If the pressure is high despite topical medications and oral acetazolamide, use intravenous mannitol to lower the tension.

Operative technique

Topical anesthesia is applied in the form of 4% Xylocaine. An Abraham's type of contact lens is applied. This lens has a +55 D peripheral button over a routine contact lens.

Advantages of contact lens

- Stabilizes the eye and keeps the lid retracted during the procedure.
- Acts as a heat sink, decreasing the number of epithelial corneal burns.
- Smoothens out the corneal surface.
- Provides highly magnified peripheral view.
- Helps to reduce the axial expansion of plasma which reduces the unnecessary spread of damage.
- Increases the power density of the spot by factor of 4, thus facilitating the production of a full thickness iris hole.

Settings

Argon laser : Long pulses (0.2 seconds) for light-colored irides and short pulses (0.020.05 seconds) for dark brown irides. Power of 1000 mW and a spot size of 50 μm.

Nd : YAG Laser : The Q-switched mode is used. Iris blood vessels are avoided. The iridectomy spot may be placed anywhere between the 11 and 1 o'clock positions. The red laser-aiming beam is brought to a focus when the multiple beams are brought into a single spot, aimed through the center of the contact lens. The energy used is 38 mJ, there are 13 pulses per shot, and one or more shots are used as required for penetration

Argon vs Nd-Yag

Nd-YAG laser has replaced all other lasers as far as iridotomy is concerned. The Nd:YAG laser does not coagulate tissue (like argon laser which has photocoagulation effect) and small hemorrhages occur more frequently with this modality. Therefore, in eyes that have prominent unavoidable vessels or in patients affected by a bleeding diathesis, combined treatment is preferred, first with the argon laser (to ablate vessels in the area) and then with the Nd:YAG laser (to establish a patent peripheral iridectomy). Sometimes this combination may be required in eyes with thick brown iris.

Choice of iridotomy site

- Upper nasal quadrant under lid - to prevent "second pupil" effect
- As close to limbus as possible - less likely to damage the lens
- Aim to hit the spot in a crypt where the thickness is much less.
- One iridotomy, if patent, is usually sufficient. However, in patients with uveitis, multiple iridotomies are suggested because of high failure rate.

End point

Once the iridotomy is complete, one can notice a sudden outflowing of the pigment from the posterior to anterior chamber along with sudden deepening of anterior chamber.

- The presence of retro illumination may not be a sure sign of total penetration.
- The minimum recommended diameter of LI is around 150 to 200 µm.

Postoperative management

- Antiglaucoma medications - should be continued along with an additional anti glaucoma agent for 1 week.
- Steroids three times/Day for 4 days to control inflammation.
- Pilocarpine 1% drop thrice a day to keep the iris stretched and iridotomy patent.
- Check IOP after 24-48 hours and patency is confirmed at slit lamp.
- Gonioscopy at 6 weeks, to see the opening up of angles.

Advantages over Surgical Iridectomy

- Safe, effective, OPD procedure.
- Lesser rate of complications such as serious intraoperative hemorrhage and cataract.
- Avoids complications like endophthalmitis, wound leak, flat anterior chamber and problems related to anesthesia.

Complications

1) Transient increase in IOP antiglaucoma drug must be added.
2) Microhemorrhages -. Not serious, easily controlled by applying pressure with contact lens for a few seconds
3) Uveitis because of pigment dispersal and a result of irritation to the iris rather than a specific iritis. Steroids antibiotic combination should be started three times for atleast 3-4 days.
4) Closure of iridotomy - due to accumulation of pigment granule or debris, give pilocarpine for 4 to 6 weeks.
5) Corneal damage - heal quickly without sequelae.
6) Cataract formation : because of direct damage from laser irradiation. Iridotomy should be performed close to limbus.
7) Retinal burns very rare. Minimized by always aiming beam towards peripheral retina and by using Abraham lens.
8) Monocular blurring - If iridotomy is not fully covered with upper lid, patient may complain of monocular blurring.

Other complications include lens capsule rupture,