MATERIALS AND METHODS
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The present study was conducted at M.L.B. Medical College, Jhansi. It includes the patients of open angle glaucoma, who attended the O.P.D. of department of Ophthalmology and were free from systemic or other ocular disease.

The patients were of either sex. A total of 20 patients were studies for viscocanalostomy and 40 were studies for sub scleral lake trabeculectomy.

The following pattern was adopted for almost all the patients.

HISTORY OF PRESENT ILLNESS:

History of diminution of vision, its rate of progression; any history of headache and eye pain, its severity, duration and association with vomiting, coloured halos, redness, discharge and watering of eyes was inquired and recorded. History of antiglaucoma therapy as well as any other ocular therapy was asked and recorded.

PAST HISTORY:

Past history regarding previous ocular diseases and their treatment was asked and noted. History of ocular trauma or other visual disturbances was
taken. History of diabetes, hypertension and tuberculosis is also inquired and noted.

**PERSONAL HISTORY:**

History of smoking, tobacco chewing, and addiction to alcohol or drug is taken. Inquiry is also made about cough, constipation and straining while micturation.

**EXAMINATION:**

**GENERAL EXAMINATION** –
Recording of pulse, temperature, respiratory rate and blood pressure was done and noted.

**SYSTEMIC** –
Examination of Cardio vascular system, Central Nervous system, Respiratory system and G.I. tract was done.

**LOCAL EXAMINATION (EYE EXAMINATION)** –
The local examination was done under bright illumination to examine the conjunctiva, cornea, anterior chamber, iris, pupil and lens.

The slit lamp examination was done routinely particularly to examine the transparency of cornea, aqueous flare, keratic precipitates, extent of
lenticular opacities, pigment dispersion over the lens and to elicit pupillary reaction in doubtful cases.

INVESTIGATIONS:
Routine investigations as random blood sugar, urine albumin & sugar, total leucocyte count, differential leucocyte count, haemoglobin % and erythrocyte sedimentation rate was done.

SPECIAL EXAMINATION:

1) Visual Acuity –
Best corrected visual acuity was recorded preoperatively in terms of Snellen’s test type, finger counting, hand movement, perception of light and projection of rays depending upon the individual’s visual status. Post operatively it was recorded after 1 week, 2 weeks, 6 week, 6 months, 1 year.

2) Pupillary Examination –
Pupils of both eyes were examined with the help of slit lamp for:
- Pupillary reaction
- Size of pupil
- Shape of pupil
- Presence of any synechiae
3) Examination of lens –

Lens was examined for cataractous changes by slit lamp and is graded into:

i. Cortical
   - Lamellar separation
   - Incipient cataract
   - Intumescent cataract
   - Mature cataract
   - Hypermature cataract

ii. Nuclear sclerosis

Post operatively cataractous changes are noted after 6 weeks, 6 months and after 1 year.

4) Fundus examination –

This was done with Welch Allyn direct ophthalmoscope, Keeler’s indirect ophthalmoscope and 90 D lens. The condition of optic disc such as size, shape, colour, margins, cup-disc ratio, nasal shifting of vessels, neuroretinal rim and parapapillary area was noted and if possible photographed with fundus camera. Besides this any other abnormality in fundus was also recorded.

Post operatively fundus was accessed after 6 weeks, 6 months and after 1 year.
5) Gonioscopy –

It was done in cooperative patients by Goldman’s three mirror gonioscope to access the angle status whether open or closed. Beside these the peripheral anterior synechiae and neovascularisation of the angle, if any were noted.

6) Field Charting –

Field charting was done pre operatively in cooperative patients with good vision. Peripheral field charting was done with the Goldman’s perimeter and central field with Bjerrum’s screen. Post operatively field charting was done after 6 weeks, 6 months and after 1 year if possible.

7) Tonometery –

Tonometery was performed with Schiotz’s tonometer, with a standard technique in all cases. One particular Schiotz’s tonometer was used pre and post operatively. Post operatively intra ocular pressure was recorded on 3rd, 14th day and then after every 1 month.

PRE OPERATIVE PREPARATIONS:

The patients were mentally prepared to undergo viscocanalostomy or sub scleral lake trabeculectomy as a surgical treatment of glaucoma. A written consent was taken from the patient or their attendants after explaining them the type of surgery and its complications.
Xylocaine sensitivity was done. The eye lashes were cut a day before operation. Ofloxacin .3% eye drop was installed every one hourly a day before operation. Patient is also given Ciprofloxacin 500mg orally a night before operation and in the morning. To relieve anxiety and to have a sound night sleep before operation Alprazolam .25mg is given. The intra ocular pressure is controlled pre operatively with Acetazolamide 250mg, in suitable doses.

**OPERATIVE PROCEDURES**

**ANAESTHESIA**

**Topical:** 4% xylocaine eye drops were installed 2 times at 2 minutes interval.

**Regional:** 2% xylocaine with adrenaline in 1:80,000 concentration was given in peribulbar region after mixing it with hylurinidase in concentration of 50 I.U /ml. If necessary retrobulbar anaesthesia was given.
VISCOCANALOSTOMY

SURGICAL STEPS

- All the operations were done with Leica M 690 microscope.
- Lids were secured with wire speculum and bridal suture to superior rectus was given
- Surgical field is prepared by creating a fornix based Conjunctival flap. To avoid damage to collector channels & Schlemm’s canal wet field cautery is used as little as possible.
- Intra scleral flap is prepared, first of all a 5mm X 5mm outer flap of 1/3 partial thickness is dissected followed by an inner concentrically 4mm X 4mm scleral flap, sculpted beneath the previous one, keeping the surface of the lower flap close to the choroids as to have a dark reflex from underlying choroid with the help of 3.2 mm bevelled up crescent blade.
- If the depth of the lower flap is correct, when the lower flap is advanced towards the limbus, Schlemm’s canal is deroofed and the two openings of the canal remain patent at the lateral edges of the cut.
- Now an intact window in Descemet’s membrane is created by gently pulling the inner scleral flap upwards and delicately depressing the floor of the canal at the schwalbe’s line using a tip of a cotton swab or cellulose sponge. The membrane is cleaved from the cornea and the cleavage is advanced into the clear cornea for approximately 1mm.
When the window is complete the inner scleral flap is excised with help of Vannas's scissor.

- After this magnification is increased to 25X and a 30G finely polished cannula is introduced in to the ostia or the surgical opening of Schlemm's canal in right and left direction, to inject Viscoelastic for 4 to 6mm on either side so as to increase the diameter and patency of Schlemm's canal so as to avoid collapse and scarring in early post operative period.

- The final step is to seal the lake. This is achieved by the tight suturing of the outer scleral flap by 10-0 monofilament. After this Viscoelastic is injected beneath the scleral flap to temporarily fill the scleral lake, thus preventing it from collapsing and scarring in early post operative period by acting as a barrier to fibrinogen migration.

- Two lateral sutures are given to hold the conjunctiva in place.
AN INNER 4mm x 4mm SCLERAL FLAP IS SCULPTURED BENEATH THE OUTER FLAP OF APPROXIMATELY 50% THICKNESS.

LOWER FLAP IS ADVANCED TOWARDS THE LIMBUS AND THE SCHLEMM'S CANAL IS DEROOFED.

INTACT WINDOW IN DESCWET'S MEMBRANE IS CREATED.

30 G CANNULA IS INTRODUCED INTO THE SURGICAL OPENINGS OF SCHLEMM'S CANAL AND VISCOCOELASTIC IS INJECTED ON BOTH SIDES FOR 4 TO 5mm.
SUB SCLERAL LAKE TRABECULECTOMY

SURGICAL STEPS

- All the operations were done with Leica M 690 microscope.
- Lids were secured with wire speculum and bridal suture to superior rectus was given
- Surgical field is prepared by creating a fornix based Conjunctival flap. To avoid damage to collector channels & Schlemm’s canal wet field cautery is used as little as possible.
- Intra scleral flap is prepared, first of all a 5mm X 5mm outer flap of 1/3 partial thickness is dissected followed by an inner concentrically 4mm X 4mm scleral flap, sculpted beneath the previous one, keeping the surface of the lower flap close to the choroids as to have a dark reflex from underlying choroid with the help of 3.2 mm bevelled up crescent blade.
- If the depth of the lower flap is correct, when the lower flap is advanced towards the limbus, Schlemm’s canal is deroofed and the two openings of the canal remain patent at the lateral edges of the cut.
- The inner scleral flap is excised with help of Vannas’s scissor.
- After this magnification is increased to 25X and a 30G finely polished cannula is introduced in to the ostia or the surgical opening of Schlemm’s canal in right and left direction, to inject Viscoelastic for 4 to 6mm on either side so as to increase the diameter and patency of Schlemm’s canal so as to avoid collapse and scarring in early post operative period.
• Now 1.5 mm anteroposterior by 4 mm wide trabeculectomy block is removed just anterior to scleral spur is removed and iridectomy is done through it.
• The final step is to seal the lake. This is achieved by the tight suturing of the outer scleral flap by 10-0 monofilament.
• Two lateral sutures are given to hold the conjunctiva in place.

POSTOPERATIVE CARE
A combination of ofloxacin .3% and dexamethasone .1% is used six times daily for 1 week. After this it is gradually tapered over a period of 1 ½ months.

FOLLOW UP
The patients were discharged on 3rd post operative day. The patients were advised follow up examination at one week interval for 2 weeks and then after every one month.

Intraocular pressure examination was done by Schiotz’s tonometer at the time of discharge that is on 3rd post operative day and then after on every follow up. The visual acuity, any post operative complication and if possible field changes on Goldman perimeter

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