

EYE TREATMENTS

By Fatima Haider

Chalazion

Conservative

- Expression - compression
- Warm Compresses
- Topical Steroid - Antibiotic Combination Drops
- Topical Anti Inflammatory Drops

Medical

- Steroid injection into the lesion through conjunctiva
- Systemic antibiotics → if chalazion associated with rosacea or blepharitis

Surgical

- Lesion is incised and contents are curetted

Hordoleum Externum (Stye) / Hordoleum Internum

- Analgesics → Relief of pain
- Systemic antibiotics
- Topical antibiotics
- Warm compresses
- Evacuation of pus

Ulcerative Blepharitis

- Eyelid hygiene
- Antibiotic ointment
- Topical steroids
- Artificial tears
- Oral antibiotics

Squamous Blepharitis

- Eyelid hygiene
- Topical antibiotics
- Steroid drops and ointment
- Co-existing seborrheic dermatitis should be treated with selenium sulphide shampoo

Posterior Blepharitis (Meibomian Gland Dysfunction)

- Systemic Antibiotics → mainstay Tx
- Eyelid hygiene
- Topical steroids
- Artificial tears

Entropion

- Artificial tears → at daytime
- Lubricating ointment → at bedtime
- Eyelid taping

Senile Entropion

- Weiss procedure
- Fox procedure
- Modified wheelers operation
- Transverse everting sutures

Cicatricial Entropion

- Mild cases → Tarsal hinge procedure
- Severe cases → Replacement of contracted conjunctival tissue by mucus membrane graft

Spastic Entropion

- Taping
- Eyelid everting sutures
- Botulinum toxin (Botox) injection
- Surgery → Myectomy of orbicularis muscle

Congenital Entropion

- Resection of abnormal position and placing the remainder in its normal position

Ectropion

Senile Ectropion

- Medial conjunctivoplasty → excision of diamond shaped piece of conjunctiva below the punctal area → For mild cases
- Horizontal Lid Shortening → pentagon of full thickness lid is excised, where the ectropion is most marked → For moderate cases
- Modified Kuhnt-Szymanowski Procedure → For severe cases
 - ↳ Full thickness base up pentagonal excision from the lateral third of eyelid combined with triangular excision of skin from just lateral to lateral canthus to elevate the eyelid

Cicatricial Ectropion

- V-Y Operation → mild cases
- Z-plasty → for moderate cases
- Skin graft

Paralytic (Facial Nerve Palsy) Ectropion

- Artificial tears
- Lubricating ointment at bed time
- Tarsorrhaphy till recovery of 7th nerve function
 - ↳ partial or complete closure of eyelids by sewing them together

Congenital Ectropion

Surgical Repair

Eyelid Tumors

* Squamous Cell papilloma

- Surgical excision or shave biopsy
- Cryotherapy
- Laser ablation
- Chemical ablation

* Pyogenic Granuloma

- Surgical excision

* Keratocanthoma

- Surgical excision

* Capillary Hemangioma

- β -Blockers $\rightarrow$ most effective
 - Oral propranolol
 - Topical Timolol

- Steroid injection

- Laser $\rightarrow$ to close the vessel

- Interferon α_2 $\rightarrow$ for steroid-resistant lesions

- Surgery $\rightarrow$ Local Resection with cutting cautery or CO₂ laser

* Xanthelasma

- Surgical excision

* Neurofibroma

- Surgical excision

Malignant Tumors of Eyelid

* Basal Cell Carcinoma

- Surgical excision → with 2-4mm margins of normal tissue
- Cryotherapy → for lesions less than 10mm
- Radiation Therapy → for small nodulo-ulcerative lesion
- Laser Microsurgery → CO₂ laser
- Chemotherapy
- Topical Imiquimod Cream → Immune Response modifier

* Squamous Cell Carcinoma

- Surgical excision → with 5-6 mm of normal tissue
- Exenteration → when lesion ≥ 2 cm
- Radiation Therapy

* Sebaceous Gland Carcinoma

- Surgical excision
- Exenteration
- Radiation Therapy

* Merkel Cell Carcinoma

- Surgical excision

* Kaposi Sarcoma

- Radiotherapy or excision with optimal control of AIDS

EYELID PIGMENTED TUMORS

* Congenital Melanocytic Nevus
• Complete surgical excision

* Acquired Melanocytic Nevus
• Surgical excision

* Melanoma

• Surgical excision

• Radiotherapy and Chemotherapy → limited efficacy

* Congenital Nasolacrimal Duct Obstruction

Conservative

- Spontaneous patency → 6-9 months
- Massage of lacrimal sac
- Antibiotics

Surgical

- Probing
- Syringing (Irrigation) → to confirm the opening and functioning of lacrimal drainage system after probing
- Intubation with silastic tube
- Balloon catheter dilatation of NLD
- Dacryocystorhinostomy (DCR) → preferably after 5-6 yrs of age

* Acquired NLD

• DCR

• External DCR → through skin approach

• Endolaser (Transnasal Laser) DCR → through nasal approach

↳ opening in lateral wall of nose made by laser through nasal cavity

* Acute Dacryocystitis

Conservative

- Antibiotics → Systemic and Topical
- Analgesic and Anti-inflammatory Drugs
- Hot fomentation

Surgical

- Incision and drainage of abscess
- DCR → After acute inflammation has settled

Contraindications

- Probing
- Irrigation

* Chronic Dacryocystitis

- External Approach DCR
 - DCR without tube
 - DCR with silicon tube
- Endolaser DCR

* Acute Dacryoadenitis

- Hot compresses
- Systemic Analgesics
- Antibiotics → Topical and Systemic
- Incision and Drainage → when there is abscess formation

* Chronic Dacryoadenitis

- Tx of underlying cause

* Keratoconjunctivitis Sicca

- Artificial Tear substitutes
 - Cellulose derivatives
 - Polyvinyl alcohol and Sodium hyaluronate
 - Petroleum mineral oil e.g. Lacrilube eye gel
- Autologous serum → for severe dry eyes
- Mucolytic agents → 5% acetylcysteine drops
- Topical Retinoids
- Topical NSAIDs
- Topical Cyclosporin
- Topical corticosteroids
- Oral omega-3 fatty acid supplements
- Soft contact lens

Surgical

- punctal plugs
- Surgical cautery → occlusion of lacrimal puncti
- Limbal stem cell transplantation
- Transplantation of parotid duct into conjunctiva

* Epiphora

- Tx of Lacrimal pump failure
 - Restoring position of eyelid and punctum
- Tx of Drainage system Obstruction
 - Surgery

* Mucopurulent Conjunctivitis (Pink Eye)

- Irrigation of conjunctiva
- Lid hygiene
- Antibiotics

* Purulent Conjunctivitis (Gonococcal Conjunctivitis)

- Hospitalization of patient
- Irrigation of eye
- Antibiotics (Topical and Systemic)
- Topical Atropine drops → if corneal involvement

* Membranous Conjunctivitis (Corynebacterium diphtheria)

- Irrigation of eye
- Attempts to peel off membrane
- Antitoxic → Anti diphtheric serum
- Antibiotics → Topical and Systemic

* Epidemic Keratoconjunctivitis

- Spontaneous Resolution → 1-2 weeks
- Cold water application
- Topical antibiotics
- Topical steroids → when eye is uncomfortable & visual acuity is diminished by subepithelial corneal opacities

* Pharyngoconjunctival Fever

- Cold water application
- Antibiotics
- Steroids

* HSV Conjunctivitis

- Cold water application
- Antibiotics

* Molluscum Contagiosum Conjunctivitis

- Spontaneous Resolution → months to years
- Removal of lid lesions by:
 - Shave excision
 - Cryotherapy
 - Cauterization
 - Expression

- * Covid Conjunctivitis
 - Cold water application
 - Antibiotics
 - Weak Steroid

* Trachoma

Medical

- Antibiotics → Topical and Systemic

Surgical

- * Adult Inclusion Conjunctivitis
- Antibiotics

- * Neonatal Conjunctivitis
- Antibiotics

★ Acute Allergic Conjunctivitis

- Cold compresses
- Topical Antihistamine
- Topical Adrenaline → 0.1% single drop
↳ to reduce chemosis
- Mast cell stabilizers

★ Seasonal and Perennial Allergic Conjunctivitis

- Cold compresses
- Topical antihistamine → emedastine
- Topical Vaso constrictor → Naphazoline
- Topical Mast Cell Stabilizers
 - Sodium cromoglycate
 - Lodoxamide
- Oral antihistamine

* Vernal Keratoconjunctivitis and Atopic Keratoconjunctivitis

Topical

- Cold compresses
- Mast cell stabilizers
- Anti histamine
- NSAIDs
- Topical steroids
- Acetylcysteine → mucolytic agent
- Antibiotics
- Immuno modulators
- Supratarsal steroid injection
 - ↳ Dexamethasone or Triamcinolone injection given through conjunctival surface of anesthetized everted upper eyelid

Systemic

- Oral Anti Histamine
- Immunosuppressive agents → steroids, cyclosporin, tacrolimus, azathioprine
- Antibiotics → Azithromycin

* Phlyctenular Keratoconjunctivitis

- Topical steroids
- Topical antibiotics

* Ocular Cicatricial Pemphigoid

- Dapsone
- Antimetabolites eg Azathioprine
Methotrexate
- Steroids
- IV Immunoglobulin therapy and Rituximab

* Stevens Johnson Syndrome

- Lubrication with artificial tears
- Antibiotics
- Corticosteroids
- Cycloplegic
- Amniotic membrane transplantation

* Pterygium

Non Surgical

- Tears substitute
- Topical Steroids
- Sunglasses to reduce UV exposure

Surgical

- Simple excision → Bare Sclera Technique
- Simple Conjunctival Flap → Excision and covering of bare area with conjunctiva

Prevention of Recurrence

- Conjunctival autograft or amniotic membrane transplantation
- Mitomycin C
- Radiation → β rays applied to limbus after surgery
- Argon laser → to destroy regrowth of new vessels at limbus
- Peripheral lamellar keratoplasty → for deep lesions

* Pseudo pterygium

surgical excision

* Vit A Deficiency Xerophthalmia

Topical

- Artificial Tears
- Topical Retinoic acid
- Tx of corneal ulcer and perforation

Systemic Therapy

- Oral Vit A
- IM Injection
- Protein caloric supplement

* Sub Conjunctival Hemorrhage

- Self limiting → 1-2 weeks
- Artificial tears

* Bacterial Corneal Ulcer

Control of Infection

- Topical Antibiotic drops
- Antibiotic ointments
- Subconjunctival Injection ^{not antibiotic} → into subconjunctival space near the limbus

Relief of pain

- Cycloplegic → Atropine 1% drops
- Analgesics → oral or injections
- Anti glaucoma drugs → to lower the raised IOP
 - β blockers
 - Carbonic anhydrase inhibitors

Miotics are never used

Tx of Non Healing Corneal Ulcer

- Bandage Contact Lens
- Conjunctival Flap
- Tarsorrhaphy
- Umbilical cord serum or autologous serum
- Amniotic membrane transplantation
- Therapeutic keratoplasty

Tx of Corneal Complications

* Descemetocle

- Topical Antibiotics → Intensive fortified therapy
- Anti Glaucoma drugs to lower IOP
- Pressure bandage
 - Bandage contact lens
 - Conjunctival Flap
 - Amniotic membrane transplant
 - Corneal graft
 - Partial thickness graft
 - Full thickness graft → Keratoplasty

* Perforated Corneal Ulcer

- Topical Antibiotic → Intensive fortified
- 1% Atropine drops
- Anti Collagenase → Systemic tetracycline
- Bandage contact lens and pressure pad
- Tissue adhesive glue
- Conjunctival flap
- Amniotic membrane transplant
- Full thickness graft → Keratoplasty

* Fungal Keratitis

- Topical Anti fungal therap
- Broad Spectrum Antibiotics
- Tetracycline → Anti Collagenase
- Cycloplegic
- Subconjunctival Fluconazole → in severe cases with hypopyon
- Systemic Antifungals → in severe cases
- Intrastromal Antifungals
- Mechanical debridement
- Therapeutic keratoplasty

* Acute Epithelial Keratitis (Dendritic Ulcer / Geographical Ulcer / Amoeboid Ulcer)

- Topical Antiviral drugs
- Debridement → with sterile cotton tipped bud
2mm beyond the edge of ulcer
- Topical antibiotics
- Cycloplegic for pain relief → 1% Atropine
- Oral Anti viral therapy in immunodeficient pts
↳ Acyclovir

* Stromal Necrotizing Keratitis

- Antiviral eye ointment
- Steroids (Prednisolone or dexamethasone)
- Topical antibiotics
- Cycloplegics
- Cyclosporin
- Lubricants with pressure patching or bandage contact lens

* Disciform Keratitis

- Steroids
- Antiviral eye ointment
- Antibiotics Topical
- Cycloplegic
- Cyclosporin

* Herpes Zoster Ophthalmicus

Systemic Therapy

- Oral Antiviral Treatment → Oral Acyclovir 800mg tabs 5 times per day
- IV Acyclovir → 5-10 mg/kg 3 x Daily in encephalitis and immunocompromised patients
- Analgesics
- Antibiotics
- Systemic steroids → prednisolone

Topical Therapy

- Acyclovir ointment
- Antibiotic drops
- Steroid-antibiotic preparation
- Cycloplegic → 1% Atropine
- Anti glaucoma drugs
- Topical aspirin dissolved in chloroform
- Calamine lotion

* Acanthamoeba Keratitis

- Debridement
- Topical amoebicides
- Antibiotics
- Topical cycloplegic
- Therapeutic keratoplasty

Keratoconus

- Spectacles → to correct Refractive error
- Rigid Contact lenses → for high degree of Astigmatism
- Intacs (Intracorneal Ring Segment)
- Collagen Cross Linking (CXL)
 - ↳ to stop progression of keratoconus
- Deep Anterior Lamellar Keratoplasty (DALK)
- Keratoplasty → when there is significant corneal scarring
- Hypertonic Saline and patching
 - ↳ Tx of Acute Hydrops

* Episcleritis

- Generally self limiting → 1-2 weeks
- Topical artificial tears
- Topical vasoconstrictors → to reduce redness
- Weak topical steroids
- Topical NSAIDs
- Oral NSAIDs

* Scleritis

- Treat associated systemic disease
- Treat associated ocular complications such as cataract and glaucoma

Tx of Scleritis

- Topical Steroids
- Systemic NSAIDs
- Systemic steroids
- Immunosuppressants
- Subconjunctival Steroid injection

Treatment Scleritis + Episcleritis

Surgical

Patch graft

Medical

Systemic

Topical

NSAIDs
and
Steroids

Episcleritis

NSAIDs

Non Selective
COX
Inhibitors

Steroids

Oral

Prednisolone
(1mg/kg/day)

Immunosuppressive

IV

Methyl
prednisolone
(500mg
-1g
IV
infusion)

* Congenital Cataract

- Lens Aspiration and IOL implantation in posterior chamber
- Lensectomy through pars plana

* Senile Cataract

Non Surgical

- Spectacles
- Dark glasses
- Pupillary dilatation with mydriatic

Surgical

- Extraction of cataract

* Aphakia

- Spectacles → convex lenses
- Contact lenses
- IOL implantation → Most common method
- Keratorefractive Surgery
 - Epikeratoplasty
 - Lasik

* Ectopia lentis

- Correction of refractive error by spectacles
- Surgical removal of lens

Overview of surgical techniques for cataracts [7][19][20]

	Description	Characteristics
Phacoemulsification	• <u>Liquefaction</u> and aspiration of the lens <u>nucleus</u> • The <u>intraocular lens</u> implant (IOL) is placed in the posterior chamber.	• Small <u>incision</u>, sutureless surgery • Compared to extracapsular cataract extraction: ◦ Improved visual acuity ◦ Lower complication rate ◦ Higher cost • May not be feasible for advanced cataracts
Extracapsular cataract extraction (ECCE)	• Removal of the lens <u>nucleus</u> by anterior capsulotomy • The posterior capsule is retained. • The <u>IOL</u> is placed in the posterior chamber.	• More cost-efficient than phacoemulsification • Often requires suture removal
Intracapsular cataract extraction (ICCE)	• Removal of the entire lens (including the posterior capsule) • The <u>IOL</u> is placed in the anterior chamber or sutured to the iris	• No longer a preferred approach • Compared to ECCE: ◦ Larger <u>incision</u> ◦ Slower wound healing ◦ Higher rates of complications (e.g., postsurgical astigmatism) [21]
Manual small incision cataract surgery (MSICS) [22]	• Removal of the lens through a small <u>incision</u> • The <u>IOL</u> is placed through the same <u>incision</u>.	• Can be sutureless • Compared to phacoemulsification: ◦ Similar improvements in visual acuity ◦ Lower cost

Complications Of Cataract Surgery

Complications

- Blindness
- Glaucoma: phacolytic glaucoma, angle-closure glaucoma
- Deprivation amblyopia in congenital cataract
- Complications after cataract surgery are rare
 - Astigmatism caused by wound incision
 - Dislocation of the intraocular lens
 - Postoperative uveitis, endophthalmitis
 - Cystoid macular edema: an accumulation of fluid at the macula in tiny cyst-like cavities within the outer plexiform layer (Henle's layer) and inner nuclear layers of the retina
 - Posterior capsule opacification (PCO; secondary cataract) after ECCE
 - Rare complications: retinal detachment, progressive Fuchs dystrophy , loss of the eye

We list the most important complications. The selection is not exhaustive.

- Posterior Capsule opacification is treated surgically in children and by Nd-Yag laser in adults

✧ Primary Open Angle Glaucoma

• Laser Trabeculoplasty

- Argon Laser Trabeculoplasty
- Selective Laser Trabeculoplasty
- Micropulse Laser Trabeculoplasty

• Surgical

↳ Fistulization operation which provides a new channel for aqueous outflow to control the IOP

• Trabeculectomy → allow aqueous outflow from anterior chamber through a surgical corneoscleral opening into subconjunctival and sub tenon space

• Trabeculectomy with antifibrotic Mitomycin C

• Deep Sclerectomy → anterior chamber is not entered and internal trabecular meshwork is preserved, thus reducing the incidence of post operative overfiltration with hypotony and its potential complications

Laser Trabeculoplasty

* Argon Laser Trabeculoplasty

- 50 discrete laser burns applied to anterior part of trabecular meshwork over 180°

* Selective Laser Trabeculoplasty

- Nd:YAG laser

- selectively target melanin pigment in trabecular meshwork cells

* Micropulse Laser Trabeculoplasty

- extremely short duration pulses of laser to deliver thermal energy to trabecular meshwork to stimulate cells without damage

* Primary Angle Closure suspect

Communication is made between posterior and anterior chambers by making hole in the iris

- Laser peripheral Iridotomy
- Peripheral Surgical Iridectomy

* Sub Acute or Intermediate Angle Closure Glaucoma

- During Attack → 2-1- pilocarpine
- After Attack → prophylactic peripheral laser iridotomy

* Congenital Glaucoma

- Angle surgery
 - Goniotomy
 - Trabeculotomy
- Trabeculectomy
- Glaucoma drainage device

* Acute Primary Angle Closure Glaucoma

Systemic Therapy

- Carbonic Anhydrase Inhibitors → Acetazolamide
- Hyperosmotic Agents
 - Mannitol
 - Glycerol
 - Isosorbide → can be used orally in diabetic patients
- Analgesics → for pain Relief
- Anti emetics
- Atropine is Contra indicated

Topical Therapy

- Pilocarpine → cause pupil constriction
- β -blockers → Timolol or Betaxolol
- Alpha 2 Agonists
- Topical Carbonic Anhydrase inhibitor
- Topical Steroid

Prevention of Attack in Same eye

- Laser Iridotomy
- Trabeculectomy

Prevention in Fellow Eye →

- Laser Iridotomy
- Surgical Iridectomy

* Neovascular Glaucoma

- Anti Glaucoma Drugs

- Topical 1% Atropine →

- prevent synechiae formation
- aqueous outflow through uveoscleral route
- ↓ capillary permeability
- reduce incidence of hyphema

- Topical Corticosteroids

- Anti VEGF → to reduce neovascularization

- Pan retinal photocoagulation (PRP)

- Carotid endarterectomy → carotid artery stenosis

- Diode Laser Cyclo ablation → when Anti Glaucoma therapy fails to control IOP

- Filtration Surgery with use of Mitomycin C

- Artificial filtration shunt when trabeculectomy fails

- Miotics are Avoided

★ Phacomorphic Glaucoma

- Medical → to control IOP
- Nd-YAG peripheral iridectomy → to reverse pupillary block component
- Cataract extraction

★ Phacolytic Glaucoma

- Medical → to control IOP
- Early cataract extraction

★ Phacoanaphylactic Glaucoma

- Medical → to control IOP
- Topical steroids → to control inflammation
- Surgical Removal of any retained lens matter

* Pseudoexfoliative Glaucoma
(Glaucoma Capsulare)

- Anti Glaucoma Tx → to control IOP for POAG
- Argon laser Trabeculoplasty
- Trabeculectomy

Primary Infantile Glaucoma

Medical Therapy

- Prostaglandin Analogues → Latanoprost
Travoprost
- Beta blockers → Betaxolol
Timolol
- Topical Carbonic Anhydrase Inhibitors → Dorzolamide
- Alpha 2 Agonist → Brimonidine
 - ↳ should be avoided in infants as they can cause significant CNS depression
- Miotics are of no use

Surgery

- * Angle Surgery
 - Goniotomy → incision made in angle to establish a communication between anterior chamber and Schlemm canal with the help of gonioscopy
 - Trabeculotomy → when goniotomy cannot be performed due to hazy cornea
- * Trabeculectomy → Trabecular meshwork is removed
 - Aqueous from anterior chamber is drained into subtenon or subconjunctival space
- * Artificial Drainage Shunt (Glaucoma Drainage Devices)
 - ↳ Silicon tube is placed b/w anterior chamber and subtenon space

Laser Therapy

- Diode Laser cycloablation

Surgical Procedures In Glaucoma

(1) Iridectomy

- Creation of hole in periphery of iris so aqueous can easily pass from posterior chamber to anterior chamber
- prophylactic procedure in primary angle closure glaucoma

(2) Goniotomy

- superficial incision is made in the anterior aspect of trabecular meshwork under gonioscope
- establish a communication b/w anterior chamber and Schlemm canal
- Congenital Glaucoma with a clear cornea

(3) Trabeculotomy

- Trabecular meshwork is broken up
- communication is established b/w aqueous humor and Schlemm Canal
- Congenital Glaucoma, when goniotomy is not feasible due to hazy cornea

(4) Trabeculectomy

- lowers IOP by creating a fistula, which allows aqueous to pass from anterior chamber to subtenon space and subconjunctival space
- procedure of choice in all types of glaucoma particularly in primary glaucomas

(5) Non Penetrating Filtration Surgery

- anterior chamber is not entered and internal trabecular meshwork is preserved
- Aqueous humor passes from anterior chamber through trabecular meshwork into subtenon and subconjunctival space

• POAG

(6) Artificial Drainage Shunt / Glaucoma Drainage Devices

- create communication b/w anterior chamber and subtenon space
- Uncontrolled glaucoma, where previous trabeculectomy has failed
- Secondary glaucoma, where routine trabeculectomy will not be successful

(7) Cyclocryotherapy

- lowers IOP by producing coagulation necrosis of secretory epithelial cells of ciliary body
- Neovascular Glaucoma
- Aphakic Glaucoma
- Absolute Glaucoma with pain
- Glaucoma with poor prognosis

(8) Cyclodialysis

- A direct communication is created between anterior chamber and suprachoroidal space
- Rarely performed as a primary procedure
- Aphakic Glaucoma with extreme peripheral anterior synechiae

(9) Laser Therapy

- Laser Iridotomy → Primary Angle closure glaucoma
- Argon Laser Trabeculoplasty → POAG, Pigmentary glaucoma, Exfoliative glaucoma
- Selective Laser Trabeculoplasty → Nd:YAG laser
 - selectively target melanin pigment
- Micropulse Laser Trabeculoplasty
 - extremely short time duration pulses of laser to deliver thermal energy to trabecular meshwork
- Diode Laser Cycloablation
 - used to control pain in end stage glaucoma

(10) Anti Metabolites

- Mitomycin C → inhibit DNA and RNA synthesis
- 5-Fluorouracil (5-FU) → inhibit DNA and RNA function

- Neovascular glaucoma
- Previously failed trabeculectomy
- Inflammatory glaucoma
- Young patients
- Pediatric glaucoma

* Acute Anterior Uveitis

- Cycloplegic drugs
- Topical steroids
- Systemic NSAIDs
- Systemic steroids
- Anti metabolites → Azathioprine, Methotrexate
- Cyclosporin
- Antibiotics
- Intra ocular steroid → Intra vitreal triamcinolone acetate
- Suprachoroidal triamcinolone acetate

* Intermediate Uveitis

- Topical steroids
- Posterior sub-tenon steroid injection
- Intravitreal triamcinolone injection → in severe refractory cases
- Systemic steroids
- Systemic immunization → Azathioprine
- Intravitreal Anti VEGF

Surgical

- cryotherapy → to pars plana and retinal periphery
- Laser photocoagulation
- Pars plana vitrectomy

* Endophthalmitis

- Intra vitreal Antibiotics
- Anterior Sub-tenon Antibiotic Injections
- Topical Antibiotics
- Topical Steroids
- Cycloplegic Atropine 1% drops
- Pars plana vitrectomy

* Pan ophthalmitis

- Anti inflammatory and analgesics → for pain Relief
- Topical Antibiotic drops
- Broad Spectrum Antibiotics
- Evisceration → to avoid risk of intracranial spread of infection

* Diabetic Retinopathy

- Patient education
- Good control of diabetes
- Control of Risk Factors
- Discontinue smoking

Tx of Retinopathy

Medical

- Anti VEGF → Bevacizumab, Ranibizumab, Aflibercept
- Steroids
 - Intravitreal
 - Suprachoroidal

Laser Photocoagulation

- Focal laser
- Grid pattern laser
- Pan retinal photocoagulation

Surgical

- Pars plana vitrectomy

Non-Ischemic CRVO

Systemic

- Control of risk factors
- Anti platelet therapy

Ocular

- Intra retinal Anti VEGF
- Intra vitreal triamcinolone acetonide

Ischemic CRVO

Systemic

- Control of risk factor
- Anti platelet therapy

Ocular Tx of Rubeosis iridis

- Panretinal photocoagulation → to prevent neovascular glaucoma
- Cryotherapy → when retinal view is not possible due to hazy media

Branch Retinal Vein Occlusion

• When Visual Acuity 6/12

- Intra vitreal Anti VEGF → for macular edema and neovascularization
- Laser photocoagulation
 - Grid pattern for macular edema
 - Scatter photocoagulation for neovascularization
- Intra vitreal Steroid → Triamcinolone acetonide very effective for macular edema

CRAO

- Reduction of IOP
 - Acetazolamide
 - Mannitol
 - Paracentesis of anterior chamber by 27 gauge needle through limbus
- Ocular massage → for 15-20 min
↳ to dislodge emboli
- Sublingual isosorbide dinitrate
- Breathing high oxygen
- IV methylprednisolone → to reduce retinal edema
- Transluminal Nd → VAG laser embolysis/embolectomy
when the occluding emboli are visible

* Rhegmatogenous Retinal Detachment

* RD Surgery Steps

- Localization of retinal break
- Subretinal fluid drainage
- Seal all retinal breaks
 - Laser photocoagulation
 - Cryophotocoagulation
- Chorioretinal apposition
 - External tamponade (scleral buckling)
 - Internal tamponade

* Tractional Retinal Detachment

- Control of predisposing systemic factors e.g Diabetes, HTN
- Ocular Tx

- Pars plana vitrectomy
- Removal of fibrovascular membranes to relieve traction on retina
- Internal tamponade to cause apposition of neurosensory retina with RPE by silicone oil or expanding gases

* Exudative Retinal Detachment

- Control of underlying disorder e.g HTN

- Medical Tx

- Corticosteroids and immunomodulatory therapy

- Biologic Therapy

- TNF α inhibitors

- Interferon α , β

- Anti VEGF

- Subtenon steroid

* Retinitis pigmentosa

- No effective treatment

- Vitamin A and E supplements

- Use of dark sunglasses

* Retinoblastoma

- Chemotherapy
 - IV carboplatin, etoposide, vincristine
- Transpupillary Thermotherapy (TTT) → to achieve focal consolidation following chemotherapy
- Photocoagulation → for small tumors posterior to equator
- Cryotherapy → for small tumors anterior to equator
- Brachytherapy
- External beam radiotherapy
- Enucleation

* Optic Neuritis

- Corticosteroid therapy
(oral prednisolone alone is contra indicated)

If Multiple Sclerosis

- IV methylprednisolone sodium succinate
- IM interferon beta
- Vit B₁, B₆, B₁₂ injections

* Papilloedema

- Tx of underlying cause
- Control of raised IOP
 - Diuretics → Acetazolamide oral
 - Repeated lumbar puncture
 - Ventriculo lumboperitoneal shunt
 - Optic nerve sheath decompression to release pressure on optic nerve

* Arteritic Anterior Ischemic Optic Neuropathy

- Systemic Corticosteroids
 - IV methylprednisolone
 - oral prednisolone

* Non Arteritic AION

- Treat the underlying cause → HTN, diabetes, hyperlipidemia, collagen vascular disease
- Low dose aspirin

* 3rd Cranial Nerve Palsy

Treatment of Symptoms

- Diplopia

- Prisms

- Patching or occlusion of deviated eye

- Botulinum (Botox) injection into opposite overactive muscle

- Squint Surgery to realign eyes → 6-9 months later

- Eyelid Surgery → to correct ptosis

* 4th Cranial Nerve Palsy

- Diplopia

- prism lenses

- Patching or occlusion of deviated eye

- Surgery to realign eyes → 6-9 months later

* 6th Cranial Nerve Palsy

- Diplopia

- prisms

- patching or occlusion

- Botulinum toxin injection

- Squint Surgery → 6-9 months later

* Myasthenia Gravis

- Acetylcholinesterase inhibitor → First line therapy
 - Neostigmine
 - Edrophonium (Tensilon)
- Immunosuppressant
- Iv immunoglobulin
- Plasmapheresis

★ Pre Septal Cellulitis

- Systemic Antibiotics → Oral or IV
- Topical Antibiotics → for conjunctivitis
- Systemic analgesics

★ Orbital Cellulitis

- Hospital admission
- Systemic antibiotics
- Analgesics and NSAIDs
- Topical Antibiotics
- Surgery → Drainage of orbital abscess or subperiosteal abscess

Thyroid Eye Disease

Tx of Hyperthyroidism

- Anti thyroid Drugs → Carbimazole
Propylthiouracil
- Radioactive iodine
- Thyroidectomy

Tx of Ocular Discomfort and Dryness

- Artificial tears
- Lubricants at bed time
- Eyelid Taping during sleep
- Topic Anti inflammatory (steroids and NSAIDs)

Orbital Decompression

Non Surgical

- Teprotumumab (TEPEZZA)
- Systemic corticosteroids
- Orbital Radiotherapy

Surgical

- Removal of wall of orbit
- Extra ocular muscle surgery → Strabismic surgery
- Eyelid surgery → Tarsorrhaphy

- ✧ Hypermetropia (Far sightedness)
 - Convex lens (plus power lens)
 - Contact lens

Surgical

- Photorefractive keratectomy (PRK)
- Laser in situ keratomileusis (LASIK)
- Conductive keratoplasty

- ✧ Myopia (Near sightedness)

- Concave lens
- Contact lens

Surgical

- Flattening of central part of cornea
 - Radial keratotomy
 - Photorefractive keratectomy
 - Laser epithelial keratomileusis (LASEK)
 - Laser in situ keratomileusis (LASIK)

- Clear lens extraction
- Phakic posterior chamber implant (implantable contact lens)

- ✧ Presbyopia

- Convex lens

* Irregular Astigmatism

Non Surgical

- Cylindrical lens → correct Simple Astigmatism
- Sphero-cylindrical → correct compound and mixed astigmatism
- Hard contact lens → correct 2-3 Diopter, of regular astigmatism

Surgical

- Astigmatic keratotomy (Limbal Relaxing incision)
- Extra sutures
- Photorefractive keratotomy → corrects up to 3 Diopter
- LASIK → corrects up to 3D
- LASIK → corrects up to 5D

Pre Septal Cellulitis

- * Systemic Antibiotics
 - Oral Antibiotics → mild to moderate cases
 - IV Antibiotics → Severe cases
- * Topical Antibiotics → For associated conjunctivitis
- * Systemic Analgesics → For Relief of pain and edema

Orbital Cellulitis

- * Hospital Admission
- * Systemic Antibiotics
 - IV Ceftriaxone, ciprofloxacin or Vancomycin
 - Supplemented by Metronidazole
- * Analgesics + Anti inflammatory
- * Topical Antibiotics and ointment for corneal exposure and conjunctival chemosis
- * Surgical → Drainage of orbital abscess or subperiosteal abscess