PRESENTATION

CATARACT

DEFINITION

Cataract is opacification of the crystalline lens that can lead to decreased visual acuity and/or functional impairment; can lead to vision loss

- Most prevalent and treatable cause of vision impairment and blindness worldwide
- Typically bilateral

CLASSIFICATION

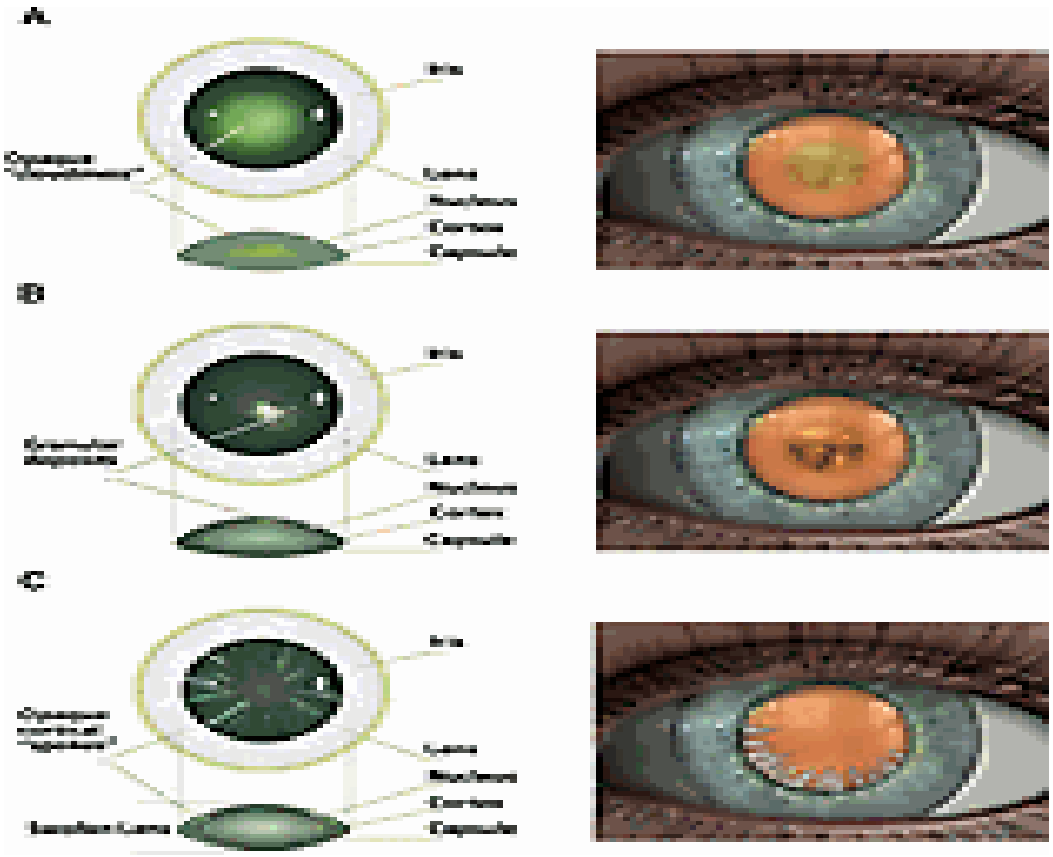
- 3 common types (classified by site within lens)
  - **Nuclear**
    - Central opacification or discoloration of lens
      - Progressive yellowing, browning, opalescence, and sclerosis of central portion of lens
    - Most common type; result of normal aging process

CLASSIFICATION

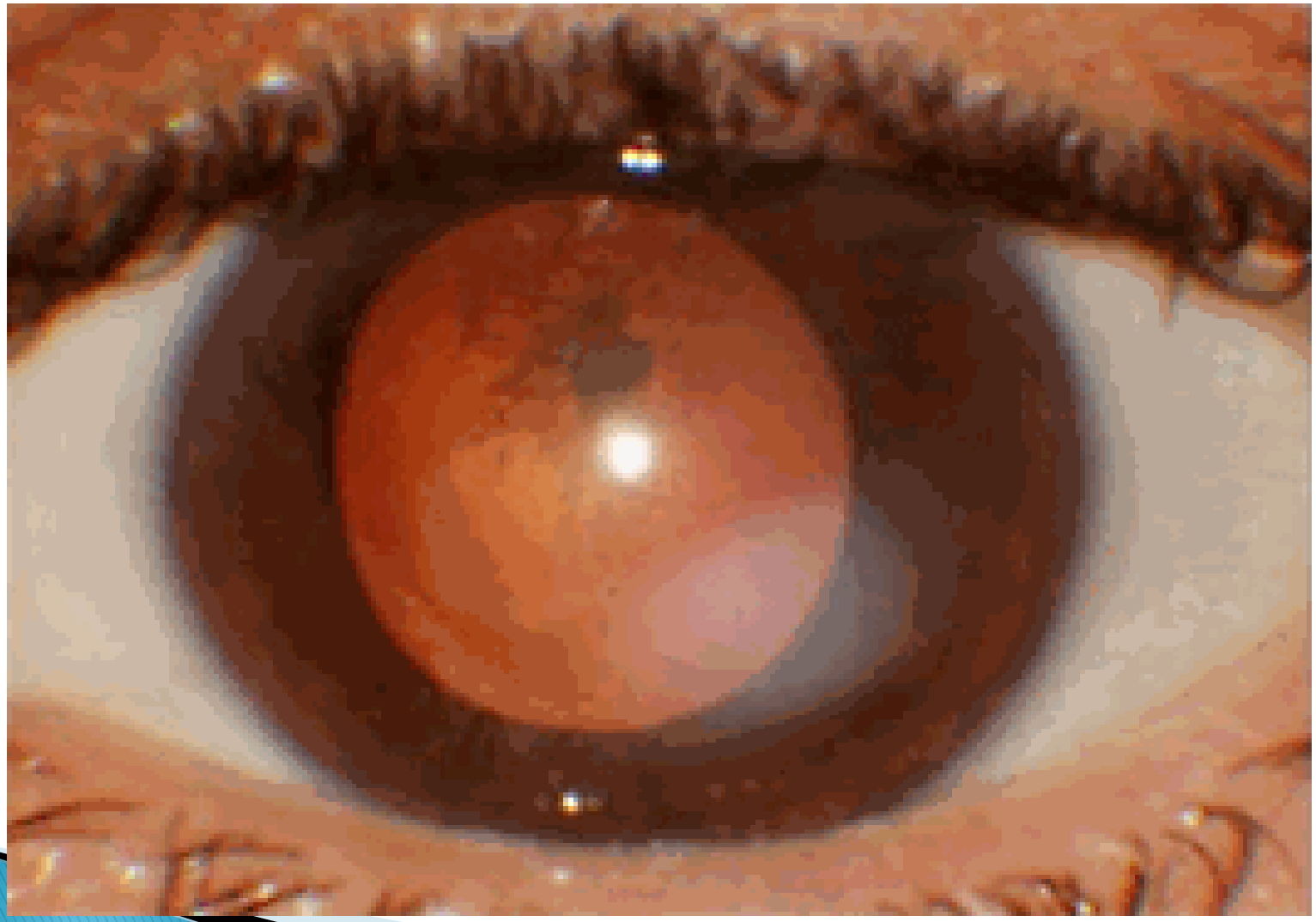
- **Cortical**
  - Affects outer cortical layers of lens surrounding nucleus
  - Appears like wedges or spokes of wheel moving inward toward center from periphery
  - More often found in persons with diabetes

CLASSIFICATION

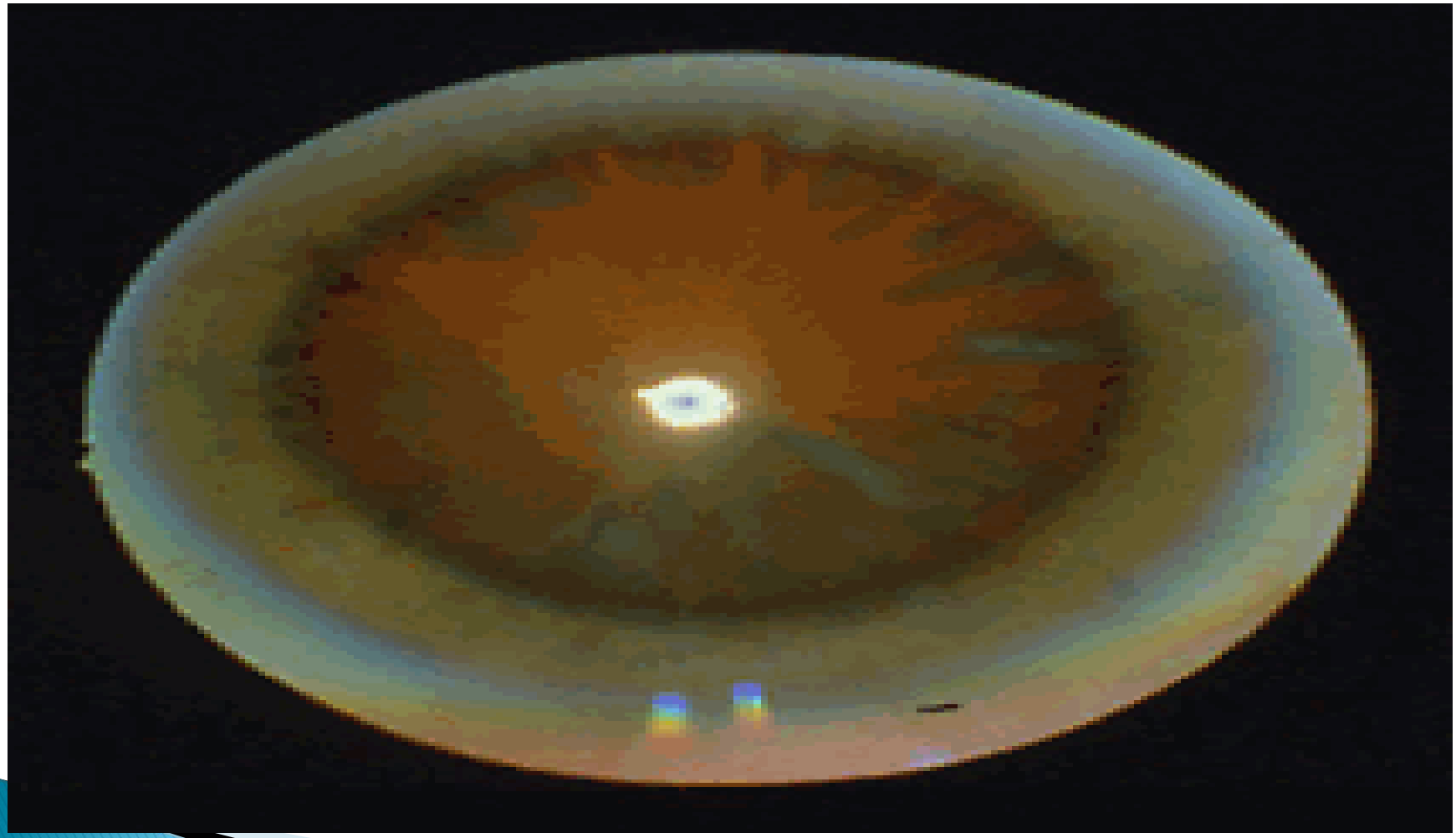
- **Posterior subcapsular**
  - Opacities in posterior outer layer of lens
  - Tends to occur in younger patients; associated with corticosteroid use, diabetes, or trauma
- **Congenital cataracts**
  - Wide morphologic variations exist; often sub classified on basis of location of opacification with further description of clinical appearance


A
Iris
Lens
Nucleus
Cortex
Capsule
B
Iris
Lens
Nucleus
Cortex
Capsule
C
Iris
Lens
Nucleus
Cortex
Capsule

Posterior subscapular cataract



Cortical cataract



CAUSES&RISK FACTORS

- Causes
- Acquired cataracts
  - Age-related change is most common cause (senile cataract)
    - Gradual oxidative stress results in lens changes and is a normal and expected result of aging

Conti.....

- Secondary to:
  - Systemic conditions (eg, diabetes, myotonic dystrophy, hypoparathyroidism, atopic dermatitis)
  - Ocular conditions (eg, high myopia, uveitis, glaucoma, retinitis pigmentosa)

Conti.....

- Trauma
  - Blunt trauma and penetrating trauma
  - Radiation exposure
    - Exposure to therapeutic ionizing radiation
    - Occupational or other exposure to infrared energy

Conti.....

- Congenital cataracts
  - In utero infection (eg, rubella, varicella, cytomegalovirus, toxoplasmosis, syphilis)
  - Genetic disorder
    - Inherited congenital cataract without other associated metabolic or physical abnormalities
    - Trisomies, including Down syndrome
    - Heritable metabolic disorders, such as Lowe syndrome and galactosemia

Conti.....

- Idiopathy
- **Risk factors**
- Age
- Risk increases with age, starting around age 40 years
  - Most people older than 60 years have some degree of cataract formation
- Sex
- Risk of cataract, especially cortical, is higher in women
- Genetics

Conti.....

- Senile cataract
  - Often multifactorial, with both multiple genes and environmental factors influencing the phenotype
- Inherited types of cataracts with delayed onset (adult)
  - Galactosemia is associated with autosomal recessive cataracts

Conti.....

- Hereditary congenital cataracts
  - Defects in many different genes have been identified
  - Some cases are associated with galactosemia due to galactokinase deficiency (autosomal recessive inheritance)
  - Also a feature of Lowe syndrome, which is an X-linked disorder

Conti……

- Ethnicity/race
- Cortical cataracts are more common in African American populations
- Nuclear cataracts are more common in white populations

Conti.....

- Most common
  - Diabetes mellitus
    - Increases risk 2- to 5-fold
    - Observational studies show association with cortical and nuclear cataract

Conti……

- Corticosteroid use
  - Long-term use of corticosteroids, either local or systemic
    - Inhaled or oral corticosteroids pose higher risk for cataract formation; nasal corticosteroids are less likely to cause progression of cataracts
  - Studies show association with posterior subcapsular cataracts
- Previous intraocular surgery
  - Pars plana vitrectomy is associated with nuclear and posterior subcapsular cataract

Conti.....

- Other associations
  - Smoking
  - Hypertension
  - Ocular trauma and inflammation
  - Obesity
  - Phenothiazines and chlorpromazine
  - UV-B light exposure
  - Excessive alcohol consumption

PATHOPHYSIOLOGY

- Lens is made mostly of water and protein fibers
- Opacity occur when the lens proteins(crystallins) clumps together.
- Ability for lens t refract lights reduce which cause reduce visual acuity.
- Chemical modifications f the lens cause it to be thicken and harden.

CLINICAL FEATURES

- Painless, gradual onset of blurred vision is typically the first symptom
  - Worsens over months to years
  - Rarely, in advanced cases, patient can only distinguish light from dark

Conti……

- Symptoms may include:
  - Blurred distance vision
  - Sensitivity to light glare (eg, halos around lights at night)
  - Difficulty seeing in low-light conditions
  - Decreased near vision; difficulty reading
  - Reduced intensity of colors
  - Loss of contrast sensitivity
  - Double vision or ghosting in 1 eye

Features varies on site

- Nuclear cataract
  - Slow progression
  - Blurred distance vision and increased sensitivity to glare
    - Affects distance vision more than near vision
    - In early stages, near vision may temporarily improve

Conti.....

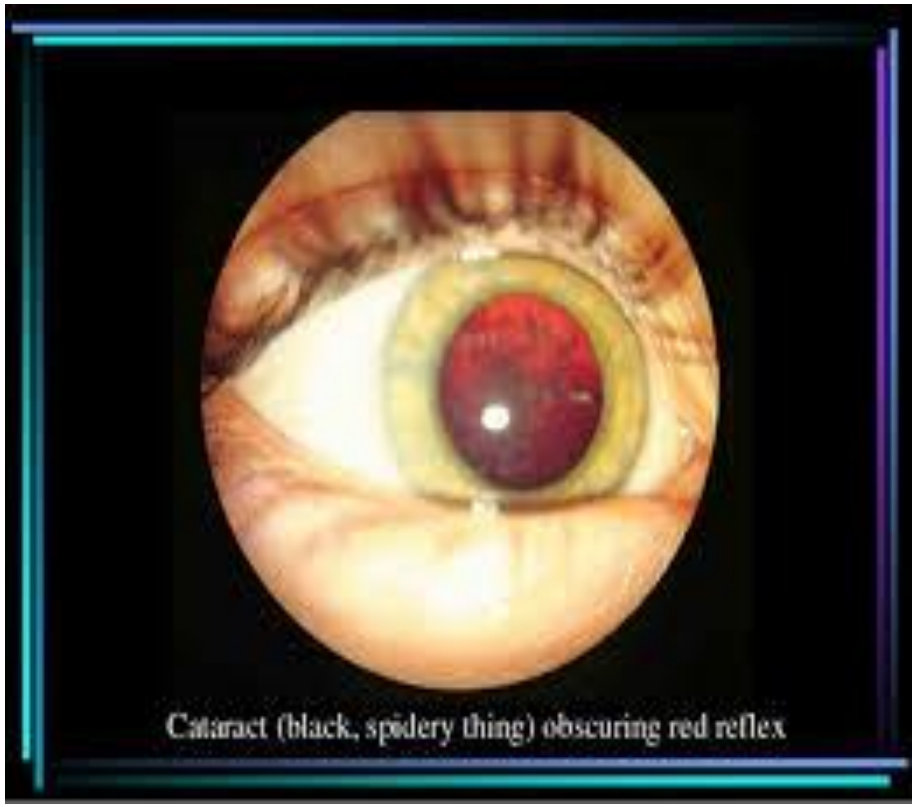
- **Cortical cataract**
  - Glare is a common complaint
  - Problems with distance vision, contrast sensitivity, and clarity may occur at an advanced stage
- **Posterior subcapsular cataract**
  - Can cause substantial visual loss, especially if located in axial region of lens
  - Problems with glare and poor vision in bright light; often cannot drive at night owing to glare from headlights
  - Near vision more often affected than distance vision

Conti.....

- **Congenital and childhood cataract**
  - Parent may report that 1 or both pupils appear white (leukokoria)
    - Usually noted at birth; can be unilateral or bilateral
  - Parent may notice visual inattention or poor eye-hand coordination; eye deviation or unusual eye movements may also be reported (late signs)

DIAGNOSTIC TESTS

- History(previous eye conditions, surgeries, injuries, genetic predispositions)
- Evaluate extraocular movements and external eyes for signs of trauma or irregularity and for presence of afferent pupillary defect
- vision tests (Snellen chart and near card)
- Ophthalmoscopy-direct ophthalmoscopy (Cataracts can appear as a dull, darkened, or absent red reflex or as a dark spot within the red reflex)


Cataract (black, spidery thing) obscuring red reflex


Patient Side
Practitioner Side
Viewing Window
Filter Switch
Aperture Dial
Diopter Dial
Rheostat
Brow Rest
Viewing Window
Diopter Power Display
On/Off Switch

Normal reflex

Red reflex absent

Red reflex abnormal

Conti.....

- Assess visual acuity
- Measure intraocular pressure
- assess pupillary function
- examine ocular alignment and motility
- Examine anterior segment of eye with dilated pupils by slit lamp biomicroscopy

Conti.....

- Perform dilated-pupil examination of lens, vitreous, macula, peripheral retina, and optic nerve
- Use questionnaires to evaluate the impact of cataract on visual status and functional ability

Conti.....

- **ocular imaging** _
- B-scan ultrasonography
- optical coherence tomography
- fluorescein angiography
- A-scan ultrasonography, optical biometry- *Before cataract surgery to calculate intraocular lens power*

Conti.....

electrophysiologic testing –nonverbal patients to evaluate potential retinal function electroretinography

- visual evoked potential tests

Conti.....

- laboratory testing for congenital cataracts. may indicate systemic or metabolic disease)
- TORCH screening
- VDRL test
- blood tests for calcium, glucose, phosphorus, and galactokinase levels
- urine test for glucose level
- genetic testing

MANAGEMENT

Goal

- Correct visual impairment and increase functional ability

Nonsurgical management

- Initial treatment of early symptomatic cataracts by ophthalmic provider
  - Prescribe new eyeglasses or contact lenses to correct vision
  - Consider mydriatic agents to reduce symptoms associated with small centrally located cataract (may cause disabling glare)

Surgical management

- Surgical removal of opaque lens is the primary treatment for visually significant cataract
  - Threshold for performing surgery should not be based on a single functional measure
  - Timing of surgery is individualized to patient's needs

Surgical procedures include 3 primary techniques

- phacoemulsification
- extracapsular cataract extraction
- intracapsular cataract extraction

phacoemulsification

- Preferred method of cataract removal in developed countries
- Nucleus of lens is emulsified and aspirated within the capsule using an ultrasonic probe
  - Capsular bag is maintained, allowing for placement of intraocular lens
- Requires only small incision (1.8–3 mm) that generally eliminates the need for sutures (self-sealing)

extracapsular cataract extraction

- Opacified lens is manually removed as a whole, leaving the lens capsule and zonular attachments intact
  - A synthetic intraocular lens is then typically implanted into the remaining capsular bag
- Typically requires large incision (about 10 mm) at corneal-scleral junction and sutures for closure

intracapsular cataract extraction

- Rarely performed
- Entire lens is extracted as 1 unit, with nucleus and cortex still enclosed in lens capsule
  - Anterior chamber or sutured posterior chamber intraocular lens may be implanted
  - If left aphakic, patient must wear thick eyeglasses or contact lenses after surgery
- Requires a very large incision and has a high rate of complications

Conti……

- Femtosecond laser-assisted cataract surgery is a promising new technology, but it remains under study
- Not yet shown to be superior to phacoemulsification and not yet cost-effective

Conti……

- Congenital cataracts –Monocular complete cataracts are removed within first few months of life, preferably in first few days or weeks, to avoid amblyopia
- Bilateral cataracts are removed within first few months of life. The more opaque lens is removed first; the second lens follows about 1 week later

Drug therapy

- No known pharmacologic treatments can eliminate or slow progression of cataracts

Nondrug and supportive care

- Temporary measures to optimize vision
- Prescribe eyeglasses or contact lenses for early cataract
  - Incorporating filters into eyeglasses may decrease glare disability
- Recommend better lighting for reading and/or hats or sunglasses for glare
-

PREOPERATIVE PHASE

- Administer preoperative antibiotic eye drops
- NPO FOR 6-8 hrs
- Admister mydriatic for pupillary dilation by contraction iris dilator muscle
- Administer cycloplegic produces paralysis of accommodation by blocking the effect of acetyl choline on ciliary body muscle

Postoperative

- Eyes wil be covered with eye patch and protective sheild.removed on the firsy post – operative visit
- Unless complication occur discharge as soon as the effect of sedative agebts have worn off
- Antibiotic drops to prevent infection
- Corticosteroid drops to reduce postoperative inflammatory response

Conti……

- Avoid activities increasing increasing IOP(bending /lifting/coughing)
- Glasses are prescribed after checking the visual acuity after healing the eye

Complications

- Preoperative complications
- Iris prolapse
  - Includes intraoperative floppy iris syndrome
    - Associated with systemic use of α_1A-blockers, especially tamsulosin
    - Avoid use of α_1A-blockers (often used in men with prostate disease) before cataract surgery, because it may cause intraoperative floppy iris syndrome and result in surgical complications; alert surgeon to such use so that surgical technique can be adjusted

Conti.....

- Suprachoroidal hemorrhage
  - Low incidence; patients typically do not need to discontinue anticoagulant or antiplatelet therapy for cataract surgery
- Endophthalmitis
  - Topical antibiotics (eg, 5% povidone-iodine) are often applied just before surgery as prophylactic strategy
  - Intracameral antibiotics may reduce risk of postoperative endophthalmitis

Conti.....

- Toxic anterior segment syndrome
  - A postoperative inflammatory condition that may mimic endophthalmitis
  - Earlier onset (12–48 hours) than endophthalmitis; responds to steroids
- Elevated intraocular pressure
  - Spikes in intraocular pressure may occur after cataract surgery, but they are typically transient and medically treated

Conti……

- Corneal edema or tears
  - May be due to mechanical injury or prolonged intraocular pressure
- Intraocular lens dislocation
- Cystoid macular edema
  - Often associated with postsurgical inflammation
- Posterior capsule tears and zonule ruptures

Conti……

- Long-term complications can include:Posterior capsular opacification
  - May be treated with laser (Nd:YAG capsulotomy)
- Retinal detachment (rare)

Prognosis

- Untreated cataract typically progresses over time
- Cataract surgery has high success rate
  - Improved functional status and vision satisfaction are found in up to 90% of patients after first-eye cataract surgery
  - Chance of failure to achieve expected improvement in visual acuity and function increases with comorbidities

THANK YOU