Metabolic and complicated cataract

Learning Objectives

- **At the end of this class students shall be able to :**
- Classify cataract according to aetiology.
- Understand pathophysiology of metabolic and complicated cataract.
- Identify distinct morphological subtypes of metabolic and complicated cataract.

'CATARACTA'(LATIN)MEANING 'WATERFALL'

Definition of cataract

- Any opacity in the lens or its capsule

Etiological classification of cataract

1. Age related cataract
2. Traumatic cataract
3. Metabolic cataract
4. Complicated cataract
5. Toxic cataract
6. Radiation induced cataract

METABOLIC CATARACTS

- Due to endocrine disorders and biochemical abnormalities.

- **Diabetic cataract**

Hyperglycemia

Excess glucose metabolizes into sorbitol

(Aldose reductase mediated)

Osmotic over hydration

1. ***Age related cataract in diabetics***

- Early onset
- Rapid progression

2. ***True diabetic cataract.***

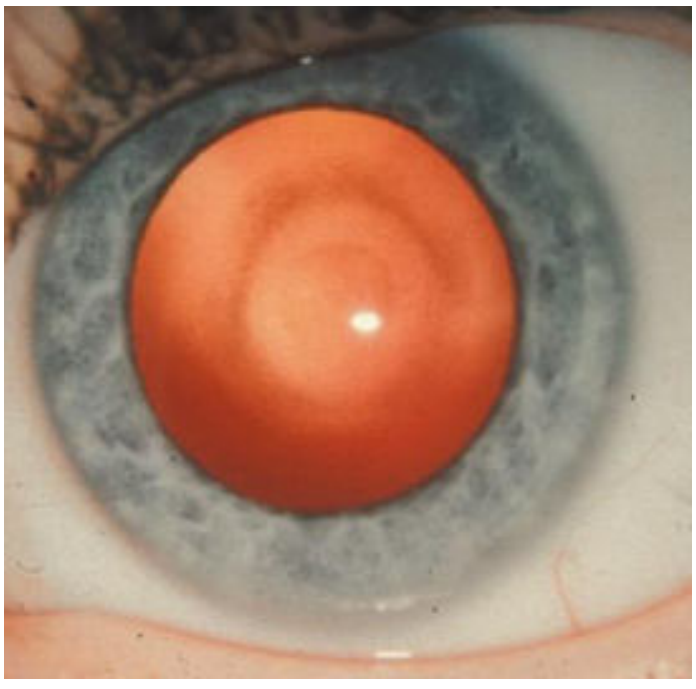
- Also called '*snow flake cataract' or 'snow-storm cataract'*
- Fluid vacuoles appear underneath anterior and posterior capsules
- Bilateral snowflake-like white cortical opacities

Snowflake cataract

Galactosemia

- Multisystem disorder
- Inborn error of galactose metabolism

- Anterior and posterior subcapsular lamellar opacities- 'oil droplet cataract'



Oil droplet cataract

Myotonic dystrophy

- Fine dust like opacities with tiny iridescent spots in cortex- *'christmas tree cataract'*
- May progress to stellate opacity at posterior pole

Christmas tree cataract

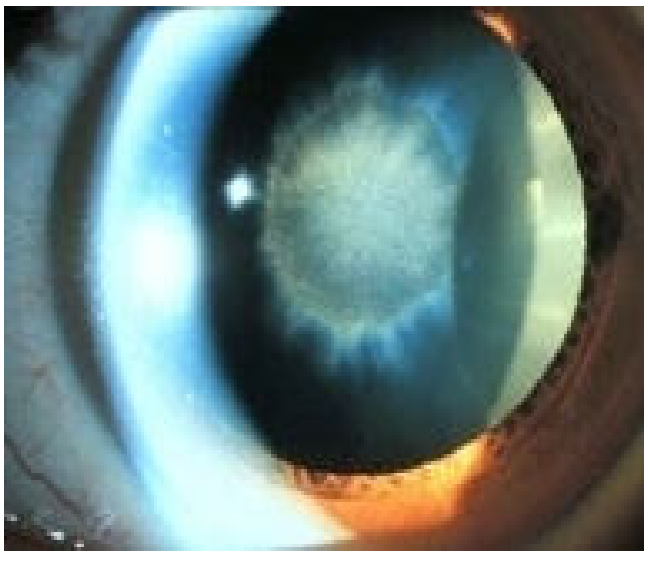
Hypocalcaemic cataract

- May be associated with parathyroid tetany.
- Multicoloured crystals

  or
- Small discrete white flecks of cortical opacities

Wilson's disease

- *'Sunflower cataract' is* rare in such patients.
- 'Kayser-Fleischer ring' (KF ring) in the cornea is more common.



Sunflower cataract

(Photographs- Courtesy : Kanski's Clinical Ophthalmology)

Lowe's syndrome

- Lowe's (Oculo-cerebral-renal) syndrome
- Rare inborn error of amino acid metabolism.
- *Ocular features*

  congenital cataract and glaucoma
- *Systemic features*

  *m*ental retardation

  dwarfism

  osteomalacia

  muscular hypotonia

  frontal prominence.

Systemic disorders	Description
Galactosemia	Absence of enzymes that convert galactose to glucose. Cataract associated with the accumulation of galactitol and lens swelling
Diabetes Mellitus	Increase of glucose level in lens fibers causing accumulation of sorbitol and leakage of water into the lens
Fabry's disease	X-linked lysosomal storage disorder leads to abnormal glycolipid into lens fibers creating opacity
Lowe's syndrome	Total cataract due to serious X-linked disorder leading to a small lens + metaplastic EP
Alport's syndrome	Congenital/postnatal cortical cataract with anterior or posterior Lenticonus and Microspherophakia
Dystrophia Myotonica	Inherited disease where multilamellar disease causes opacity

COMPLICATED CATARACT

- Opacification of the lens secondary to some other intraocular disease.

- *Inflammatory conditions*
- Uveal inflammations
  (like iridocyclitis, pars planitis, choroiditis)
- Hypopyon corneal ulcer
- Endophthalmitis.

- *Degenerative conditions*
- Retinitis pigmentosa
- Myopic chorioretinal degeneration

- *Retinal detachment*

  Long-standing cases

- *Glaucoma (primary or secondary)*

- *Intraocular tumours*
- Retinoblastoma
- Malignant melanoma

COMPLICATED CATARACT

- Lens changes typically in front of the posterior capsule.
- Irregular in outline
- Variable in density
- Appearance like '*breadcrumb'.*
- A very characteristic sign is Iridescent coloured particles *'polychromatic lustre'* of reds, greens and blues.

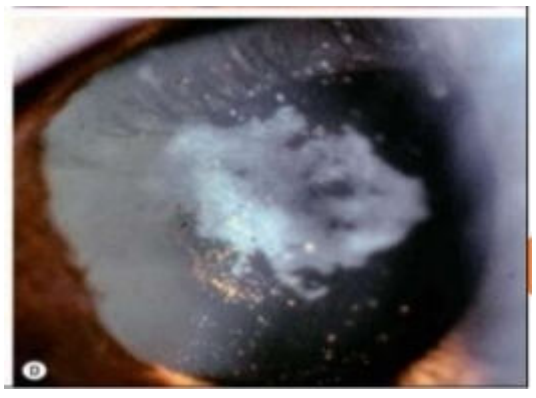
COMPLICATED CATARACT

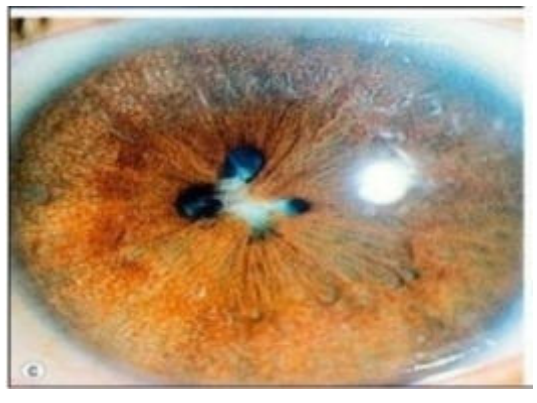
- Chronic anterior uveitis

  Most common cause
- Polychromatic lustre

  at posterior pole
- If persists, anterior and

  posterior opacities develop

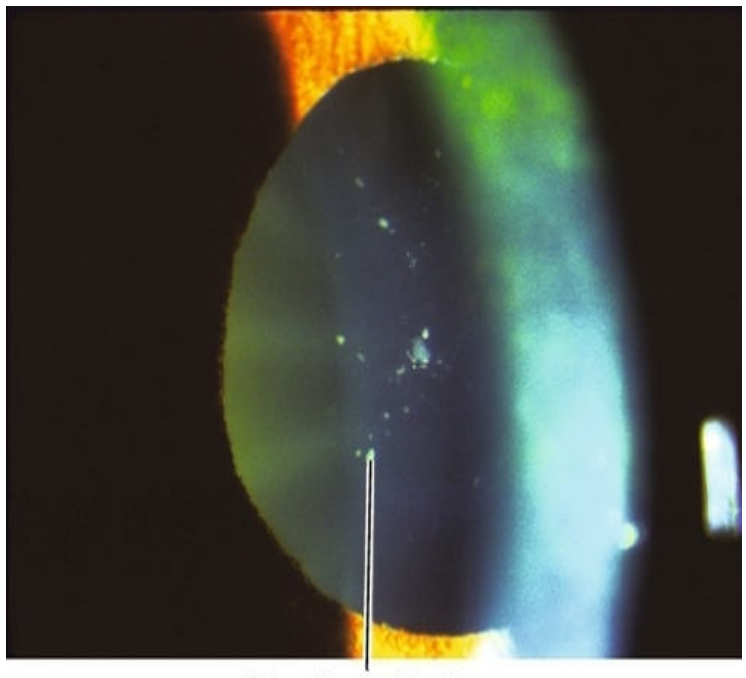




Angle closure glaucoma

Focal infarcts of lens epithelium

-small grey-white anterior subcapsular or capsular opacities
'glaukomfecken'



Glaukomflecken

- Pathological myopia

Posterior subcapsular opacities
Early onset nuclear sclerosis

- Hereditary fundus dystrophies

Lebers: total cataract
Stickler syndrome: cortical cataract

Toxic cataracts

1. Smoking

2. Alcohol

3. Drug induced cataract
   - Corticosteroids
   - Phenothiazines
   - Pilocarpine
   - Diuretics
   - Amiodarone
   - Allopurinol
   - Chloroquine

Other types:

- Infrared (heat) cataract:
  '*Glass-blower's* or *Glassworker's cataract*'

- Irradiation cataract

- Ultraviolet radiation cataract

- Electric cataract

MANAGEMENT OF CATARACT IN ADULTS

- A. Non-surgical measures

- B. Surgical management

Non-surgical measures

1. *Treatment of cause of cataract*

2. *Measures to delay progression*

3. *Measures to improve vision in the presence of incipient and immature cataract*

Surgical management

- *Indications*

1. *Visual improvement*

2. *Medical indications :*
   Lens induced glaucoma
   Retinal diseases like
   diabetic retinopathy or retinal detachment
   (treatment of which is hampered by
   presence of lens opacities)

3. *Cosmetic indications*

Preoperative evaluation

I. General medical examination of the patient

II. *Ocular examination*

A. *Retinal function tests*
B. *Search for local source of infection*
C. *Anterior segment evaluation by slit-lamp examination*
D. *Intraocular pressure (IOP) measurement*

Retinal function tests

- *Light perception (PL)*
- *Projection of rays (PR)*
- *Pupillary reaction to light*
- *Two-light discrimination test*
- *Maddox rod test*

Retinal function tests

- *Colour perception*
- *Entoptic visualisation*
- *Laser interferometry*
- *Objective tests for evaluating retina like VEP, ERG, EOG, USG*

Preoperative medications and preparations

- 1. *Topical antibiotics*
- 2. *Preparation of the eye to be operated.*
- *3. An informed and detailed consent*
- 4. *Scrub bath and care of hair.*
- *5. To lower IOP*
- 6. *To sustain dilated pupil*

- ***Anaesthesia***
- LA/GA

Types and choice of surgical techniques

- Phacoemulsification (MICS)
- Small incision cataract surgery (SICS)
- *Extracapsular cataract extraction (ECCE)*
- *Intracapsular cataract extraction (ICCE)*

Conclusion

- Metabolic cataracts are due to endocrine disorders and/or biochemical abnormalities.
- Complicated cataracts involve opacification of the lens secondary to some other intraocular disease.
- Many metabolic and complicated cataracts have distinctive morphologies.

Thank you