LENS-ASSOCIATED UVEITIS

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Introduction

- An immune reaction to lens material may result in ocular inflammatory disease.
- This reaction may follow disruption of the lens capsule (traumatic or surgical), termed phacoantigenic uveitis, or leakage of lens protein through the intact lens capsule in mature or hypermature cataracts, termed phacolytic uveitis.

Pathogenesis

1. The exact mechanism of lens-induced uveitis, although unknown, is thought to represent an immune reaction to lens protein.
2. Experimental animal studies suggest that altered tolerance to lens protein leads to the inflammation, which usually has an abrupt onset but may occasionally occur insidiously.
3. Patients previously sensitized to lens protein (eg, after cataract extraction in the fellow eye) can experience inflammation within 24 hours after capsular rupture.

Phacoantigenic uveitis

- Phacoantigenic uveitis was previously termed phacoanaphylactic endophthalmitis, an incorrect nomenclature because anaphylaxis involves immunoglobulin E (IgE), mast cells, and basophils, none of which is present in the more appropriately termed phacoantigenic uveitis.

- **Signs and symptoms**

1. Patients exhibit an **anterior uveitis** that may be **granulomatous or nongranulomatous**.
2. **KPs** are usually present and may be small or large.
3. **Anterior chamber reaction** varies from mild (eg, postoperative inflammation involving a small amount of retained cortex) to severe (eg, traumatic lens capsule disruption);
4. **Hypopyon** may be present.
5. **Posterior synechiae** are common
6. **IOP** is often elevated.
7. Inflammation in the anterior vitreous cavity is common - vitritis, but fundus lesions do not occur.

- **Histology**

1. A zonal granulomatous inflammation is centered at the site of lens injury.
2. Neutrophils are present around the lens material with surrounding lymphocytes, plasma cells, epithelioid cells, and occasional giant cells.

- **Complications**

1. CMO
2. Epiretinal membrane
3. Cyclitic membrane
4. Glaucoma
5. Retinal detachment

- **Treatment**

1. It consists of topical and, in severe cases, systemic corticosteroids,
2. Cycloplegic and mydriatic agents.
3. Surgical removal of all lens material is usually curative from AC or pars plana vitrectomy.
4. When small amounts of lens material remain, corticosteroid therapy alone may be sufficient to allow resorption of the inciting material.

Phacolytic uveitis

- Phacolytic uveitis (or phacolytic glaucoma, as it is frequently referred to) involves an acute increase in IOP caused by clogging of the trabecular meshwork by macrophages engorged with lens proteins leaking through the intact capsule of a hypermature cataract.
- The **diagnosis** is suggested by
  - The presence of elevated IOP,
  - Refractile bodies in the aqueous (representing lipid-laden macrophages),
  - And a lack of KPs and synechiae.

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- **Therapy** includes pressure reduction often through use of osmotic agents and topical medications, followed quickly by cataract extraction.
- An aqueous tap may reveal swollen macrophages.

Postoperative inflammation: infectious endophthalmitis
- Infectious endophthalmitis must be included in the differential diagnosis of postoperative inflammation and hypopyon.
- Infection with low-virulence organisms such as Propionibacterium acnes and Staphylococcus epidermidis as well as fungal species can cause delayed or late-onset endophthalmitis after cataract surgery.

Postoperative inflammation: IOL-associated uveitis
- Intraocular lens (IOL)–associated uveitis may range from mild inflammation to the uveitis-glaucoma hyphema (UGH) syndrome.

Etiopathogenesis
1. Surgical manipulation results in breakdown of the blood–aqueous barrier, leading to vulnerability in the early postoperative period.
2. IOL implantation can activate complement cascades and promote neutrophil chemotaxis, leading to cellular deposits on the IOL, synechiae formation, capsular opacification, and anterior capsule phimosis.
3. Retained lens material from extracapsular cataract extraction may exacerbate the usual transient postoperative inflammation.
4. Iris chafing caused by the edges or loops of IOLs on either the anterior or the posterior surface of the iris can result in mechanical irritation and inflammation. Incidence of this type of complication using modern lenses is less than 1%.
5. The motion of an iris-supported or anterior chamber IOL may cause intermittent corneal touch and lead to corneal endothelial damage or decompensation, low-grade anterior uveitis, peripheral anterior synechiae, recalcitrant glaucoma, and CME. These lenses should be removed and exchanged when penetrating keratoplasty is performed.
6. UGH syndrome may be caused by irritation of the iris root by any intraocular implant.
7. Because ACIOL use is rare, UGH syndrome is encountered most commonly with sulcus placement of a single-piece acrylic IOL (something that should never be intentionally done).
8. UGH syndrome may also occur even with the appropriate placement of a 3-piece IOL in the sulcus.

Investigation
- Ultrasound biomicroscopy or anterior segment optical coherence tomography (OCT) can be helpful in evaluating lens position in cases of chronic pseudophakic uveitis.

Management
1. Many cases can be managed with topical corticosteroids only, although some may require
2. IOL explantation or repositioning.
3. As a general rule, the more biocompatible the IOL material, the less likely it is to incite an inflammatory response.

Prevention
1. Flexible anterior chamber IOLs (ACIOLs) are less likely than older rigid ACIOLs to cause UGH syndrome.
2. Irregular or damaged IOL surfaces as well as polypropylene haptics have been associated with enhanced bacterial and leukocyte binding and probably should be avoided in patients with uveitis.
3. Several attempts have been made to modify the IOL surface to increase its biocompatibility.
4. These modifications have had little clinical impact on postoperative inflammation and have been abandoned with the advent of acrylic IOLs.
5. Foldable implant materials have also been found to be well tolerated in many patients with uveitis. .
6. Acrylic IOLs appear to have excellent biocompatibility, with low rates of cellular deposits and capsular opacification.
7. One of the most important factors in the success of cataract surgery in patients with uveitis is aggressive control of intraocular inflammation in the preoperative and postoperative periods.

Drug-induced uveitis
- Use of certain medications has been associated with the development of intraocular inflammation; these drugs include

1. Rifabutin (an antibiotic used in the treatment of Mycobacterium avium intracellulare infection),
2. Systemic fluoroquinolones (especially moxifloxacin, which may induce iris depigmentation and uveitis),
3. Bisphosphonates,

4. Sulfonamides,
5. Diethylcarbamazine (an antifilarial drug),
6. Oral contraceptives.
7. Paradoxically, certain anti-TNF drugs (eg, etanercept) have also been associated with new-onset uveitis and a systemic sarcoid-like syndrome.
8. Vaccines such as BCG vaccine and influenza vaccines,
9. Purified protein derivative (PPD) used in the tuberculin skin test, have also been implicated in the development of uveitis.
10. Intravesical BCG vaccine (used in the treatment of bladder cancer) can result in an infectious uveitis.

Numerous topical antiglaucoma medications have been associated with uveitis:

11. Metipranolol (a nonselective beta-blocking drug used in the treatment of glaucoma),
12. Anticholinesterase inhibitors
13. Prostaglandin F2α analogues.

Drugs that are injected directly into the eye have also been associated with uveitis.

14. Urokinase (a plasminogen activator),
15. Cidofovir (a cytosine analogue effective against CMV) and
16. Vascular endothelial growth factor (VEGF) inhibitors.

- Treatment generally involves topical corticosteroids and cycloplegic drugs, if necessary.
- Recalcitrant cases may require cessation or tapering of the offending medication.

Anterior uveitis

1. FUS 2. JIA 3. HLA-B27 AS 4. Reactive arthritis 5. Psoriatic arthritis 6. Ulcerative colitis 7. Crohn's disease	8. TINU 9. Glaucomatocylitic crisis 10. Phacolytic uveitis 11. Phacoantigenic uveitis 12. UGH syndrome 13. Drug induced uveitis