

CONTACT LENS RELATED KERATITIS

Presented by

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CONTACT LENS RELATED KERATITIS

Contact lenses have gained increased popularity for the correction of refractive errors & cosmetics.

PHYSIOPATHOLOGY OF C.L.K.

- **Hypoxia**
- **Hypercapnia**

CL acts as a barrier to the elimination of waste products during extended wear. This leads to increased concentration of carbonic acid in the tissues and stromal acidosis.

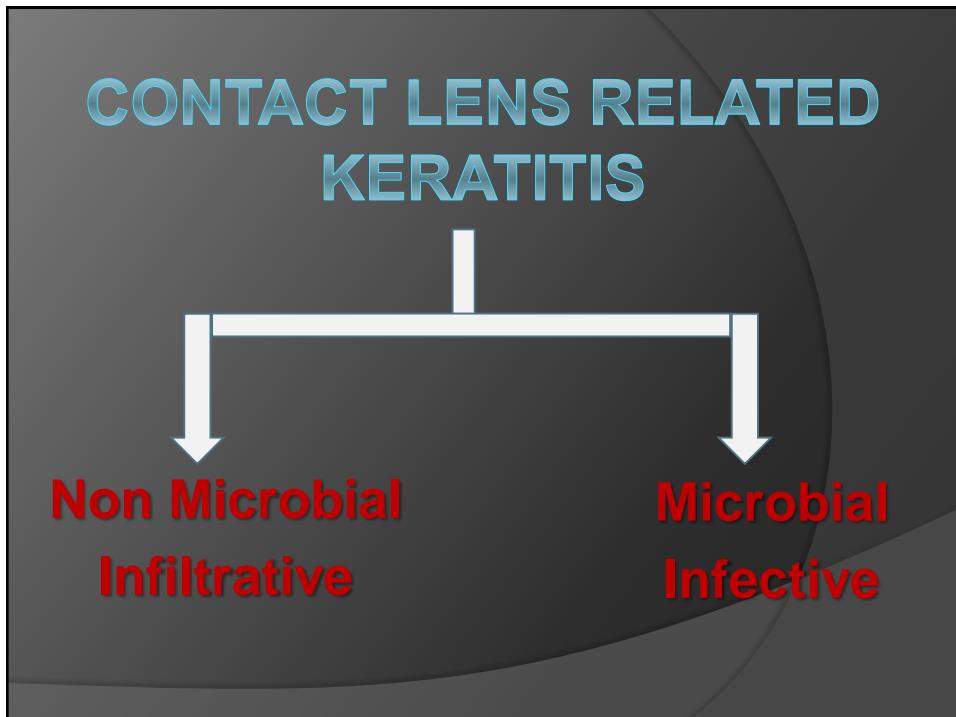
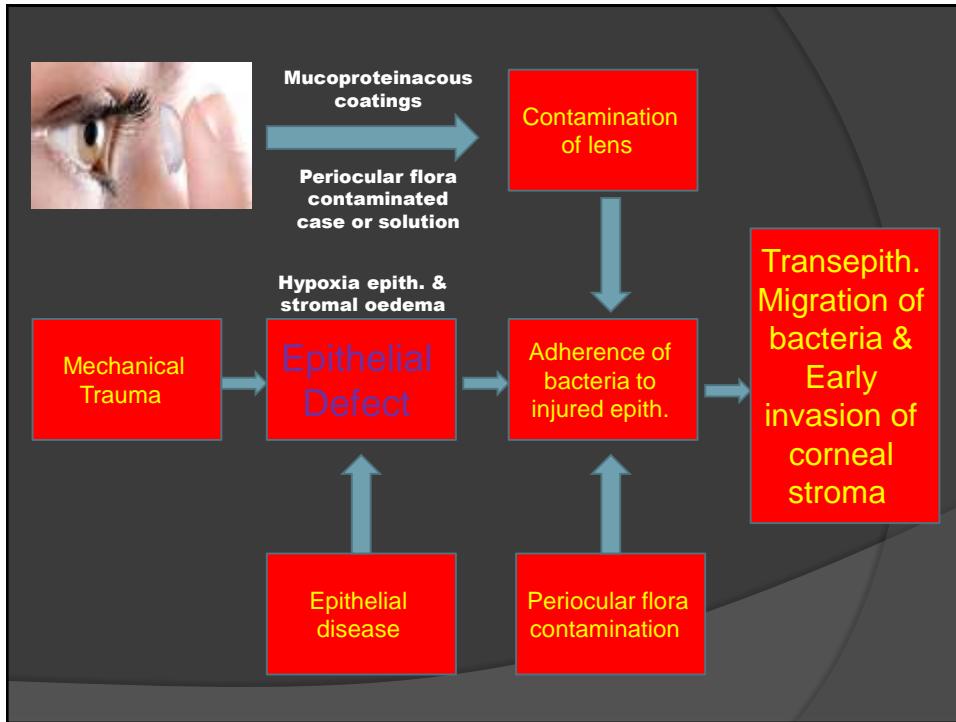
- **Cellular debris**

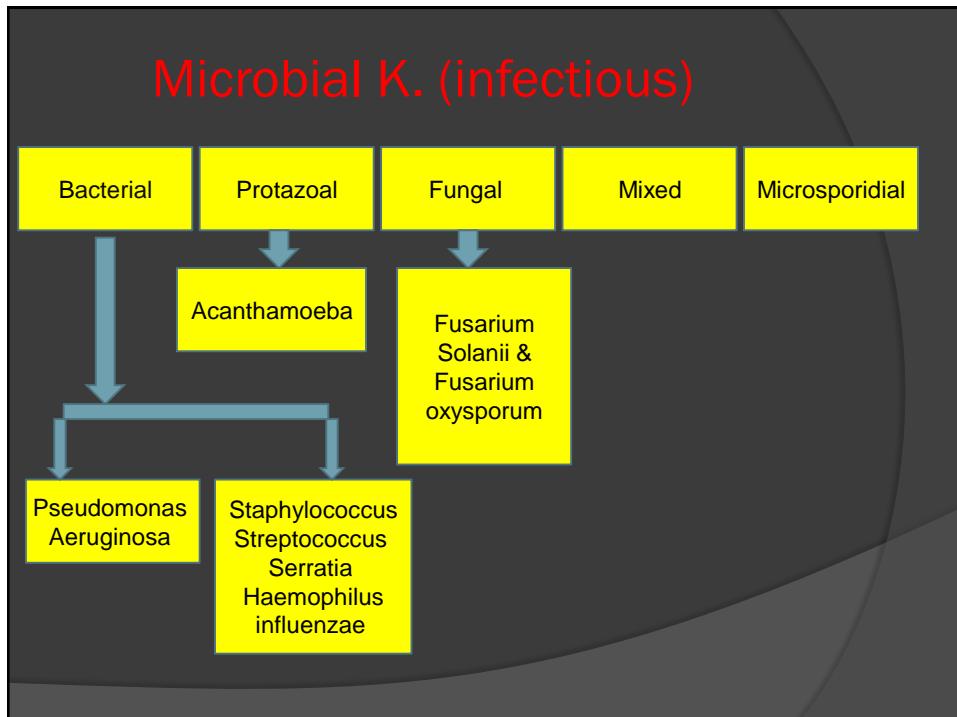
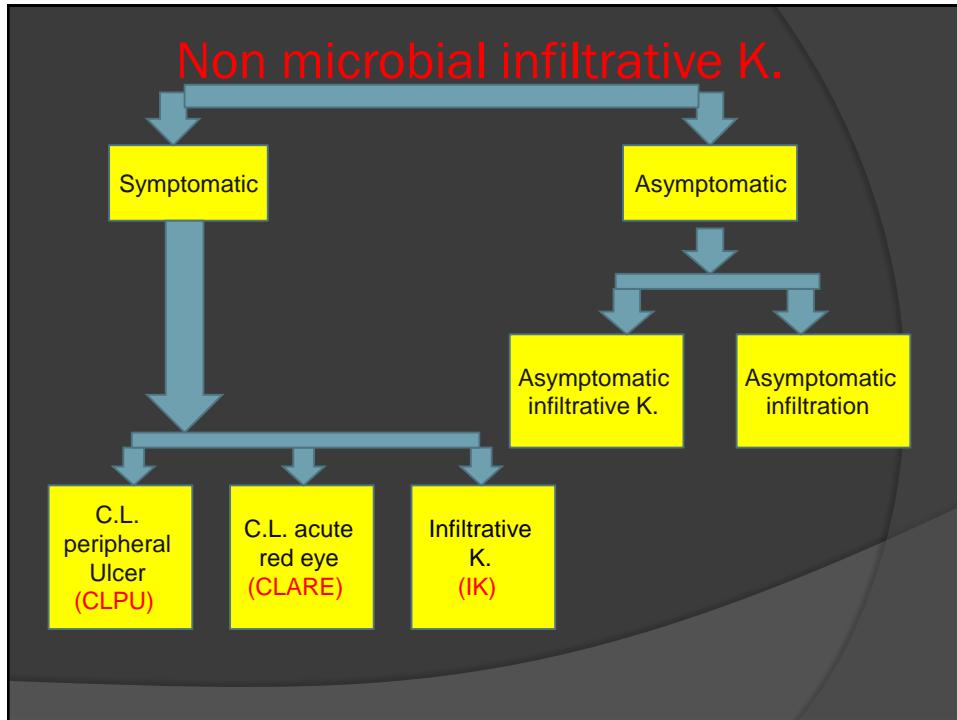
Accumulated cellular debris and exfoliated cells leading to toxic reactions.

PHYSIOPATHOLOGY OF C.L.K.

- **Mechanical**
- **Corneal Hypothesia**
- **Immunological**

Is a response to microbial antigens (usually Staphylococcal), derived from bacteria on the lens or on the lid margin.





NON MICROBIAL INFILTRATIVE KERATITIS

Etiology:

Inflammation, not infective and there is no progression to infection, nor increase risk of microbial keratitis , which is a separate disease entity.

Micro-organisms cannot usually be recovered from the lesion.

RISK FACTORS

- **Lens material :**

Wettability and deposit attraction, stiffness and other physical characteristics.

- **Lens design and fitting:**

Lens to cornea relationship , position and movement and thickness profile.

- **Wearing time :**

Daily Wear vs. Extended Wear , Daily vs. part-time.

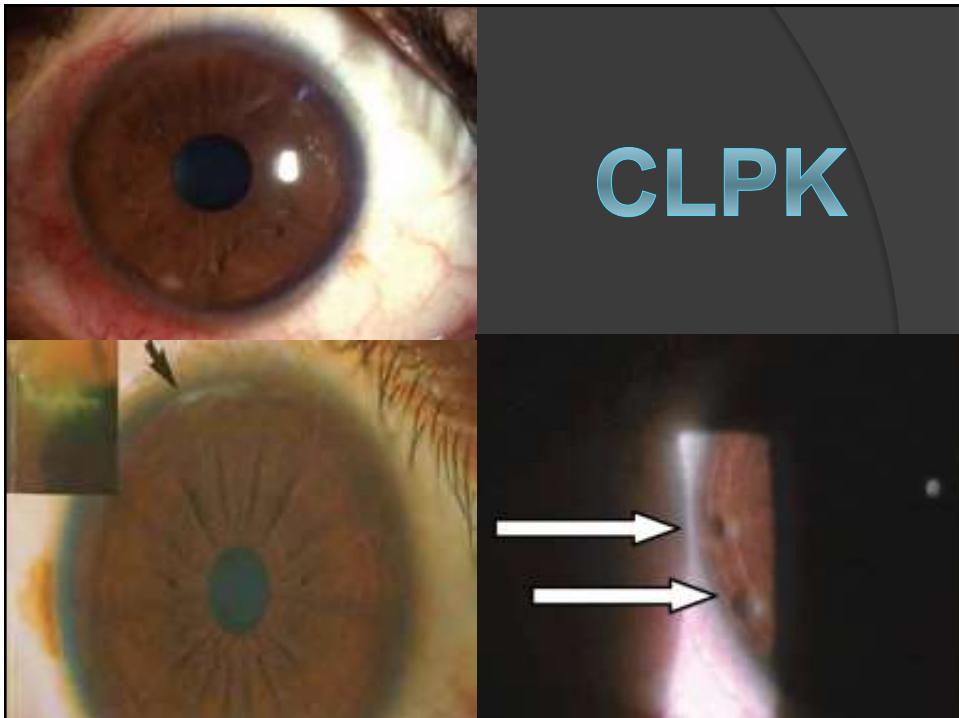
- **Patient compliance.**

SYMPTOMS

- Redness and slightly watery.
- Mild FB sensation.
- Mild photophobia.

SIGNS

- Peripheral anterior stromal infiltrate, single or multiple **noticed in morning**.
- Usually small (0.1 – 2.0mm diameter).
- Overlying epithelium usually stains with fluorescein.
- Conjunctival hyperemia.
- Mild epiphora.
- **Absent** or Mild AC reaction.
- No lid oedema.
- Usually **unilateral**.



DIFFERENTIAL DIAGNOSIS

- **Microbial (bacterial , fungal....) keratitis** appearance can be similar, therefore monitor closely especially over the first 24 hours and if diagnosis remains in doubt, consider as microbial.
- **Corneal scar.**
- **Viral keratitis.**

MANAGEMENT

◎ Non pharmacological

- Discontinue lens wear. Most S&S resolve within 48 hours & infiltrates resolve over 2-3 weeks.
- Advise against extended wear.
- Warn about possibility of recurrence.
If condition recurs, switch to disposable CL.
- Lid hygiene if blepharitis present.

MANAGEMENT

◎ Pharmacological

- Oral antibiotic may be indicated for blepharitis.
- Tear substitute.
- NSAID.

INFECTIVE (MICROBIAL) KERATITIS

Contact Lenses inducing Corneal Disasters

are a major sight threatening complication of lens use .

RISK FACTORS FOR INFECTIOUS KERATITIS

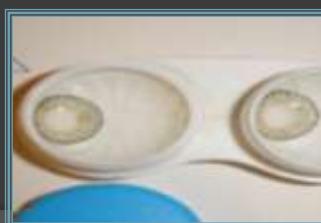
- Alteration in normal ocular flora .
- Noncompliance with CL disinfection , storage , mode of use over night
- Biofilm formation and lens polymer – Microbes such as bacteria and fungi adhere to contact lens surfaces, cell membrane.

RISK FACTORS FOR INFECTIOUS KERATITIS

- Altered ocular defense (OSD) factors like tear deficiency or corneal epithelium defect.
- Bad habits (??? Rent) :-
 - Sharing cosmetic C.I.
 - Topping off lens solution not discarding.
 - Storing or rinsing C.L. in water.
 - Non cleaning C.L. cases.
 - Not disinfecting C.L. well.

- Temperature, humidity, smoking & Water contamination (swimming with no goggles).

You can **Rent** a contact lenses



NOW YOU CAN RENT OR BUY CL

From

- Optical shops.
- Hair dressers.
- Shops for dress rent.
- Supermarket.
- Pharmacy.
- Mobile shop.





CAUSATIVE ORGANISMS

◎ Bacterial

Gram-negative

Pseudomonas aeruginosa.
Klebsiella oxygene and others.

Gram positive

Staphylococcus aureus.
Coagulase-negative staph.
Nocardia SP.
Streptococal pneumoniae.
Corynebacterium and others.

- ◎ **Fungal**

Filamentous & yeast.

- ◎ **Protozoal**

Acanthamoeba.

- ◎ **Mixed infection**

- Acanthamoeba and *Fusarium*.
- *Staphylococcus epidermidis* and *P. aeruginosa*.
- *P. aeruginosa* and *Escherichia coli*.
(Lead agent and coinfecting)

Acanthamoeba feed on biofilm produced by other microbes

*Major epidemiological studies consistently shows that the most common pathogen is ***Pseudomonas aeruginosa***.*

- ◎ **Source of infection**

Endogenous.

Exogenous (Environmental).

CLINICAL PRESENTATION

History .

Clinical findings

Ulcer site

Size

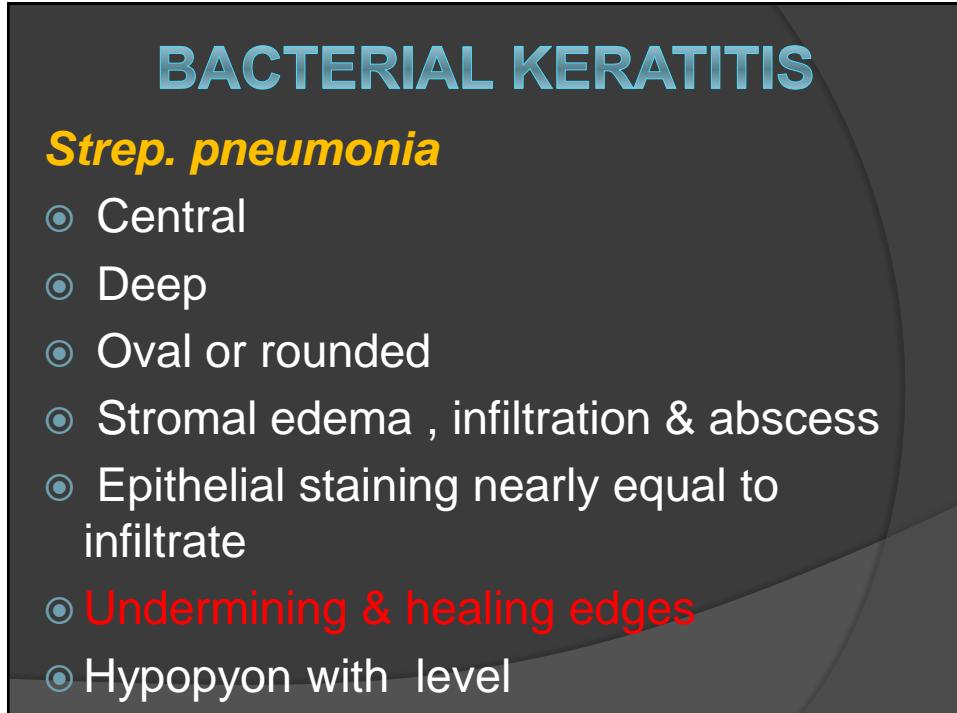
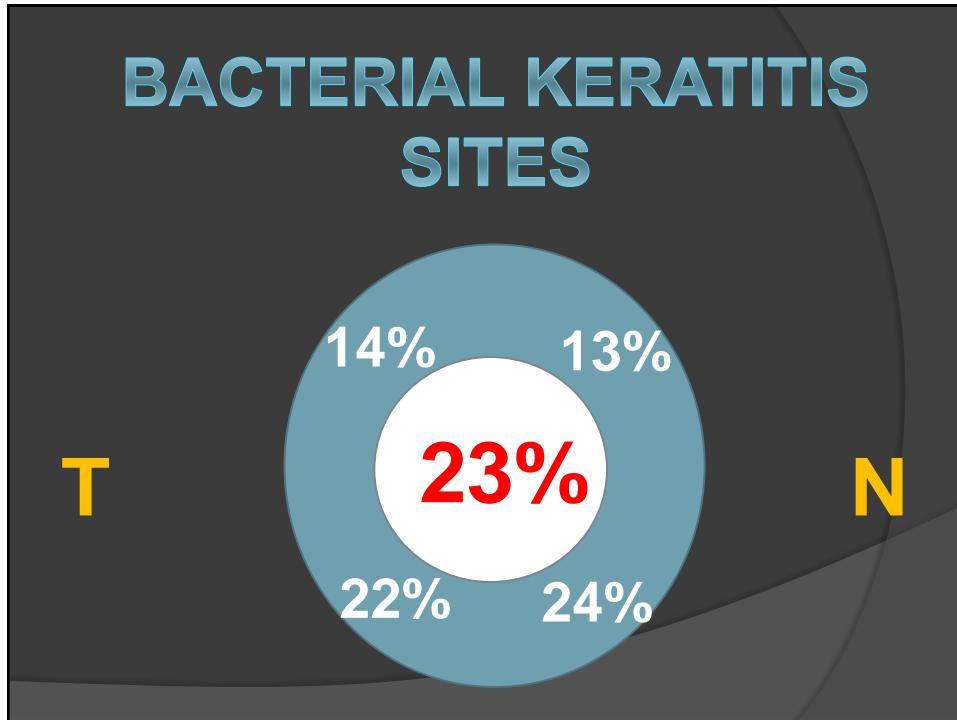
Shape

Edge

Depth of infiltration

Surrounding cornea

Pattern of corneal staining in relation to stromal infiltration



Pseudomonas

- Rapid severe progression
- Ring abscess
- Severe stromal necrosis & destruction





MYCOTIC

- Thick area of Keratitis
- Dense fibrinous (coagulum) hypopyon
- Stromal reaction with feathery hyphate edge
- Micro-abcesses (satellite lesion)
- Epithelial defect smaller than stromal reaction
- Immune rings
- Gutter
- Endothelial plaques & Iritis

FEATHERY EDGE



FEATHERY
EDGE &
SATELLITE
LESIONS



GUTTER & PYRAMIDAL HYPOPYON



STROMAL NECROSIS



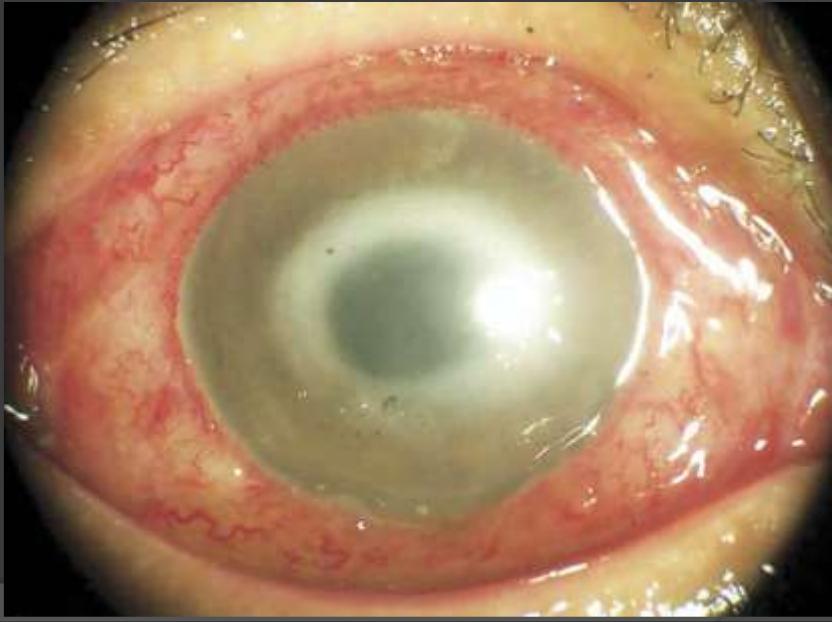
ACANTHAMAEBA

- Severe pain out of proportion to clinical findings
- Lack of response to their medication
- Negative culture for bacterial , mycotic and viral
- Confocal microscopy cyst appear as highly refractile spherical structure

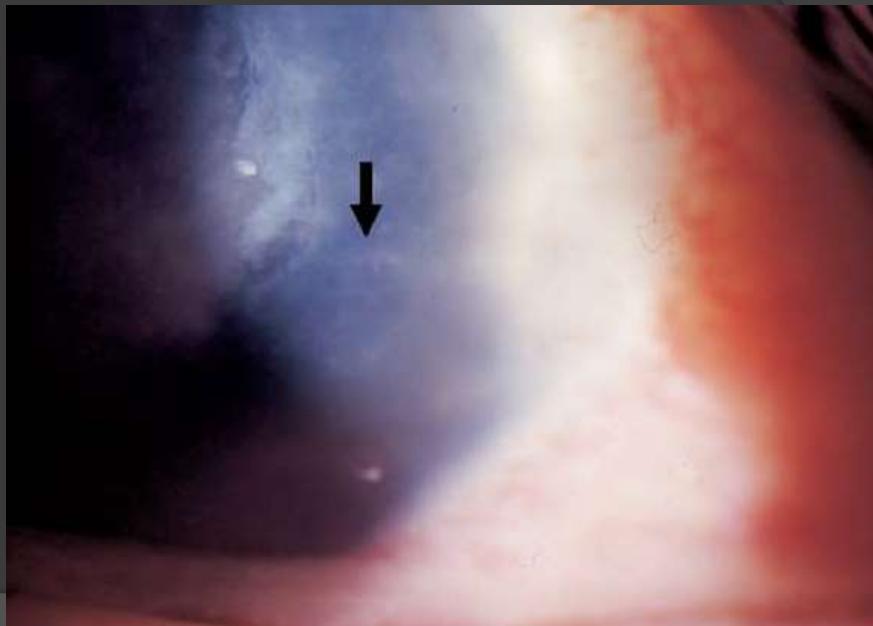
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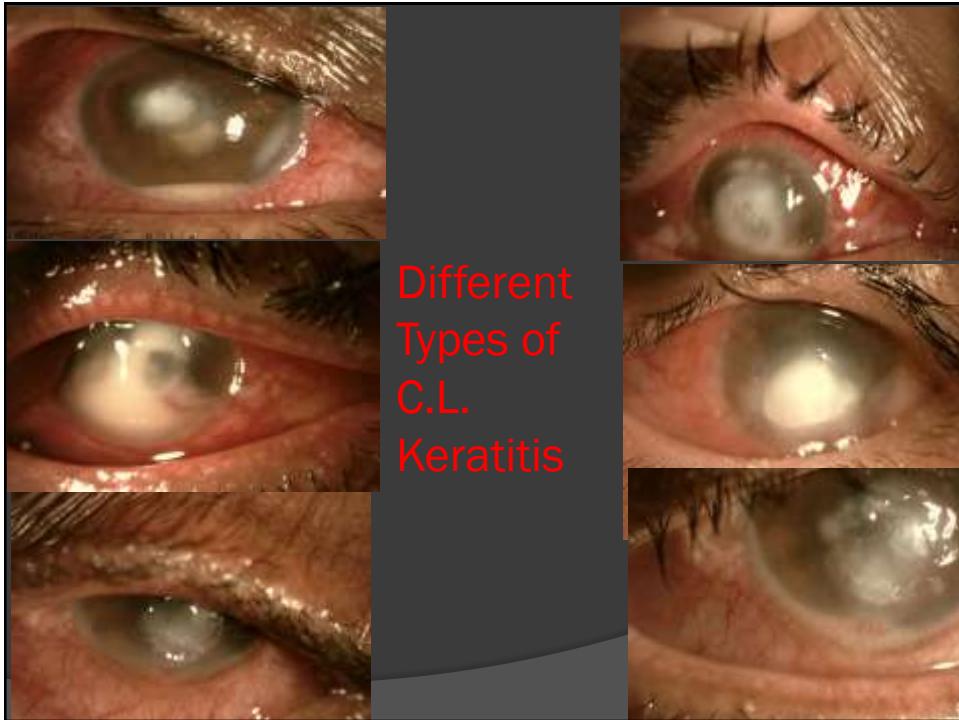
- Patchy or diffuse infiltration
- Perineural infiltration
- Ring infiltration
- Satellite lesions
- Absence of vascularization
- Anterior scleritis in advanced cases
- Hypopyon may be found

RING INFILTRATION



PERINEARAL INFILTRATION





Mixed Acanthamoeba & Fungal



LABORATORY WORK

❖ *Culture & sensitivity*

❖ *Staining*

Specimens from:

- Corneal scraping
- Corneal biopsy
- Contact lens
- Solution
- Cases

LABORATORY SPECIMEN COLLECTION

- Microbial specimen can be collected from a corneal ulcer by scraping the lesion with a platinum Kimura spatula, sterile needle, surgical blade, or thioglycollate-moistened calcium alginate or Dacron swab.
- After cessation of antimicrobial for 24 hours.

- when repeated corneal scrapings are negative Corneal biopsy may be necessary in cases of apparent and significant microbial infection.
- A small 2- to 3-mm trephine can be used to create a partial-thickness incision, and forceps and scissors are used to excise a lamellar flap of cornea.
- The specimen is generally split into 2 pieces, or separate biopsies are taken so that tissue can be evaluated by both histopathology and microbiology.

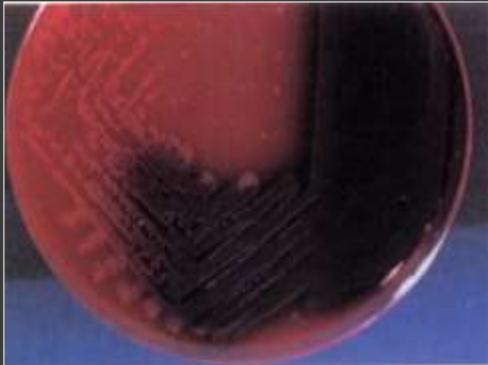
RECOMMENDED STAINS AND CULTURE MEDIA FOR MICROBIAL KERATITIS

Suspected Organism	Stain	Media
Aerobic bacteria	Gram Acridine orange	Blood agar Chocolate agar Thioglycolate broth
Anaerobic bacteria	Gram Acridine orange	Anaerobic blood agar Phenylethyl alcohol agar in anaerobic chamber Thioglycollate broth
Mycobacteria	Gram Acid-fast Lectin	Blood agar Lowenstein-Jensen agar
Fungi	Gram Acridine orange Calcofluor white	Blood agar (25°C) Sabouraud's agar (25°C) Brain-heart infusion (25°C)
Acanthamoeba	Acridine orange Calcofluor white	Non-nutrient agar with E.coli overlay Blood agar Buffered charcoal-yeast extract agar

LABORATORY WORK

- PCR
- Alcoholic delamination
- Impression cytology

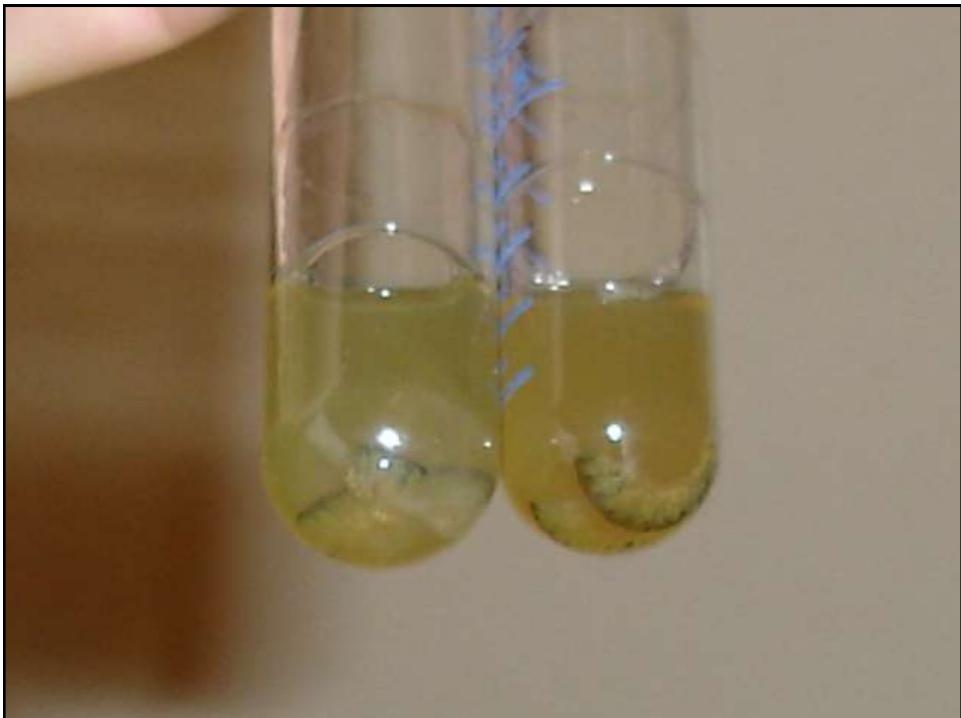
Pseudomonas

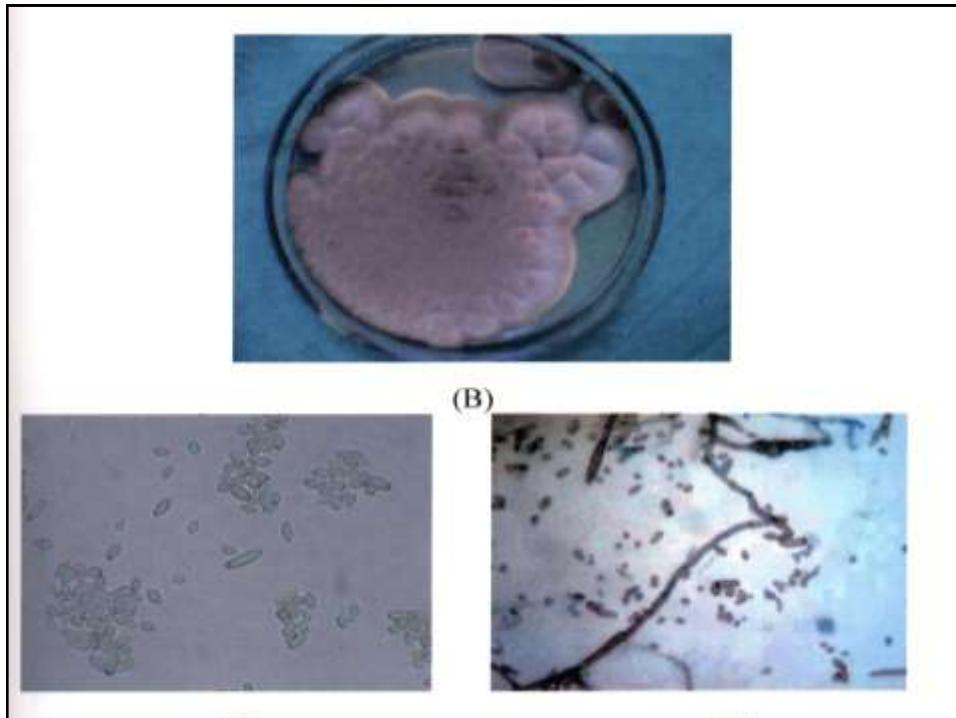


Culture on blood agar



Microscopic Picture





PROPHYLAXIS TREATMENT

Precautions before wearing CL

- Fitting must be checked by a physician.
- Wash well /Rinse well/dry well your hands before handling.
- Container must be clean , filled with CL solution and sealed well with maximal use for three months.
- CL solution from it's original bottle.
- Don't use any other fluids even distilled water or saline.

PROPHYLAXIS TREATMENT

Precautions before wearing CL

- Don't wear CL than the period recommended.
- Nails must be short & clean.
- Good training to the patients for safety ideal fitting.

PROPHYLAXIS TREATMENT

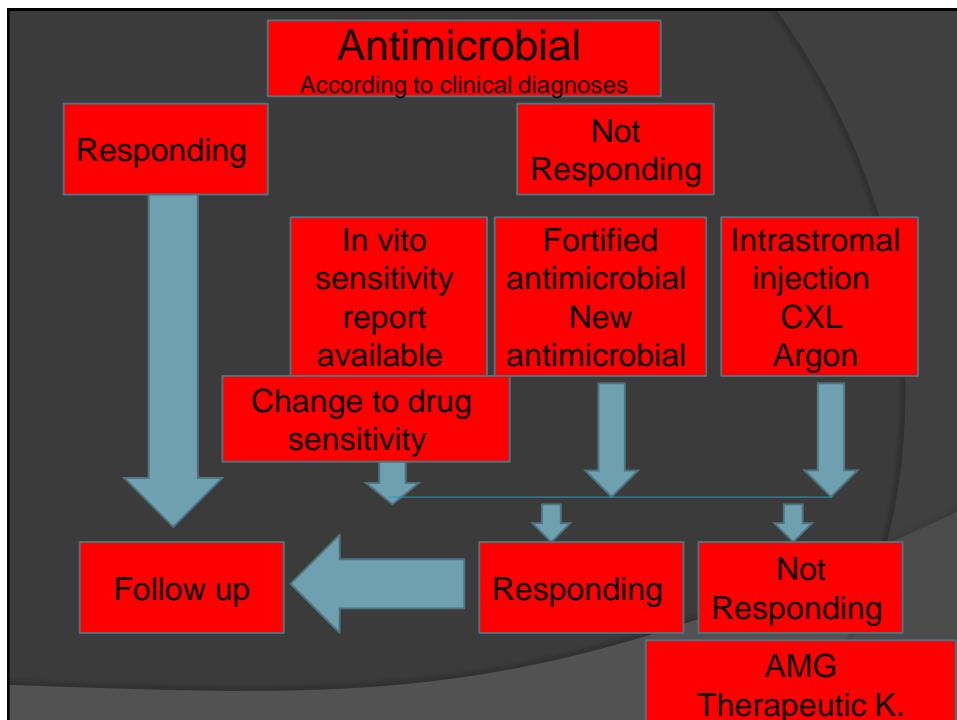
Biofilm destruction

- Two Step 3% hydrogen peroxide and neutralization after 9 hours.
- Multipurpose solution.
- PVP Iodine
- Modifications of the physicochemical properties of the CL material (New).
- Modifications physicochemical properties of the storage solution (New).
- Microbicidal impregnation of storage box walls (New).

PROPHYLAXIS TREATMENT

Biofilm destruction

- Surface Nanotechnology (New).
- Nanoetching of lens and storage box walls Interference of microbial communication(New).
- Enzyme treatment of the matrix (New).
- Molecular penetration of the matrix and destruction of microbes.



SPECIFIC

Antimicrobial

- ✓ Empirical
- ✓ According to culture &sensitivity

Non specific

- Cycloplegic
- Antiglaucomtous
- Vit C (high doses)
- Tetracycline
- Healing promotion medication

