

Mixed Bacterial and Fungal Corneal Infections from Rural India



Dr Nita Shah

Dr Nita Shanbhag

Aayush Eye Clinic - Microsurgery & Laser Centre
Mumbai INDIA

The Authors have no financial in the subject matter of this poster

Introduction

- Bacterial, Fungal & Mixed Keratitis is a Diagnostic and Therapeutic challenge for the Ophthalmologist.
- Difficulties related to Mixed Infections
 - Establishing a clinical diagnosis as the clinical picture is not classical for any one microbe.
 - Isolating the Etiologic Organism in the Laboratory , in view of the Corneal Ulcer being previously treated.
- Management remains a challenge because of the poor corneal penetration, and the limited commercial availability of drugs .

Total cases seen in 2 yrs	24
No Organism isolated	20
Gram positive cocci	1
Acanthamoeba cyst	1
Filamentous Fungus	2

Markers for Diagnosis

Detailed History

- Long term use of Antimicrobials / Steroids
- Trauma / Abrasions
- Foreign Body – e.g. vegetable matter
- Contact lens
- Contaminated Medications and Dispensers
- Chronic Dacryocystitis
- Dry eyes
- Bullous Keratopathy
- Reduced Corneal Sensations
- Trachoma with sequelae
- Lack of immediate medical care and Home Therapy

General

- Malnutrition
- Immuno-compromised Patient
- Diabetes
- Chronic Alcoholism
- Collagen Vascular Diseases

Clinical Examination

- **Visual Acuity**
- **External Examination-** Lid oedema, Blepharospasm, Conj and Ciliary Injection - present in Bacterial and minimal in Fungal Ulcers.
- Lid Abnormalities, Lagophthalmos
- **Biomicroscopy** - Corneal Ulcer characteristics thinning or perforation, Stromal oedema
- Iritis/Hypopyon
- **Sac Syringing-** for focus of Infection

Smear and Culture

- Scraping from ulcer margins

Fluorescein Microscopy

- Acridine Orange
- Calcoflour white stain.

Clinical Characteristics

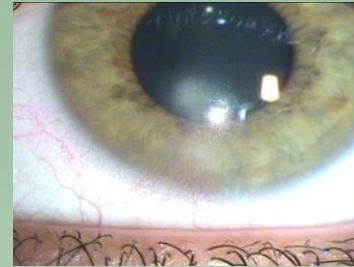
- The **Bacterial infections** are fulminant yellowish white ulcers with irregular swollen overhanging margins and necrotic grayish floor which progress fast. Stromal haze and Iritis with Hypopyon may occur.
- Symptoms are Severe: Diminution of Vision, lacrimation, photophobia and blepharospasm. Also pain, discharge and foreign body sensation .
- The **Fungus** grows slowly in the cornea and has feathery margins and/or satellite lesions and proliferates to involve the Stromal layers. The patient presents a few days or weeks later with symptoms.
- It breaks through the Descemet's membrane and passes into the anterior chamber to cause Hypopyon.
- Immune ring of Wessley

Mixed Infections were suspected when the clinical characteristics were of both Bacterial and Fungal and the predisposing factors were relevant...

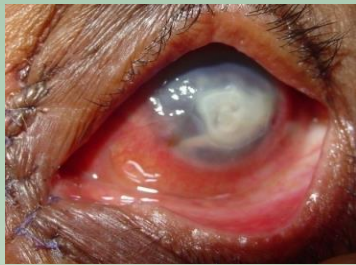
Variety of Clinical presentation



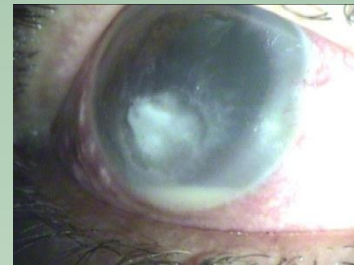
Dense Keratitis



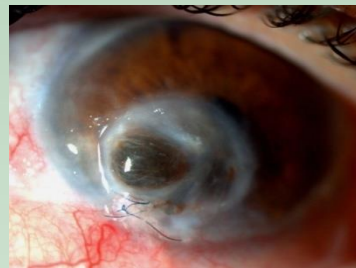
Satellite lesions



Corneal
Abscess with
Necrotic floor



Feathery margins



Descemetocele

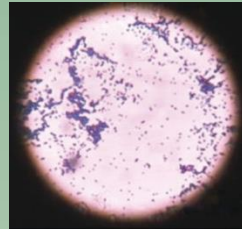


Perforated Corneal
Abscess

Lab Diagnosis

Bacterial-Smear

- Gram Stain
- Giemsa Stain
 - Culture
 - Blood Agar
 - Nutrient Agar



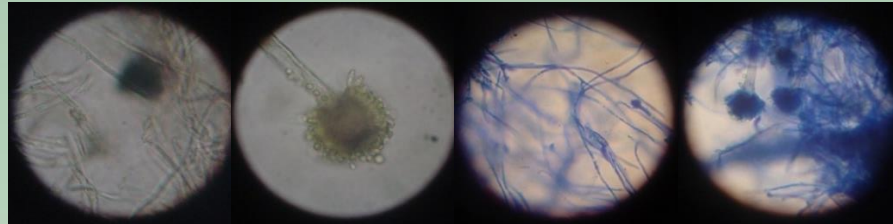
Gram Positive Cocci



Gram Negative Rods

Fungal Smear

- 10 % KOH
- LPCB mount
- Culture
 - Saboraud's Agar
 - 25 deg & 37 deg
 - Brain-Heart Infusion Broth



Filamentous Hyphae on KOH



Colonies of Fungal growth

Anaerobic Org

- Thyoglycolate broth

Acanthamoeba

- Saline smear
- Calcofluor white



Acanthamoeba Cyst

Treatment Protocol

Control of Infection with appropriate drugs is based on

- Clinical judgment
 - Findings of Smear report
 - Culture and Sensitivity report
- Along with

Supportive Therapy

- Oral Analgesics/NSAIDS
- Oral Acetazolamide and Local Anti-Glaucoma agents
- Atropine eye ointment 1 %
- Septidine 5%
- Protection of the eye from the environment with dark glasses
- Therapeutic Contact Lens
- Control of DM / HIV
- Tear substitutes
- Treatment of - Local conditions viz. Dacryocystitis, Trichiasis etc
- Systemic conditions viz. Malnutrition, Diabetes

Treatment Anti-Microbials

Drug Name	Organism Name	Dosage
Anti-Bacterials		
Tobramycin	1. Broad Spectrum 2. Gram Negative Rods	Topical 0.3%, S/C 20 mgm in 0.5ml.
Amikacin	1. Gram Negative Rods	Topical 8mgm/ml, S/C 20 mgm in 0.5 ml.
Vancomycin	1. Gram Positive Cocci	Topical 15 - 50 mgm/ml, S/C 25 mgm in 0.5 ml.
Fluroquinolones	1. Broad Spectrum 2. Gram Negative Rods/Cocci	Topical 0.5%,S/C 3 mgm/ ml
Cefixime	1. Broad Spectrum	Orally 8mgm/kg body weight per day
Cefazolin	1. Broad Spectrum 2. Gram Positive Cocci	Topical 50 mgm/ml, S/C 100 mgm in 0.5 ml.
Ceftazidime	1. Gram Negative Rods /Cocci	Topical 50 mgm/ml, S/C 100mgm in 0.5 ml
Ceftriaxone	1. Gram Negative Cocci	Topical 50 mgm/ml, S/C 100 mgm in 0.5 ml
Anti-Protozoal		
PHMB/ Chlorhexidine	1. Acanthamoeba	Topical 0.02 %
Anti-Fungals		
Fluconazole	1. Broad Spectrum	Topical 0.3%, Orally 150 mg/d, 1 to 2 tablets per day
Voriconazole	1. Candida 2. Aspergillus	Topical 1%
Natamycin	1. Fusarium 2. Aspergillus	Topical 5%
Amphotericin B	1. Candida 2. Other filamentous fungi	Administration is every 30 minutes for the first 24 hours, every hour for the second 24 hours, and then is slowly tapered
Nystatin	1. Candida	Topical 1%
Istroconazole	1. Broad Spectrum	Topical 1%

Treatment

Treatment of Indolent and Progressive ulcers

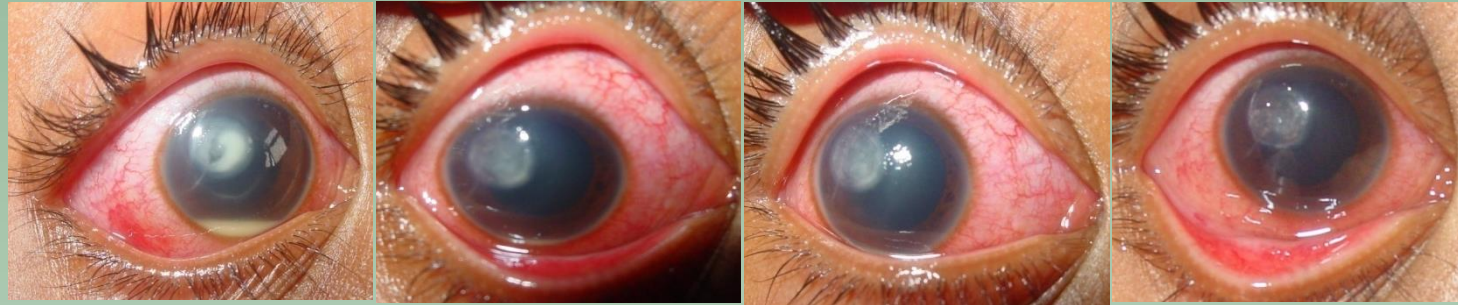
- Systemic Treatment : Cefixime 200mgm. Intravenous Tobramycin, Amikacin, Oral Fluconazole etc
- Sub-Conjunctival Antibiotics /Antifungal for imminent scleral spread or where compliance to medications is questionable.
- Collagen shield or soft contact lenses soaked in antibiotics are sometimes used to enhance drug delivery.
- The Eye is Re-evaluated for Drug toxicity and Non-infectious causes .
- Unusual organisms such as Non-tubercular Mycobacteria, Nocardia or Acanthamoeba are ruled out.
- Debridement of Necrotic Corneal Stroma. Scraping of ulcer floor followed by cauterization with pure (100%) carbolic acid or 10-20% trichloroacetic acid or 5% Povidone Iodine

Treatment of Keratocele/Descemetocoele or Perforation

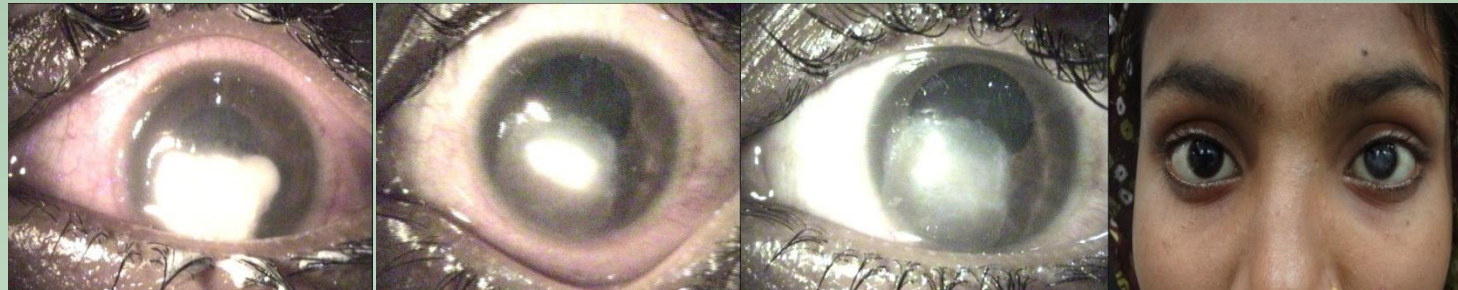
- In addition to Local and Systemic Antimicrobials the following may be done
- Systemic acetazolamide, bandage contact lens, atropine, topical antiglaucoma medication, Use of tissue adhesive (Glue): N-butyl 2-ethyl cyanoacrylate
- Therapeutic Penetrating Keratoplasty
- Conjunctival Flap

Sequential healing Pattern

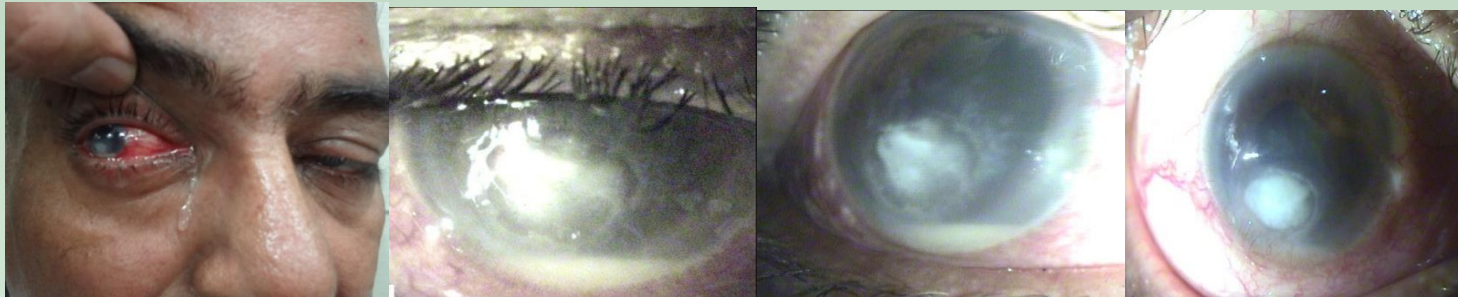
Corneal ulcer with Hypopyon (Fungal)



Mixed Corneal Abscess (Fungal + Bacterial)



Mixed Corneal Abscess (Fungal + Acanthamoeba)



In Conclusion

- It is a challenge to successfully treat Mixed Infections from Rural Areas as
 - There is extensive Agricultural exposure,
 - There is a lack of prompt expert medical care
 - There are a host of predisposing factors
- The success is significant only if
 - The microbes can be identified early (Clinically or in the Laboratory) - i.e. before significant visual loss.
 - The Medications are used sparingly and correctly to get adequate dosages without significant side effects.
 - Complications and Recurrences are prevented.

References

1. Br J Ophthalmol. 2006 March; 90(3): 289–292.
Prevalence and spectrum of bacterial co-infection during fungal keratitis
J C Pate, D B Jones and K R Wilhelmus
2. Am J Ophthalmol. 1992 Jul 15; 114(1):97-9.
Streptococcus viridans-induced crystalline keratopathy and fungal keratitis.
Kaufmann JG, Driebe W, Margo CE.
3. Indian J Ophthalmology 2007 Jan-Feb;55(1):5-6.
Infective keratitis: a challenge to Indian ophthalmologists.
Srinivasan M.
4. Indian J Med Res. 2009 Dec;130(6):749-57
Analysis of the risk factors predisposing to fungal, bacterial & Acanthamoeba
keratitis in south India.
Bharathi MJ, Ramakrishnan R, Meenakshi R, Shivakumar C, Raj DL
5. Indian J Ophthalmol. 2002 Sep;50(3):213-4.
Simultaneous bilateral fungal keratitis caused by different fungi.
Prajna NV, Rao RA, Mathen MM, Prajna L, George C, Srinivasan M.