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Clinical and Microbiological Study of Different Corneal Ulcers

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1. Objectives

1) *Primary Objective:* To correlate between the clinical diagnosis and the microbiological results of bacterial and fungal keratitis.
2) *Secondary Objective:* To identify the predisposing factors responsible for bacterial and fungal infections of the cornea.

2. Materials and Methods

- Prospective study done in Santhiram Medical College and General Hospital, Nandyal.
- The study will be done from October 2018 to July 2019.

Inclusion criteria:
All patients who referred from out- patient to cornea-clinic with features suggestive of infective keratitis are included in the study.

Exclusion criteria:
Viral keratitis excluded in the study, excluding other infectious and non-infectious keratitis cases.

Sample Size: 100

Study type: Hospital based prospective study

Study period: October 2018 to July 2019.

Method of collection of data
- Patients with infective corneal ulcers attending OPD/cornea-clinic of our hospital.
- Informed written consent will be taken.
- A detailed history including demographics, ocular disease, past medical illness, history of trauma, treatment history and personal history will be taken.
- Ophthalmological examination will include :
- Best corrected visual acuity
- Slit lamp bio-microscopic examination
- Digital IOP
- Flourescein staining
- All infectious corneal ulcers were subjected to smears & cultures.

3. Procedure

After instilling 4% lignocaine, scrapings were taken from the base & edges of the ulcer under slit-lamp, using a no-15 Bard Parker blade.

Scrapings were smeared on two fresh glass-slides one for gram-stain & other for 10% KOH wet mount.

The smears were then subjected to direct microscopic examination.
- Inoculation into culture media was done on blood agar & chocolate agar & sabourauds dextrose agar
- The inoculated culture media were placed in appropriate incubators & observed for 24-48 hrs for bacterial and 3-4 weeks for fungal for any growth.
- Bacterial colonies were identified based on morphology, Gram stain &results of biochemical tests & fungal species on colony characteristics & features on lacto phenol cotton blue mount.

Proforma for the Study

Demographic details:

Name: Age: Sex: OP/IP No: Date: Address:
Contact number: Occupation: Chief complaints:
History of present illness:

Past history
- Treatment history:
- Personal history:
- Family history:
- General examination:
- History of systemic illness:
- Ophthalmic examination of both eyes

Ophthalmic Examination

	Right	Left
BCVA		
Eyelids		
Lacriminal sac area		
Tear film		
Conjunctiva		

	Right Eye	Left Eye
Cornea:		
Size		
Shape		
Surface		
Transparency		
Sensations		
Vascularisation		
Ulcer:		
Site		
Size		

Colour		
Margins		
Floor		
Depth		
Satellite lesions		
Any other lesions		
Flourescein staining		

Slit Lamp Examination

	Right Eye	Left Eye
Anterior chamber		
Iris		
Pupil		
Lens		
Fundus examination		
Any other significant findings		

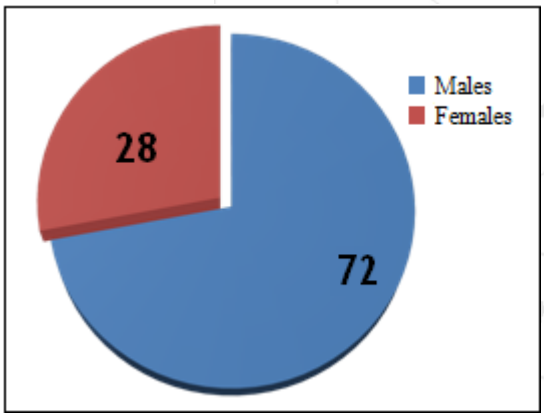
Investigations

- IOP : digitally
- Syringing of ducts
- Urine-albumin/suga
- Corneal scraping: Stains
  10% KOH mount
  Gram stain
- Culture-Blood agar
- Chocolate agar Sabourauds dextrose agar

Diagnosis

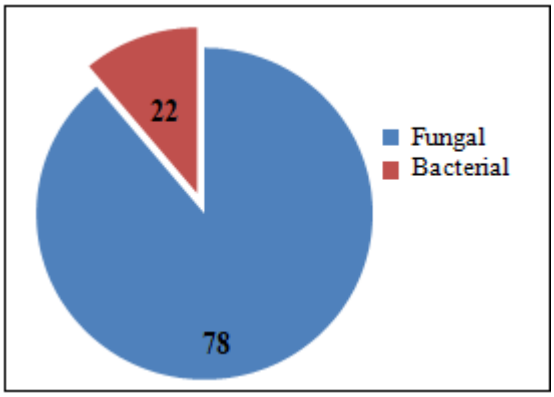
- Provisional clinical diagnosis
- Microbiological diagnosis

Total-100 cases



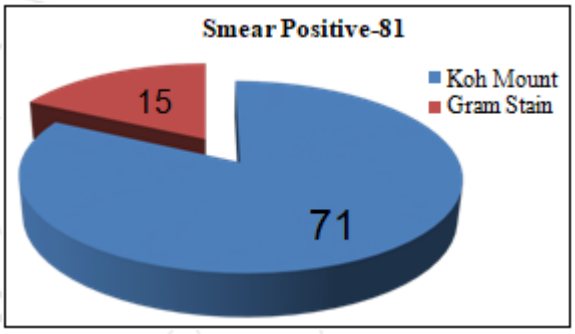
Age	Males	Females	Total
10-20yrs	2	----	2
21-30yrs	5	3	8
31-40yrs	10	4	14
41-50yrs	25	12	37
51-60yrs	14	5	19
61-70yrs	12	4	16
71-80yrs	4	----	4

Clinical Diagnosis:
Out of 100 cases 22 were clinically diagnosed as bacterial, while 78 were diagnosed to be of fungal aetiology.



Smear Results:-

- 14 out of 22 clinically diagnosed bacterial ulcers were smear positive on gram stain.
- Out of the 78 clinically diagnosed fungal corneal ulcers, 71 showed fungal hyphae on 10% KOH wet mount.



Culture Results

- In 16 cases (19.04%), bacteria were identified from the corneal scrapings cultures.
- Cultures were positive for fungi in 72 cases (67.85%).
- Both bacterial & fungal growth in 1 case (1.19%)
- While no growth was detected in 11 cases (11.90%).

Correlation between Clinical Diagnosis & Microbiological Cultures

Clinical Diagnosis	*Culture Positivity*		
	Bacterial	*Fungi*	*Mixed*
Bacterial-----22	16	---	---
Fungal------**78**	----	**72**	1
Total-------100	16	72	1

16 out of the clinically diagnosed bacterial ulcers yeilded growth on bacterial culture media thus giving % sensitivity to clinical diagnosis.

Sensitivity of clinically diagnosing fungal corneal ulcer is 82.35%, as out of 78 clinically diagnosed fungal ulcers ,64 showed growth on SDA.

Correlation between Smear and Culture

	SMEAR+ ve CULTURE +ve	**SMEAR -ve CULTURE +ve**
Bacterial	**15** (83.33%)	1 (1.66%)
Fungal	**71** (92.85%)	**1** (7.14%)

Both smear & culture +ve for bacteria in 15 out of 16 culture positive bacterial ulcers, giving a sensitivity of 83.33% to Gram stain

Sensitivity of 10%KOH wet mount in detecting fungal hyphae was 92.85%, as 71 out of the 72 culture positive fungal ulcers, were both smear and culture positive

Fungal Isolates

Isolate	*Total*	*%*
FUSARIUM SPP	**29**	39.33%
ASPERGILLUS SPP	**28**	37.25%
CURVILARIA SPP/CURVILARIA +EPICOCCUM	6+1	10.41%
ALTERNARIA	4	04.16%
CLADOSPORA	1	02.08%
SYNCEPHALASTRUM	1	02.08%
PHILOPHORA JEANSELMEI	1	02.08%
HELMENTHOSPORIUM	1	02.08%

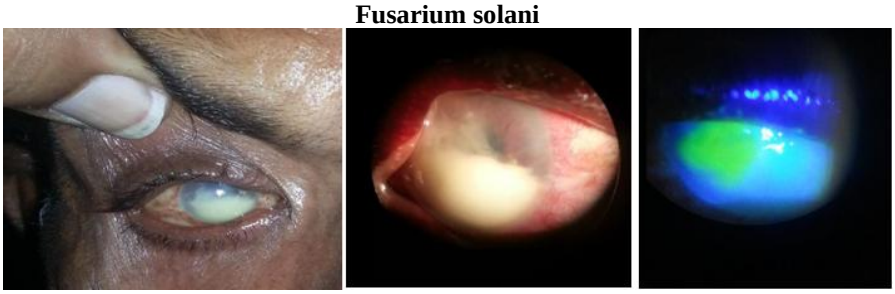
Fungus-Cladospora

Fungus-Helmenthosporium

Fungus-Syncephalastrum

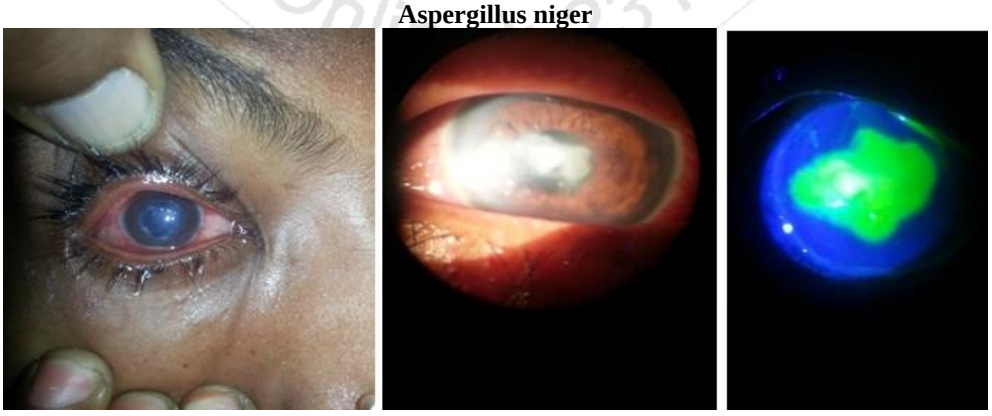
Philophora jeanselemi

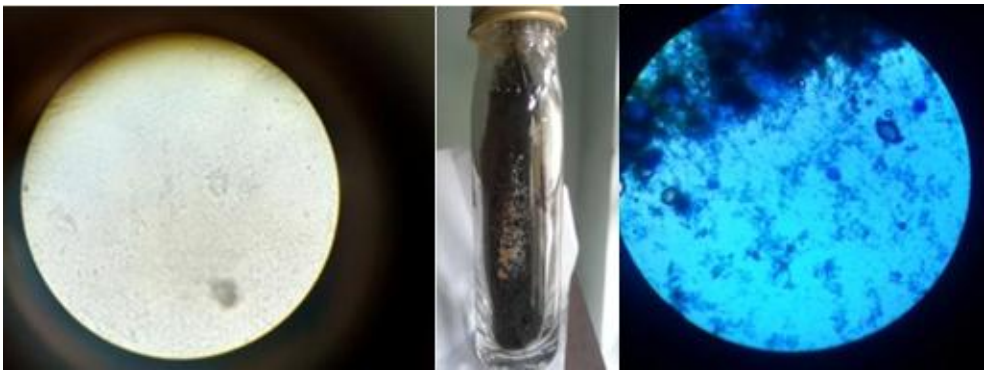
Fusarium solani



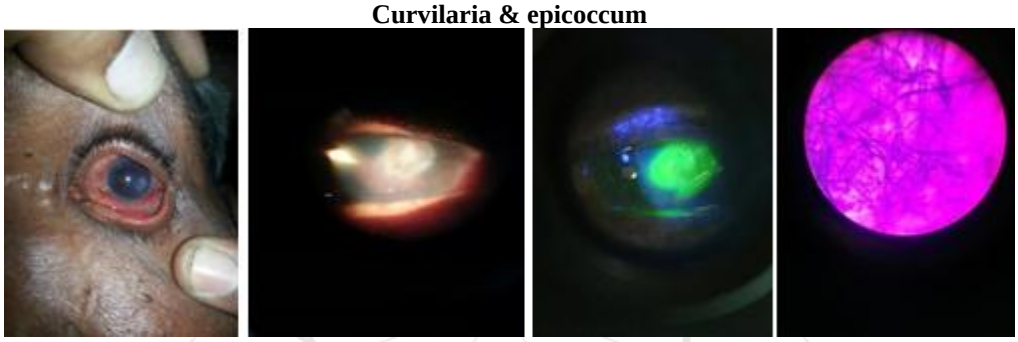
Aspergillus flavus

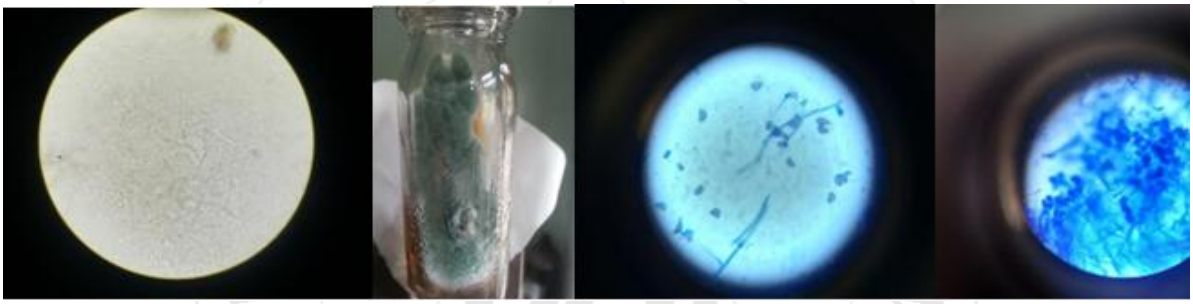
Aspergillus niger



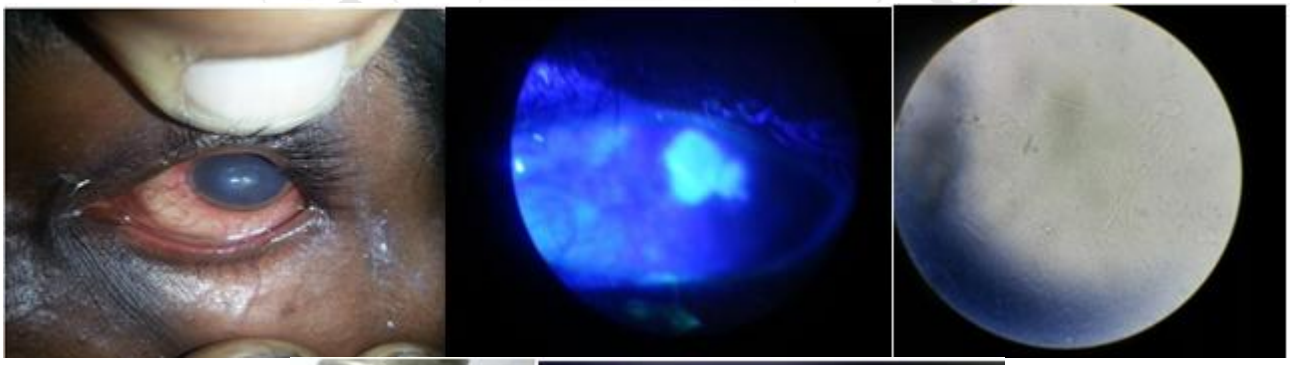


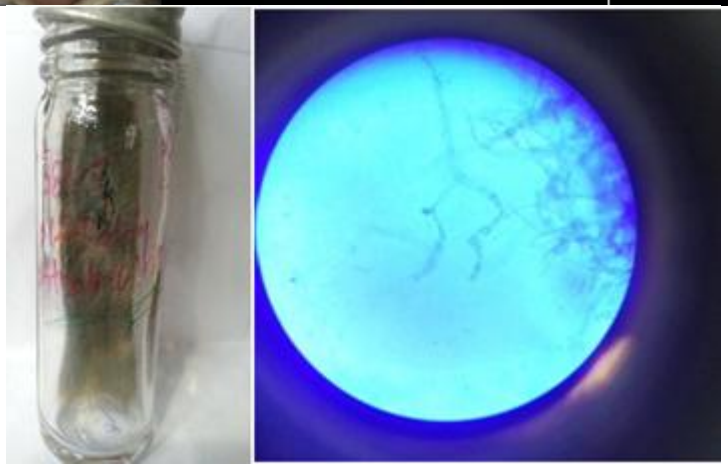
Curvilaria & epicoccum





Alternaria

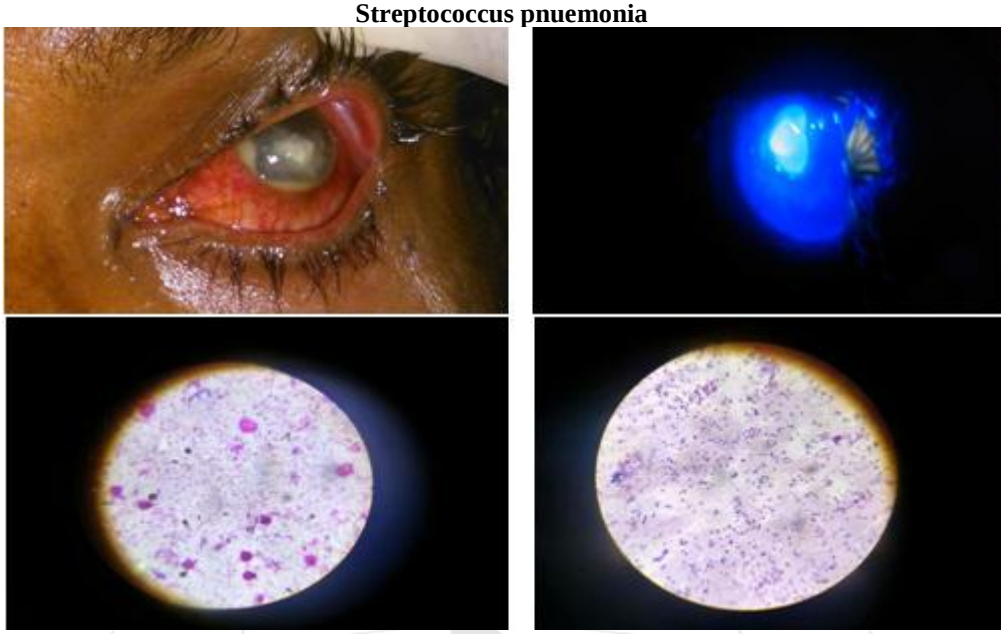




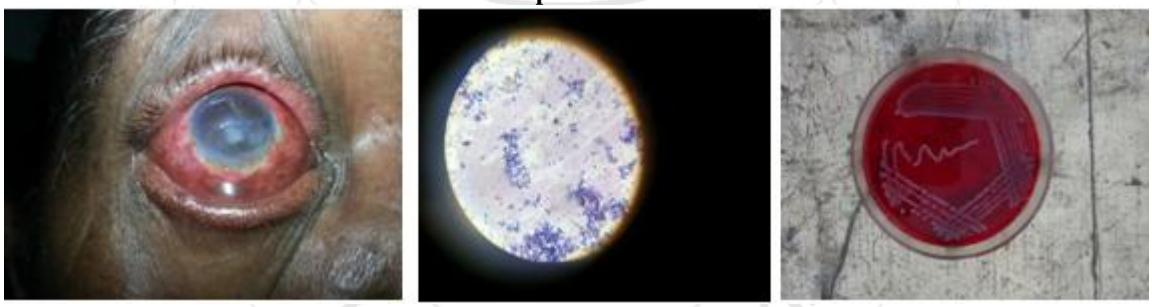
Bacterial Isolates

solate	Total	%
Streptococcus Pnuemonia	**10**	37.33%
Pseudomonas Aeruginosa	9	31.66%
Diptheriods	1	18.66%
Staphylococcus Aureus	1	6.66%
Staphylococcus Epidermis	1	6.66%

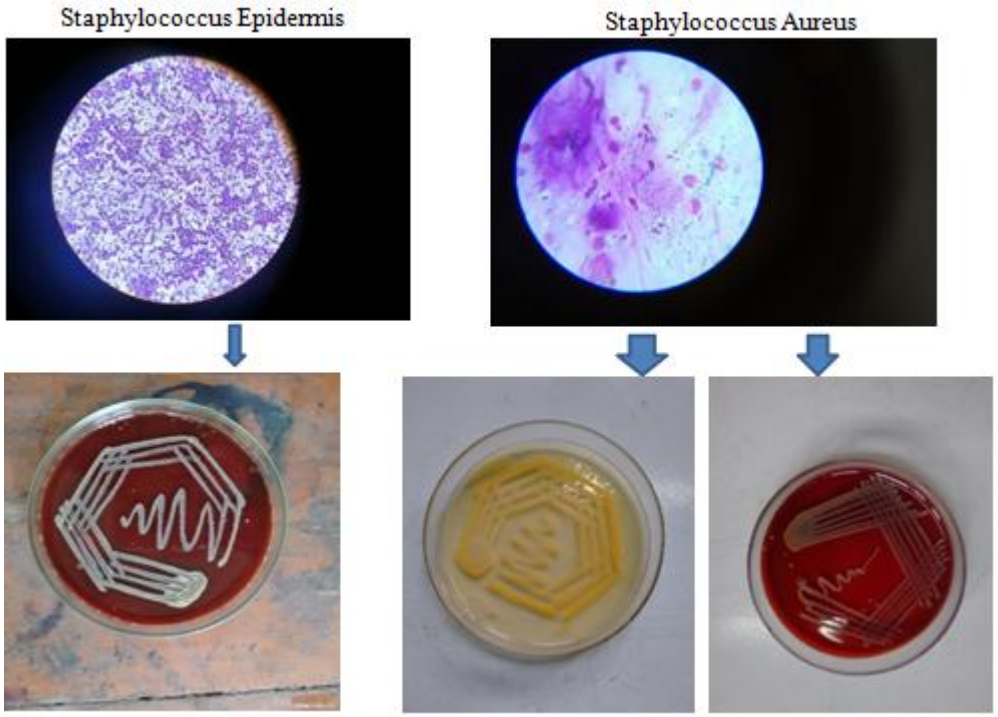
Streptococcus pnuemonia



Diptheriods



Pseudomonas



Age in years	*Bacterial*	*Fungal*	*Mixed*	*No growth*	*Total*
<20 yrs	1 (16.66%)	4 (02.08%)	-	-	5 (3.70%)
20-40 yrs	11 (33.33%)	18(25.00%)	-	2	31(25.92%)
41-60yrs	8 (33.33%)	**34**(37.50%)	1	6(66.66%)	**49**(46.29%)
>60 yrs	2 (16.66%)	16 (20.83%)	-	3 (33.33%)	21(24.07%)

Gender distribution

	Bacterial	Fungal	Mixed	No growth	Total
Males	10 (100%)	54 (66.66%)	1(100%)	7 (80%)	72
Females	6	18 (33.33%)	-	4(20%)	28

Occupation

	Bacterial	Fungal	Mixed	No growth	Total
Agricultural Labourers	8 (33.33%)	45 (78.57%)	1	7 (66.66%)	61 (72.00%)
Non Agricultural Labourers	*6 (33.33%)*	24 (16.66%)	-	3 (16.66%)	33 (18.50%)
Indoors	*2*	3		1	6

Majority of fungal ulcers were seen in agricultural labourers 72% followed by non agricultural labourers 18.5% & others.

Injury with vegetative matter was most common traumatic agent resulting in majority of fungal corneal ulcers.

Predisposing factors

	Bacterial	Fungal	Mixed	No growth
Trauma	11 (66.66%)	67 (92.50)	1	7 (50%)
Chronic dacrocystitis	2 (16.66%)	-	-	1 (16.66%)
Diabetes milletus	1 (16.66%)	2 (5.0%)	-	-
Xerophthalmi a	-	-	-	2 (16.66%)
H I V	-	1 (2.5%)	-	-
Non identified	2	2	-	1 (16.66%)

Trauma was the most predisposing factor, accounting for majority of bacterial & fungal corneal ulcers respectively.

Nature of Trauma

Traumatic agent	Bacterial	Fungal	Mixed	No growth
Vegetative matter	5	47	1	4
Foreign body	4	16	-	2
Finger nail	1	1	-	-
Others	1	3	-	1
TOTAL	11	67	1	7