

Case Series

**A CASE SERIES OF FUNGAL INFECTIONS IN CORNEAL  
ULCER PATIENTS AT TERTIARY CARE HOSPITAL, GMC,  
JAMMU**

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**Place of study:** Government Medical College, Jammu

**Abstract:**

Fungal keratitis is a major ophthalmic problem worldwide specially in tropical and subtropical region. It is common in India due to the tropical climate and a large agrarian population that is at risk. **Materials & Methods:** The 3 cases for this case series we have taken from ophthalmology OPD having suspected fungal ulcer or vegetative trauma to the eye. Conjunctival swab cultures were carried out from affected eye and do the mycological investigations (10% KOH & culture over the SDA culture media) and clinically normal cases to study the fungal flora of conjunctival sac. **Results:** The fungal etiology in the causation of corneal ulcer varies in relation to age, sex and occupation of the patients and climatic condition of the region. The prevalence of mycotic corneal ulcer is more among male agriculture workers in the age group of 40 -60 years. Fungal corneal ulcer occurs more frequently during the harvesting season of the year. Minor vegetative trauma to cornea acts as precipitating factor of kerato mycosis mostly by the vegetative origin like paddy leaves straw, etc. Out of topical antifungal agents Fluconazole, Natamycin and voriconazole, Fluconazole has edge over Natamycin and Voriconazole in treating mycotic corneal ulcer.

**KeyWords:** Fungal keratitis, antifungal therapy, aspergillus, Mucor, Voriconazole

**Introduction:**

- Fungal corneal ulcer is one of the leading cause of ocular morbidity throughout the world, particularly in tropical and subtropical countries and [1,2]. According to World Health Organization; 2001 survey, corneal blindness is the second major cause of blindness after cataract [3]. ocular trauma either vegetative or other and corneal ulceration are one of the most important causes of corneal blindness, especially in developing countries like India. Overall corneal ulceration has been recognized as a silent epidemic in the developing

countries [3]. Fungal keratitis carries a relatively poor prognosis, compared to other forms of infectious keratitis either via the bacterial or viral keratitis due to various reasons such as delayed microbiological identification, sub-optimal efficacy and penetration of antifungal agents, morphologic pleomorphism in cultures and a very wide spectrum of drug sensitivity with the existing medication.

- The approximate annual incidence of fungal keratitis in India is to be 11.3/10000 population.[4]. Frequently it is caused by filamentous fungi (*Aspergillus*, *Fusarium*, *Mucor*, *Curvularia*, *Bipolaris* spp.) in the tropical areas, while in temperate regions it is mostly caused by *Candida* species (*C. albicans*, *C. Parapsilosis* ). Fungal keratitis incidence or prevalence is more in tropical regions of the world like India and southern USA and is less commonly encountered in the temperate zones.[5].
- In our case series the most common fungal species which is the main causative organism found was *Aspergillus* spp. and *mucor*, have discussed their clinical presentation, positive ophthalmic examination findings, their routine blood investigation, microbiological culture and sensitivity and culture sensitivity of the corneal scrapping and based on the report their management. Numerous risk factors have been associated with the development of FK, such as trauma, ocular surface disease, topical steroid use, and atopic disease [6–8]. Occupations involving agriculture and ocular exposure with vegetative matter are important risk factors for filamentary fungal infections, particularly in developing countries [6,9]. Contact lens use is a leading risk factor in developed countries [8], with a rise in FK cases paralleling the increased use of CL overtime [6]
- Delays in the diagnosis of FK may occur due to challenges related to prolonged isolation time and negative cultures. Microscopic examination of corneal scrapings is typically used for preliminary diagnosis, followed by gold standard diagnostic testing with isolation on Sabouraud's dextrose agar and blood agar, which is highly specific, but not sensitive [6]. Given the challenges in diagnosis, a high index of clinical suspicion is required to initiate timely management. In comparison to bacterial keratitis, fungal keratitis generally has worse clinical outcomes [10]. Even with appropriate diagnosis, management is challenging since many antifungal agents have poor penetration into the cornea [6]. Various antifungal management options have been described, including topical natamycin, topical amphotericin B, and topical and oral voriconazole [6,11,12].

The purpose of the present case series study is to characterize the clinical manifestations, management, and outcomes of fungal keratitis in this region in order to provide insights that will allow for timely diagnosis and initiation of optimal management. Given the geographic predominance of the disease, region-specific data are necessary to provide appropriate care.

**CASE 1:**

- 65 years male patient presented to Eye OPD with history of Irritation and Foreign body sensation since 1 month associated with watering, photophobia pain redness and periorbital swelling

- There was history of ocular trauma with vegetative matter 1 month  
On Examination:

Patient's vision: Left eye was PL+, PR+ in all quadrants.

There was mild swelling on the upper and lower lid with deep congest



Cornea: A large epithelial defect with infiltrates was noticed, covering the centre of cornea. Non-mobile Hypopyon was present involving < 1/3rd of the anterior chamber.

Swab culture:

After doing the ocular examination the proceed for investigation part 1<sup>st</sup> taken the sample via corneal scrapping with the help of 11 number surgical maintaining all the aseptic precaution taken three samples over the slide for KOH mount to look for hyphae, Gram's staining and for culture over the SDA (Sabouraud's dextrose agar)

- **Mycological investigation findings:**

KOH (10%) mount- aseptate hyphae seen under the low(10X) to high power objective lens(40X)

Gram's Staining- septate hyphae seen

SDA culture media –Aspergillus fumigatus seen

Along with doing the mycological investigation, blood sample send to the pathology department of routine investigation for CBC, LFT, KFT & RBS and findings were within the normal limit.

Management:

Patient was put on:

- E/d Natamycin 5% L/E (1 hourly for 1<sup>st</sup> 48-72 hrs and tapered gradually)
- E/d Fluconazole 0.3% L/E
- Tab Fluconazo150 mg OD L/E

After the culture report findings E/D Voriconazole added in the management of the patient.

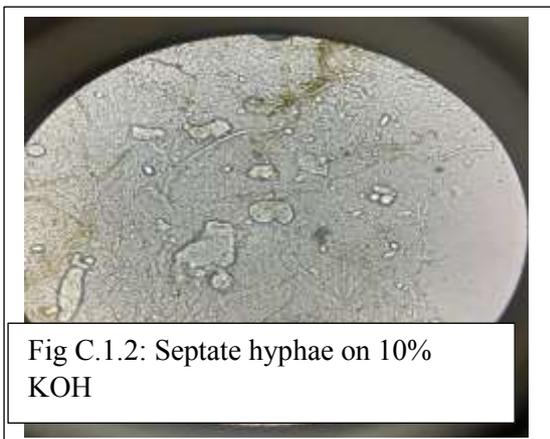


Fig C.1.2: Septate hyphae on 10% KOH

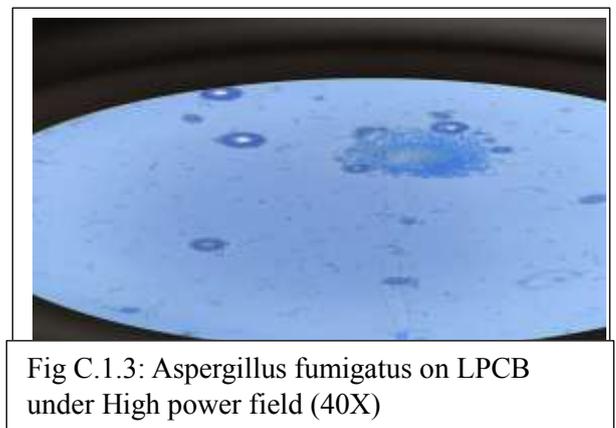


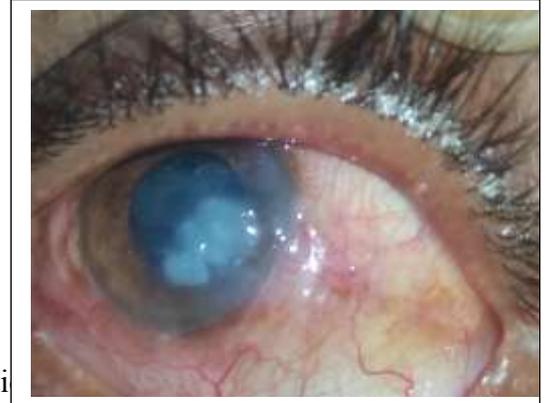
Fig C.1.3: Aspergillus fumigatus on LPCB under High power field (40X)

**CASE 2:**

- A 50 years old female presenting to eye OPD with c/o pain, redness, watering and foreign body sensation in the left eye since 2 weeks following trauma with dust (soil) associated with the swelling of the left eye.

On ophthalmic examination of the affected eye:

- vision:  
VC- 6/60  
BC- 6/60
- IOP 28 on Left eye
- Eye Lids - Lid oedema present
- Palpebral aperture-  
Horizontal - 26mm  
Vertical - 9mm
- Conjunctiva - Circumcilliary congestion
- Cornea- Epithelial defect 1.5cm x 1cm extending to centre of pupillary area from 3'O clock to 6'O clock temporally
- Pigment- Not seen
- Sensation- Present
- Iris- Normal pattern
- Pupillary- Round, Regular, Reaction to light present.
- Fundus- Normal (hazy media)



After doing the ocular examination the proceed for investigation part 1<sup>st</sup> taken the sample via corneal scrapping with the help of 11 number surgical maintaining all the aseptic precaution, taken three samples over the slide for KOH mount to look for hyphae, Gram's staining and for culture over the SDA (Sabouraud's dextrose agar)

Mycological investigation findings:

KOH (10%) mount- aseptate hyphae seen under the low (10X) to high power objective lens(40X)

Gram's Staining- aseptate hyphae seen

SDA culture media – Mucor seen

Along with doing the mycological investigation, blood sample send to the pathology department of routine investigation for CBC, LFT, KFT & RBS and findings were within the normal limit.



Fig C.2.1: Aseptate hyphae on 10% KOH



Fig C.2.2: Mucor on LPCB under high power lens(40X)

**Management:**

Patient was put on:

- E/d Natamycin 5% L/E (1 hourly for 1<sup>st</sup> 48-72 hrs and tapered gradually)
- E/d Fluconazole 0.3% L/E
- Tab Fluconazo150 mg OD L/E

After the culture report findings E/D Voriconazole added in the management of the patient.

**CASE 3:**

- A 35 years old female, farmer by occupation presented to eye OPD with complaints of pain and watering since 3 days following trauma with maize leaf.

On ophthalmic examination of the affected eye:

- Vision: 6/60
- Eye Lids - No Lid oedema present
- Palpebral aperture-  
Horizontal - 26mm  
Vertical - 9mm
- Conjunctiva - Mild congestion present



- Cornea- Epithelial defect 3.5mm x 3 mm at 9'O clock near pupillary margin with peripheral oedema around ulcer about 4mm X 3.5 mm

Vascularisation from 9'O clock limbus up to ulcer.

Rest cornea clear

- Pigment- Not seen
- Sensation- present
- Iris- with in normal limit
- Pupil- with in normal limit
- Fundus- Glow present

After doing the ocular examination the proceed for investigation part 1<sup>st</sup> taken the sample via corneal scrapping with the help of 11 number surgical maintaining all the aseptic precaution, taken three samples over the slide for KOH mount to look for hyphae, Gram's staining and for culture over the SDA (Sabouraud's dextrose agar)



Fig C.3.1: hyphae on 10% KOH



Fig C.3.2: Bipolaris spp. on LPCB under high power lens(40X)

**Management:**

Patient was put on:

- E/d Natamycin 5% L/E (1 hourly for 1<sup>st</sup> 48-72 hrs and tapered gradually)
- E/d Fluconazole 0.3% L/E
- Tab Fluconazo150 mg OD L/E

**CONCLUSION:**

- In this case series, we report the clinical feature, microbiological findings, and treatment outcomes of all the 3 patients with fungal corneal ulcer due to aspergillosis (*aspergillus fumigatus*), *Mucor* and *Bipolaris* spp. Out of the 3 patients 2 were male and one female, aged between 35 to 60 years and had history of ocular trauma few weeks back by organic material. The most common presenting symptoms were pain, redness, watering and decreased vision. The most common signs were central or paracentral corneal ulcer with feathery margins, stromal infiltration, and hypopyon. The diagnosis was confirmed by 10% KOH mount and culture on Sabouraud's dextrose agar. The isolated microorganisms were *aspergillus fumigatus*, *mucor* and *Bipolaris* spp. The patients were treated with topical and systemic antifungal agents such as natamycin, voriconazole.
- In case 1; patient was old and history of 1-month corneal ulcer was healed but he developed corneal opacity in eye. The main factors associated with the poor prognosis were large corneal ulcer size, deep stromal involvement and delayed diagnosis.
- In case 2; patient responded well but had shallow anterior chamber next day he was managed with bandage contact lens and patching in addition to antifungals.
- In case 3 since patient was young and reported early. She responded well and was stained negative within two weeks.

We conclude that fungal corneal ulcer due to aspergillosis is a severe and potentially blinding condition that requires early diagnosis and aggressive antifungal therapy. We recommend that clinicians should have a high index of suspicion for fungal corneal ulcer in patient with a history of ocular trauma and typical clinical presentation and perform appropriate laboratory tests for confirmation and identification of causative organism.

**Images & Tables:**

**Images:**

**Case 1:**



Fig 1.1 Before treatment



Fig 1.2 After treatment

**Case 2:**



Fig 2.1 Before treatment



Fig 2.2 After treatment



Fig 3.1 Before treatment



Fig 3.2 After treatment

Parameters	Case 1(left eye)	Case 2(left eye)	Case 3(left eye)
UCVA	3/60	6/60	WNL
BCVA	-3.25 DS 6/24p	6/60	WNL
IOP	Digitally found to be normal	28	WNL
Eyelids (position, margin, movement, skin of eyelid) Adnexa	lid oedema+ ROPLAS negative	lid oedema+ ROPLAS negative	WNL
Palpebral aperture (HxV) Eyeball	26 x 12 mm Bilaterally symmetrical with no enophthalmos or proptosis. Ocular motility full and adequate	26 x 9 mm Bilaterally symmetrical with no enophthalmos or proptosis. Ocular motility full and adequate	26 x 9 mm Bilaterally symmetrical with no enophthalmos or proptosis. Ocular motility full and adequate

Table 1.1 (a): Positive Ocular Examination Findings

Parameters	Case 1(left eye)	Case 2(left eye)	Case 3(left eye)
Conjunctiva	Circumciliary congestion +. No discoloration, chemosis, papillae, foreign body seen.	circumciliary congestion +	WNL
Cornea	<ul style="list-style-type: none"> <li>• ulcer Central in location.</li> <li>• Epithelial defect:- 2.5 x 1.5 mm</li> <li>• 5.5 x 3.5 mm whitish stromal infiltrate with feathery margins, raised edges and rough appearance.(90% depth)</li> <li>• Pigments +</li> <li>• Corneal stromal oedema surrounding infiltrate.</li> </ul> <p>Corneal sensations- present</p>	<ul style="list-style-type: none"> <li>• Epithelial defect: 1.5cm x1cm</li> <li>• Ulcer: 2.5x2mm extending to centre of pupillary are 3'o clock to 6'O clock nasally</li> <li>• Pigments seen</li> </ul>	<ul style="list-style-type: none"> <li>• ulcer Central in location.</li> <li>• Epithelial defect:- 3.5 x 3mm 9'O clock near pupillary margin with peripheral oedema</li> <li>• ulcer about 4mm X 3.5 mm</li> <li>• Vascularisation from 9'O clock limbus upto ulcer</li> <li>• Rest cornea clear</li> <li>• Pigment – Not seen</li> <li>• Sensation- present</li> </ul>

Table 1.1(b):Positive Ocular Examination Findings

Parameters	Case 1(left eye)	Case 2(left eye)	Case 3(left eye)
Anterior Chamber - depth - contents	Immobile thick hypopyon 2.5 mm in height	Immobile thick hypopyon 1.5 mm in height	Details not appreciated
Iris	Details not visible	Normal pattern	Normal pattern
Pupil	Pupillary margin could not be visualised due to ulcer	RRTL - Present	WNL
Lens	Not visualised	Not visualised	WNL
Fundus	No details visible	No details visible	Glow present

Table 1.1(c):Positive ocular examination findings

Microbiology Inv.	Case 1	Case 2	Case 3
On Gram staining	Hyphae seen	Aseptate hyphae seen	Hyphae seen
On KOH (10%)	Septate hyphae seen	Aseptate hyphae seen	Septate hyphae seen
On SDA	Aspergillus fumigatus	Mucor	Bipolaris spp.
Blood investigation: CBC, LFT, KFT,RBS	WNL*	WNL*	WNL*

Table2.0:Investigations Findings

\*WNL-within normal limit.

case1	Case 2	Case 3
E/d* Natamycin 5% L/E.(1 hourly for 1 <sup>st</sup> 48-72 hrs and tapered gradually)	E/d Natamycin 5% L/E.(1 hourly for 1st 48-72 hrs and tapered gradually)	E/d Natamycin 5% L/E.(1 hourly for 1 <sup>st</sup> 48-72 hrs and tapered gradually)
E/d Fluconazole 0.3% L/E	E/d Fluconazole 0.3% L/E	E/d Fluconazole 0.3% L/E
E/d Atropine 1% TDS L/E.	E/d Atropine 1% TDS L/E.	E/d Atropine 1% TDS L/E.
E/d Brimolol 0.15% TDS L/E.	E/d Brimolol 0.15% TDS L/E.	E/d Brimolol 0.15% TDS L/E.
Tab Fluconazo 150 mg OD L/E	Tab Fluconazo 150 mg OD L/E	Tab Fluconazo 150 mg OD L/E
After fungal c/s: E/d Voriconazole added	After fungal c/s: E/d Voriconazole added	

Table 3.0: Treatment history in all the three cases

E/D\*- Eye drop

**Informed Consent:**

Taken informed consent from all the three participant patients in written form.

**Conflict of interest statement:**

- No conflict of interest.

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