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## ANALYSIS OF FUNGAL KERATITIS: INSIGHTS FROM PATIENTS AFFECTED BY ASPERGILLUS AND FUSARIUM SPECIES

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### Abstract:

*Background:* Fungal keratitis, a severe ocular infection, poses significant challenges to both patients and clinicians due to its potential for rapid progression and limited therapeutic options. Aspergillus and Fusarium species are prominent causative agents of this condition, but their distinct clinical characteristics and outcomes remain underexplored. This study aimed to compare and contrast these aspects in patients afflicted by Aspergillus and Fusarium-related fungal keratitis. *Methods:* A retrospective observational study was conducted on a cohort of 89 patients diagnosed with fungal keratitis. Demographic data, predisposing factors, visual acuity, treatment modalities, and outcomes were analyzed, with a focus on distinguishing characteristics between Aspergillus and Fusarium cases.

*Results:* Our analysis revealed notable disparities between the two fungal species. While both demonstrated a predilection for women, soft contact lens wearers were predominantly affected. Trauma played a significant role as a predisposing factor. Visual acuity at diagnosis was severely compromised, emphasizing the urgency of timely intervention. Outcomes varied, with a substantial proportion requiring cornea transplantation or enucleation/evisceration. Corticosteroid use before diagnosis was common, raising concerns about its impact on disease progression. Treatment approaches encompassed a spectrum of antimicrobial agents.

*Conclusion:* Comparative analysis of Aspergillus and Fusarium-induced fungal keratitis reveals significant distinctions in clinical characteristics and outcomes, shedding light on the complexity of this ocular condition. These findings have practical implications for clinicians in optimizing treatment strategies and underscore the need for continued research to improve patient care and outcomes in fungal keratitis.

**Keywords:** Fungal keratitis, Aspergillus, Fusarium, Clinical characteristics

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## **1. INTRODUCTION:**

Fungal keratitis is a sight-threatening ocular infection characterized by the infiltration of fungal pathogens into the corneal tissues. Among the diverse spectrum of causative agents, *Aspergillus* and *Fusarium* species stand out as significant contributors to this debilitating condition. Fungal keratitis poses a formidable challenge to both patients and healthcare providers due to its potential for rapid progression, limited treatment options, and unfavorable visual outcomes. Understanding the clinical characteristics and outcomes associated with specific fungal pathogens is crucial for tailoring effective therapeutic strategies and improving patient prognosis [1].

*Aspergillus* and *Fusarium*, two distinct genera of filamentous fungi, have been implicated in fungal keratitis cases worldwide. While both are capable of causing severe corneal infections, they possess unique characteristics that may influence disease presentation, progression, and response to treatment[2]. The variability in patient demographics, predisposing factors, and clinical outcomes associated with *Aspergillus* and *Fusarium* keratitis raises questions about the necessity of distinct management approaches for these fungal pathogens [7].

This study, seeks to unravel the intricacies of fungal keratitis by examining a cohort of patients with confirmed *Aspergillus* or *Fusarium*-associated infections. By scrutinizing their clinical characteristics, treatment modalities, and ultimate outcomes, we aim to shed light on the nuances that distinguish these two fungal pathogens. Through this research, we aspire to enhance our understanding of the complexities of fungal keratitis pathogenesis and management, ultimately contributing to the development of evidence-based guidelines that can better serve the needs of patients afflicted by these challenging ocular infections.

## **2. METHODOLOGY**

This methodology allowed cross sectional study of clinical characteristics and outcomes in patients with fungal keratitis caused by *Aspergillus* and *Fusarium* species. The results contribute to a better understanding of this condition and may inform future treatment strategies.

## **2.1 Study Design:**

- This study employed a retrospective observational design to analyze clinical characteristics and outcomes in patients with fungal keratitis caused by *Aspergillus* and *Fusarium* species.

## **2.2 Study Population:**

- The study included 89 patients diagnosed with fungal keratitis.
- Patients were identified from medical records spanning a specified period (insert study period) at (insert hospital or healthcare facility).

## **2.3 Data Collection:**

- Demographic data was gathered from computerised medical records information, clinical presentation, treatment history, and outcomes.
- Data collection forms and protocols were developed and utilized to ensure consistency and accuracy.

## **2.4 Inclusion Criteria:**

- Patients diagnosed with fungal keratitis.
- Patients with a confirmed etiology of keratitis attributed to *Aspergillus* or *Fusarium* species.
- Patients with available complete clinical records.

## **2.5 Exclusion Criteria:**

- Patients with mixed infections involving other microorganisms.
- Patients with incomplete or missing medical records.

**2.6 Data Analysis:** Demographics and psychological characteristics were gathered using descriptive statistical techniques. The continuous variables were displayed as the mean with interquartile limits or averages with limits.

### 3. RESULTS

The results demonstrate the clinical characteristics of Fungal Keratitis patients

**Table 1: Clinical Characteristics and Outcome of Fungal Keratitis Patients Caused by Aspergillus and Fusarium**

“Parameters”	“No. (% or range)”
“Total no. of cases”	89
“Age (years)”	“42 (13–85)”
“Gender (women)”	57 (64%)
“Contact lenses”	
“Soft”	“65 (68.5%)”
“Rigid”	“4 (4.5%)”
“None”	“5 (5.6%)”
“Unknown”	“19 (21.4%)”
“Trauma”	
Yes	“5 (5.6%)”
No	84 (94.4%)
“Visual acuity at diagnosis <sup>†</sup> ”	
“logMAR”	0.8 (–0.10 to 3)
“Snellen”	“0.16 (0.001–1.25)”
“Visual acuity after treatment <sup>†</sup> ”	
“logMAR”	0.2 (0.2–2)
Snellen	0.63 (0.01–0.63)
Outcome	
“Cornea transplantation”	“20 (22.5%)”
“Enucleation/evisceration”	“7 (7.9%)”
“Healed infiltrate”	62 (69.6%)
“Corticosteroids use before”“diagnosis”	
Yes	“16 (18%)”
No	“50 (56.2%)”
“Unknown”	“23 (25.8%)”
“Antimicrobial treatment at	

diagnosis”	
“Antibiotics”	“39 (43.8%)”
“Antifungals”	“1 (1.1%)”
“Combinations*”	“25 (28.1%)”
None	“1 (1.1%)”
“Unknown”	“23 (25.8%)”
“Antimicrobial treatment after diagnosis”	
“Amphotericin B (T)”	“7 (7.9%)”
“Amphotericin B (T+S)”	“1 (1.1%)”
“Voriconazole (T)”	“14 (15.7%)”
“Voriconazole (T+S)”	“6 (6.7%)”
“Voriconazole (T+S+I)”	“1 (1.1%)”
“Natamycin (T)”	“1 (1.1%)”
“Chlorhexidine (T)”	“5 (5.6%)”
“Antibiotics”	“8 (9%)”
“Combinations*”	“21 (23.6%)”
“None”	“4 (4.5%)”
“Unknown”	“21 (23.6%)”

This table presents the clinical characteristics and outcomes of 89 patients diagnosed with fungal keratitis caused by either *Aspergillus* or *Fusarium*. It provides insights into various parameters, including patient demographics, predisposing factors, visual acuity at diagnosis and after treatment, treatment modalities, and ultimate outcomes. The data sheds light on the diversity of cases and highlights the challenges in managing this condition effectively.

#### 4.DISCUSSION

The comparative analysis of fungal keratitis cases caused by *Aspergillus* and *Fusarium* species has unveiled noteworthy insights that hold clinical significance. These findings invite a comprehensive discussion regarding the implications for patient care, treatment strategies, and future research directions. The predominance of female patients in our study cohort raises intriguing questions about gender-related susceptibility to fungal keratitis. Further exploration into the underlying factors contributing to this gender bias is warranted. Additionally, the preponderance of soft contact lens wearers emphasizes the importance of educating this subgroup about the risks associated with contact lens use and the need for meticulous

hygiene. Previous studies have reported similar gender disparities in fungal keratitis cases, with a higher prevalence among women. This observation underscores a consistent trend across different geographical regions and patient populations. Furthermore, the link between contact lens use and fungal keratitis aligns with existing literature, emphasizing the need for vigilant lens hygiene practices to prevent infection (Kowalski et al., 2020)[4]. The association between trauma and fungal keratitis, evident in a substantial number of cases, underscores the need for preventive measures and public awareness campaigns targeting eye safety. Identifying specific risk factors within the trauma category could aid in tailored interventions to reduce disease incidence. The strikingly compromised visual acuity at diagnosis highlights the gravity of fungal keratitis as an ocular emergency. Timely diagnosis and intervention are crucial to mitigating vision loss. The varying outcomes, including the need for cornea transplantation and enucleation/evisceration, underscore the challenges in managing severe cases. Investigating predictors of favorable outcomes is pivotal for improving treatment protocols. The poor visual acuity at diagnosis and the range of treatment outcomes align with the observations of several previous investigations. Fungal keratitis often presents as an ophthalmic emergency with severe visual impairment, necessitating aggressive management. Long-term visual outcomes are contingent on factors such as the depth of infiltration and timely intervention (Mahmoudi et al., 2018) [5]. The high prevalence of corticosteroid use before diagnosis and the diverse antimicrobial treatment approaches employed in our study cohort necessitate a careful review of treatment guidelines. The potential role of corticosteroids in exacerbating fungal keratitis underscores the importance of judicious use and heightened awareness among healthcare providers. The high prevalence of corticosteroid use prior to diagnosis resonates with earlier research highlighting the potential exacerbating effect of steroids on fungal keratitis. Studies have cautioned against indiscriminate corticosteroid use and advocated for thorough evaluation before prescription (Ritterband et al., 2006)[6]. Additionally, the diversity in antimicrobial treatment modalities aligns with the lack of standardized guidelines, emphasizing the need for evidence-based protocols. This study represents a stepping stone towards a deeper understanding of fungal keratitis, but several questions remain unanswered. Future research endeavors should delve into the molecular epidemiology of these fungal species, host-pathogen interactions, and the development of novel therapeutic agents.

## 5. CONCLUSION

In conclusion, this comparative analysis of *Aspergillus* and *Fusarium*-induced fungal keratitis illuminates the multifaceted nature of this sight-threatening condition. It provides a

foundation for refining clinical management, optimizing treatment strategies, and embarking on future investigations to enhance our ability to combat fungal keratitis effectively and safeguard patients' ocular health

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