

Fungal Keratitis in Toronto: A Decade in Review



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Background:

- Fungal keratitis is a rare, sight threatening disease requiring timely treatment
- Understanding local trends in fungal microbiology is critical to develop effective empiric treatment regimens
- We sought to describe the microbial, clinical and treatment of all fungal keratitis cases managed at a Toronto tertiary care centre between 2010 – 2020

Methods:

- Study design: retrospective chart review
- All positive fungal corneal cultures processed at University Health Network, Toronto, ON between January 2010 and March 2020 were identified through microbiology laboratory records
- We reviewed charts of all patients with a positive fungal corneal culture and collected demographic and clinical details regarding fungal keratitis course
- We conducted simple t-tests, Pearson chi-square tests, and binary regression tests to identify risk factors for poor visual outcomes ($p < 0.05$)

Results:

- Demographic characteristics:**
 - No. of female patients: 21 (46% total)
 - Mean age at presentation: 60.4 years (± 18.4)
- The **most common fungal species** cultured were:
 - Candida parapsilosis* (n=16)
 - Candida albicans* (n=13)
 - Fusarium* species (n=6)
 - Aspergillus* species (n=2)
- There was **no significant association** between history of **corneal transplant** and **fungal culture species** ($\chi^2=5.55$, $p < 0.25$)
- Patients with a history of **herpetic keratitis** were **more likely to develop *Candida* keratitis** than *Filamentous* species keratitis ($\chi^2=5.55$, $p < 0.02$).

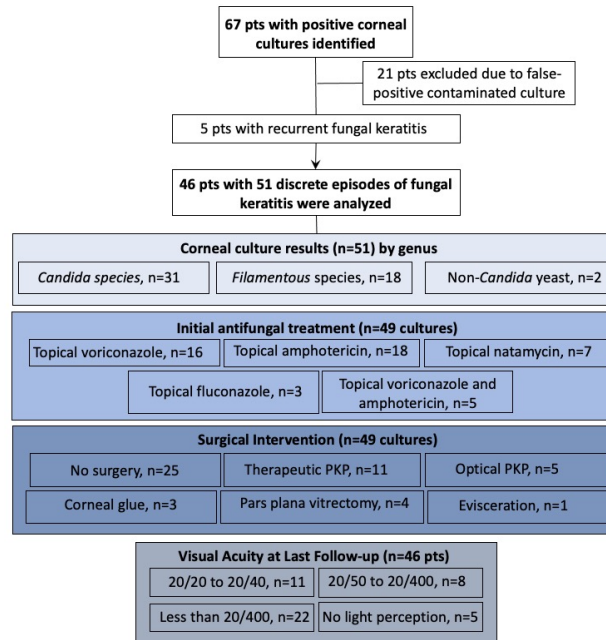


Figure 1 (above): Study design and fungal keratitis characteristics

Table 1 (below): Clinical factors influencing visual acuity (VA) outcomes

Risk Factor	VA \geq 20/200	VA < 20/200	Odds Ratio (95% CI)	p-value
VA \geq 20/200 at presentation	73.3%	13.8%	19.5 (3.6-105.7)	0.0001
<i>Candida</i> species keratitis	19.4%	80.7%	4 (1.0-15.4)	0.02
Ocular surface disease	50.0%	85.3%	1.84 (0.6-6.1)	0.01
History of ocular trauma	25%	5.9%	1.84 (0.6-6.1)	0.06
Contact lens wear	56.3%	41.2%	1.84 (0.6-6.1)	0.32
Topical steroid treatment	31.3%	63.6%	0.26 (0.1-0.9)	0.03
Previous herpetic keratitis	6.25%	20.6%	0.26 (0.03-2.3)	0.41*
Previous corneal transplant	52.9%	18.8%	0.21 (0.1-0.9)	0.02
Topical steroid use at presentation	50%	82.4%	0.21 (0.1-0.8)	0.04*

Discussion:

- We present herein the largest review of fungal keratitis in Canada to date.
- Consistent with data from Vancouver and New York, *Candida* species were the most common isolated corneal culture.
- The most significant risk factor for poor visual outcome was VA < 20/200 at presentation, reflecting the severity of keratitis and/or limited efficacy of current medical treatment.
- Less than 1 in 5 patients with *Candida* keratitis achieved vision better than 20/200 at last follow-up, highlighting the aggressive nature of this organism.
- Our institution does not currently employ universal empiric treatment for patients with suspected fungal keratitis. However, compounded topical voriconazole and amphotericin were the most frequently-used first-line agents observed in this study.

Conclusions:

- Fungal keratitis is a frequently devastating ocular infection, resulting in VA < 20/400 for 58% of patients in our study.
- Candida* keratitis is the most common cause of fungal keratitis at this tertiary facility in Toronto.
- Patients with history of corneal transplantation, ocular surface disease, and topical steroid use are at higher risk for poor vision following fungal keratitis. Ophthalmologists caring for these patients should be aware of these factors and initiate early treatment for best outcomes.

References:

- Ritterband DC et al. Fungal Keratitis at the New York Eye and Ear Infirmary. *Cornea*. 2006;25(3):264-267.
- Qiao GL et al. *Candida* Keratitis: Epidemiology, Management, and Clinical Outcomes. *Cornea*. 2020;39(7):801-805.