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Inpatient management of infectious keratitis at Denver Health Medical Center

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INTRODUCTION

Infectious keratitis (IK) is a painful and vision threatening condition caused by a variety of organisms. The American Academy of Ophthalmology preferred practice pattern recommends large or visually significant ulcers are treated with two fortified topical antibiotics with a loading dose of drops, followed by hourly instillation. IK is typically treated as an outpatient; however, a subset of patients require inpatient admission. Little research has examined the reason for admission or visual outcomes. At Denver Health Medical Center (DHMC), a safety net hospital system, the hourly drop requirement necessitates admission to the intensive care unit (ICU), representing a significant use of resources. We sought to characterize reason for admission and outcomes in patients requiring hospitalization for management of IK.

METHODS

- All patients admitted to DHMC for primary treatment of IK between January 1, 2017, and December 31, 2022, were included for analysis.
- A database was created which included information on demographics, ocular and medical risk factors associated with IK, treatment, reason for admission, presenting and final visual acuity (VA), organism identified by culture, and size of ulcer at admission.

RESULTS

After exclusion criteria was applied, 15 patients and 18 admissions were included for analysis. Concern for drop compliance in an outpatient setting was the most common reason for admission (67%) followed by demonstrated lack of compliance in an outpatient setting. Average length of stay was 7 days ± 5.72. The majority of patients (73%) were seen at least once after discharge. Of patients seen at DHMC for follow-up, 33 % had VA of 20/200 or better and 33% of patients had improved VA compared to VA on admission.

RESULTS

TABLE 1: Socioeconomic Characteristics of Patients (n=15)

Characteristic	n	%
Gender		
Male	11	73.3%
Female	4	26.6%
Race/ethnicity		
Non-Hispanic White	7	46.6%
Hispanic	7	46.6%
Unknown	1	2.0%
Language		
English	14	93.3%
Spanish	1	6.7%
Insurance		
Medicaid/Medicare	12	80.0%
Uninsured	2	13.3%
Colorado Department of Corrections	1	6.7%
Repeated Subjects		
Number of patients admitted twice	3	-
Social Risk Factors		
Housed	10	66.6%
Unhoused	5	33.3%
Drug Use	10	66.6%
Alcohol Use	1	6.6%
Mean ± Standard Deviation		
Age	±14.73	
Length of Stay in ICU (Days)	±5.79	

TABLE 2: Reason for ICU admission

Characteristic	n	%
Compliance Concern	12	66.6%
Demonstrated Non-compliance Outpatient	7	38.8%
Lost to Follow up Outpatient	4	22.2%
Risk of perforation	4	22.2%
Facility unable to provide care	2	11.1%
Cost of drops	1	5.5%

RESULTS (cont.)

TABLE 3: Ocular characteristics of patients upon admission to ICU

Characteristic	n	%
Eye*		
Right	6	40.0%
Left	9	60.0%
Visual Acuity at Presentation		
≥20/200	3	16.6%
Count Fingers	2	11.1%
Hand motion	8	44.4%
Light Perception	4	22.2%
No Light Perception	1	5.5%
Size of Ulcer at Presentation		
Medium	1	5.5%
Large	16	88.8%
Unknown	1	5.5%
Bacteria Isolated by Culture		
Coagulase-Negative Staphylococci	3	16.6%
Group B Streptococcus	1	5.5%
Corynebacterium	1	5.5%
Moraxella	3	16.6%
Mixed**	6	33.3%
No growth	4	22.2%
Ocular Risk Factors		
Eyelid Malposition	2	13.3%
Contact Lens Use	3	20%
Ocular Trauma Prior to Ulcer	6	40%
History of ocular HSV/VZV	2	13.3%

*Excluded re-admissions from this count
**Mixed culture results:
Propionibacterium Acnes, Bacillus and Capnocytophaga
Penicillin-resistant Staphylococcus Aureus and Group A Streptococcus
Streptococcus Pneumoniae and rare Diphtheroid
Streptococcus Mutans and Propionibacterium
Moraxella and Diphtheroid x2

RESULTS (cont.)

TABLE 4: Visual and anatomic outcomes following inpatient treatment for IK

Characteristic	n	%
Outpatient Follow up		
Seen at DHMC	10	66.7%
Followed at OSH	2	13.3%
Hospice	1	6.7%
Lost to Follow up	2	13.3%
Final VA (n = 11)		
≥20/200	4	36.4%
Count Fingers	4	36.4%
Hand motion	2	22.2%
Enucleated	1	11.1%
Visual Outcome (n = 11)		
Improved vision	4	36.4%
Stable vision	5	45.5%
Worse vision	2	22.2%
Anatomic Outcomes (n = 10)		
Perforation	2	22.2%
Tarsorrhaphy	2	22.2%
Enucleation	1	11.1%
PKP	1	11.1%
Resolution of infection with scar	4	40%

CONCLUSIONS & FUTURE DIRECTION

- This study highlights socioeconomic and ocular risk factors associated with ICU admission at Denver Health Medical Center, a safety-net hospital, for inpatient management of infectious keratitis.
- The most common reasons for ICU admission were concern for drop administration or demonstrated inability to manage treatment in an outpatient setting.
- While admission should be considered at an individual level, restructuring of hospital policy could avoid the high financial and resource burden of ICU admission.
- For high-risk patients, further research into self-administered medications while inpatient or use of subconjunctival antibiotics could be considered.