

Predisposing Factors, Microbial Characteristics, and Clinical Outcome of Microbial Keratitis in Hong Kong: A 10-Year Experience

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*All authors have no proprietary interests in the materials
discussed in this presentation*



Background

Microbial keratitis

- Knowledge of microbial distribution and antibiotic susceptibility pattern essential to guide initial treatment before corneal scraping results available
 - Geographical variations exist
- Local epidemiological data essential

Purpose

- To study the predisposing factors, microbial characteristics and clinical outcome of microbial keratitis in a tertiary centre in Hong Kong in the past 10 years

Method

- Retrospective study
- Period: Jan 2004 – Dec 2013 (10 years)
- Venue: Queen Mary Hospital, Hong Kong
- All corneal scrapings results reviewed
 - Culture results
 - Antibiotic susceptibility patterns
- Case notes review
 - Risk factors
 - Presenting features
 - Clinical outcome

Result (1) – Culture Results

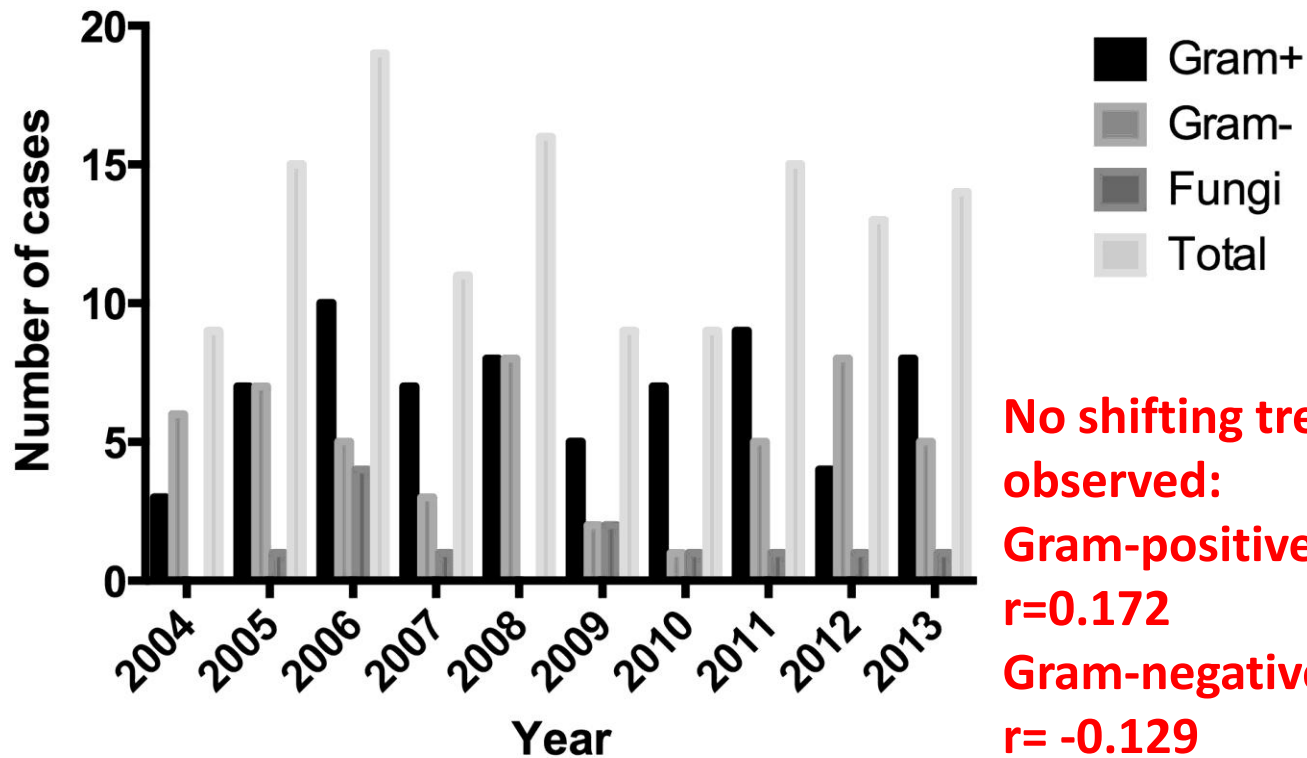
- Total scraps: **347**
- Age: 46 +/- 21
- **32.3%** culture positive
- 130 micro-organisms
- 4.6% polymicrobial
- **90.8% Bacteria**
 - 57.6% Gram-positive
 - 50% coagulase-negative *Staphylococcus*
 - 25% *Staphylococcus aureus*
 - 42.4% Gram-negative
 - 66% *Pseudomonas*
- **9.2% Fungus**
 - 33% *Fusarium*

Overall most prevalent:

1. **Coagulase-negative *Staphylococcus***
2. ***Pseudomonas***
3. ***Staphylococcus aureus***

Result (1) – Culture Results

Distribution of Gram-positive, Gram-negative bacteria and Fungus over 10 years

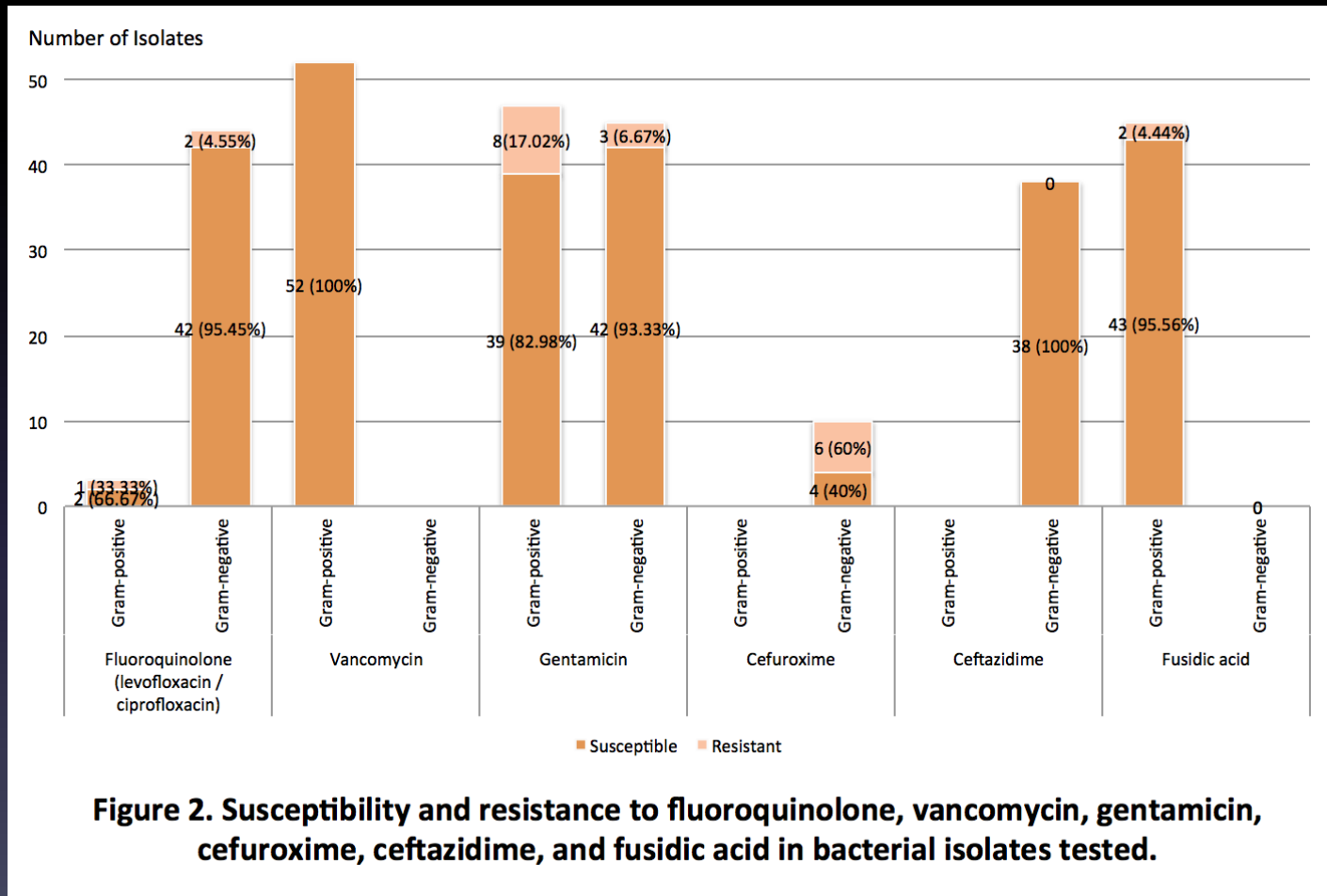


No shifting trends observed:
Gram-positive: $p=0.634$, $r=0.172$
Gram-negative: $p=0.722$, $r=-0.129$

Result (2) – Antibiotic Susceptibility

- Overall:
 - **Fluoroquinolones**: 93.6%
(tested in 47 Gram -isolates)
 - **Aminoglycoside**:
 - Overall 88% (tested in 92 isolates)
 - Gram – only: 93.3% (45 tested)
 - **Ceftazidime**: 100%
(tested in 38 Gram – isolates)
- For *Pseudomonas*:
 - **100% susceptibility** to all commonly employed agents:
 - Fluoroquinolones
 - Aminoglycosides
 - Ceftazidime
- For *S. aureus*
 - Only 1 case **MRSA** (5.9%)

Result (2) – Antibiotic Susceptibility



Result (3) – Risk Factors

82.3% cases had at least 1 identifiable risk factors.

Risk factors	% of cases	age	% culture positive rate	Commonest growth
1. Contact-lens wear	42.7%	28.4	34.2	<i>Pseudomonas</i>
2. Keratopathies / Ocular surface diseases	31.5%	58.0	52.3	Coagulase-negative <i>Staphylococcus</i> <i>Staphylococcus aureus</i>
3. Systemic conditions*	18.5%	62.4	56.3	Coagulase-negative <i>Staphylococcus</i> <i>Staphylococcus aureus</i>
4. Traumatic	10.4%	40.3	22.2	<i>Staphylococcus aureus</i>

*immunocompromised state or mental illness resulting in poor self-care. Includes: diabetes mellitus, end-stage malignancy, chronic renal or liver impairment, bed-bound or institutionalized patients (incapable of self-care), chronic steroid therapy

Result (4) – Clinical Presentation

- Lesion size
 - 87.6% ulcer < 3mm
 - 12.4% ulcer > 3mm
- Hypopyon
 - 13% cases
 - Significantly **associated with *Pseudomonas***
 - 48.3% in *Pseudomonas* vs 13.5% in non-*Pseudomonas*, $p < 0.0005$ (chi-square test)
- Treatment regime
 - 91.5% started topical fluoroquinolones as first line
 - 38% of these combined with aminoglycosides
 - 6.5% started with combined fortified antibiotics (ceftazidime plus tobramycin or vancomycin).
- 90% cases good **initial response**
 - improvement in pain, infiltrate size, epithelial defect size or amount of hypopyon
 - 12% cases needed to step up treatment
 - lack of treatment response after 48-72 hours,
 - or guided by the antibiotic susceptibility result

Result (5) – Clinical Outcomes

- **90.7% good outcome**
 - resolved keratitis without loss in VA
- **9.3% poor outcome**
 - dropped VA
 - serious complication
 - Endophthalmitis: 2
 - Therapeutic PK: 1
 - Enucleation: 1
- Associated with **poor outcome** (dropped VA)
 - **Age** (average 62.7 in poor outcome cases), $p=0.05$
 - **Traumatic** , $p=0.009$
 - Larger presenting **lesion size**, $p=0.044$

*Univariate logistic regression

Conclusion

- Slightly Gram-positive predominant
- Commonest:
 - Coagulase-negative *Staphylococcus*
 - *Pseudomonas*
 - *Staphylococcus aureus*
- No shifting trend in the isolate distribution nor emergence of resistant strains in the past 10 years
- Commonest risk factor: **Contact lens-wear**
 - *Pseudomonas* being the most frequent isolate in this group.
- *Pseudomonas* remained 100% susceptible to fluoroquinolones, aminoglycosides and ceftazidime
- Risk factors for poor outcome:
 - Age
 - Traumatic keratitis
 - Large presenting ulcer size

THANK YOU

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