Microbial Keratitis

Treatment outcomes vs time to tertiary eyecare in North India

Dr Hayden Spencer  MB ChB | MSc
HIGH INCOME
⇒ 5.3 / 100k

INDIA
⇒ 113 / 100k

NEPAL
⇒ 799 / 100k

Incidence

Photo credit: Sandip Debnath
©2010
Primary
Up to day 3

Secondary
Day 3+

Tertiary
1. Day 6 (bacterial)
2. Day 10 (fungal)

(complex cases immediately referred to tertiary)
Access to eyecare ≠ not equal
 Outcome

Δ Visual acuity

Blindness (mono)

Corneal transplant
METHODOLOGY

Study Setting
Shroffs Charity Eye Hospital (Delhi, India)

Study Design
Retrospective analysis of all patients clinically diagnosed between 1st January to 31st December 2015
&
Undergone corneal scraping (a diagnostic test)

Inclusion criteria
● Meets definition of corneal ulcer

Exclusion criteria
● Ulcer not infectious (i.e. inflammatory)
● Ulcer co-presenting with endophthalmitis
Data collection = electronic lab data and handwritten patient record data from Jan 1st to Dec 31st 2015
SAMPLING

379 corneal scrapings in 2015

345 handwritten records found

289 patients met inclusion/exclusion criteria
RESULTS

Presented

7 days ⇒ 38.2%
14 days ⇒ 51.5%

Corneal Transplant

⇒ 25.4%
RESULTS

Monocular Blind

⇒ 58.8%
RESULTS

Time to access (within 14 days)

<table>
<thead>
<tr>
<th>Age</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$&lt; 25$</td>
<td>4.51 (1.65-12.39)</td>
</tr>
<tr>
<td>$H_{Delhi}$</td>
<td>4.12 (2.12-8.03)</td>
</tr>
</tbody>
</table>

MonoBlindness

<table>
<thead>
<tr>
<th>Age</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$25-49$</td>
<td>0.34 (0.20-0.59)</td>
</tr>
<tr>
<td>$&lt; 25$</td>
<td>0.11 (0.04-0.32)</td>
</tr>
</tbody>
</table>

Change in visual acuity

<table>
<thead>
<tr>
<th>Age</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>$25-49$</td>
<td>-0.3 logMAR (p=.035)</td>
</tr>
</tbody>
</table>

Effect of time on MonoBlind & Corneal Transplant (PK)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PK</td>
<td>2.97 (1.64-5.38)</td>
</tr>
<tr>
<td>Blind</td>
<td>3.77 (2.17-6.54)</td>
</tr>
</tbody>
</table>
‘4’ CORE FINDINGS

- ~50% seen within 14 days (c.f. WHO 100% within 7 days)

POOR REFERRAL PATTERNS
LIMITED TREATMENT EFFECT SEEN

- Age <25 = significant predictor of timely access

INCREASED MOBILITY | FATALISM vs INVESTMENT

- No Gender | SES effect on time to tertiary eye care ???
‘4’ CORE FINDINGS

- Delayed presentation = worse outcomes (blind & needing transplant)

IMPROVED REFERRALS = BETTER OUTCOMES
<table>
<thead>
<tr>
<th>Analysis</th>
<th>Method/Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to access (within 14 days)</td>
<td>Binary logistic regression</td>
</tr>
<tr>
<td></td>
<td>MonoBlindness</td>
</tr>
<tr>
<td></td>
<td>Odds ratio</td>
</tr>
<tr>
<td>Change in visual acuity</td>
<td>Kruskall Wallis / Mann Whitney U (post hoc)</td>
</tr>
<tr>
<td></td>
<td>Effect of time on MonoBlind &amp; Corneal Transplant</td>
</tr>
<tr>
<td></td>
<td>Odds ratio</td>
</tr>
</tbody>
</table>
There is no end to the adventures that we can have if only we seek them with our eyes open

Jawaharlal Nehru 1889-1964

First Prime Minister of India, Leader of the Indian pro-independence movement & political heir of Mahatma Gandhi
RECOMMENDATIONS

1. WHO Guidelines

1. Prevention: Antibiotic prophylaxis

1. Disease Register: Monitoring & Evaluation
<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>64%</td>
</tr>
<tr>
<td>Mean age</td>
<td>49.5</td>
</tr>
<tr>
<td>Private</td>
<td>42.6%</td>
</tr>
<tr>
<td>General</td>
<td>41.5%</td>
</tr>
<tr>
<td>Delhi</td>
<td>47.4%</td>
</tr>
<tr>
<td>NCR</td>
<td>29.8%</td>
</tr>
</tbody>
</table>
Burden

INDIA
⇒ 1.5 million

DELHI
⇒ 28 k
Ethical Considerations

This used secondary patient data

Primary purpose of the data - providing tertiary eye care at Shroffs

Patients were consented for use of lab data at collection for ‘educational and research purposes’

Data was anonymised at point of extraction and entry by removing all ID

Approval sought from the local institutional review board.
**Strengths**

1. First of its kind

1. Electronic data on sociodemographic variables = complete dataset

1. Generalisability
Limitations

Independent variables
Dependant variables
Measurement errors
Access vs Time to Access
Recall Bias
Sampling bias
Infective Keratitis

‘Loss of epithelium with underlying stromal infiltration and suppuration with or without hypopyon’

Key Definitions

**Treatment Effect**
Change in logMAR visual acuity as measured at presentation to SCEH and at discharge to SCEH

**Requirement for penetrating keratoplasty (corneal transplant)**
Evidence found within the medical records of patient being recommended to undergo procedure

**Monocular Blindness**
Visual acuity >1.00 logMAR in the affected eye at discharge (>1.30 logMAR WHO)
Access vs Time to Access

‘Realized access is the actual use of services’


‘Equity of Access may be measured in terms of the availability, utilisation or outcomes of services’

Access vs Time to Access

‘Utilisation is dependent on the affordability, physical accessibility and acceptability of services and not merely adequacy of supply’

Access vs Time to Access

‘Number of symptomatic days’

- Number of days the patient reported symptoms consistent with infective keratitis prior to attending hospital

Symptoms = ocular pain, discharge, increased light sensitivity, reduction in vision
Histogram of treatment effect for IK patients attending SCEH in 2015
To,

Dr Hayden Spencer  
CI- Dr Manisha Acharya  
Dr. Shroff’s Charity Eye Hospital,  
5027, Kedar Nath Road, Daryaganj,  
New Delhi - 110002 India

Subject: Study Protocol Approval.

Study Title: Infective Keratitis and time to eye care access at a tertiary hospital in New Delhi: An equity analysis.

Dear Dr. Spencer,

With reference to the above mentioned study, members of the senior medical leadership have reviewed and discussed the above ref. study on 4th April at 5:00 pm at the Dr Shroff’s Charity Eye Hospital, 5027, Kedar Nath Road, Daryaganj, New Delhi-110002.

The study was approved without due IRB consideration required given the nature of project outlined in your protocol. We hereby confirm that neither you nor any of your study team members have participated in the decision making procedure leading to this approval. The members of the senior medical leadership who have participated in this approval do not have any conflict of interest in the referenced study.

Please note that you are required to follow the requirements given below for this study:

Do not implement any deviation from, or change to, the protocol approved without our prior written approval. Deviations / changes to the approved protocol may be implemented without prior approval only when necessary to eliminate immediate hazards to subjects or when changes involve only logistical or administrative aspects of the study.

With best regards

Dr. Umang Mathur  
Medical Director  
Dr Shroff’s Charity Eye Hospital
Why this study?

Pilot study

Inexpensive and relatively quick to do

Are the independent variables useful to include in a prospective study?

What clinical data is useful in the handwritten notes available?

What are the general trends seen in the tested outcomes? Are these interesting?