HIGH CHLAMYDIA TREATMENT FAILURE RATES IN MEN WHO HAVE SEX WITH MEN

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Most frequently reported STI in most developed countries
• Notification rates have been increasing steadily
• ~86,000 chlamydia diagnoses in Australia in 2014 (Kirby Institute 2014)
• Greatest burden of infection among 15-24 year olds
• Chlamydia prevalence high in men who have sex with men (MSM) (Vodstrcil, BMC Infect Dis 2011; Annan, STI 2009)
• Reinfections common (20-30%) (Walker, PLoS ONE 2012; Harte, STI 2011)
  – Increased risk of HIV (Wasserheit, STI 1999; Bernstein, JAIDS 2010)

Chlamydia infections and reinfections

Most repeat infections
– Due to reinfection from the same or a new partner
– Less commonly treatment failure (Batteiger, J Infect Dis. 2010)

Increasing concern about azithromycin treatment failure

Reported treatment failure rates:
– 5-14% in genital chlamydia infection;
– 6-21% in asymptomatic rectal infection (Dukers-Muijrers, PLoS ONE 2013)

Is treatment failure an issue?

Aims:
• To compare repeat chlamydia infection rates between MSM and heterosexual men and women
• To compare treatment failure rates between MSM and heterosexual men and women

Study design:
• Prospective cohort in the context of a RCT (Smith, Am J Prev Med 2015)

Study sites:
• Melbourne and Sydney Sexual Health Centres

Participants:
• 600 people: 200 MSM, 200 women, 200 heterosexual men
• 16 years or above
• Diagnosed with chlamydia and treated with azithromycin

Cohort follow-up procedures

• Chlamydia retesting recommended at 3 months
• SMS reminder sent at 3 months
• Randomised to specimen collection at home or clinic
• Testing conducted by three diagnostic laboratories
• Positive specimens stored for further testing at reference laboratory

Survey
• SMS reminder at 4 months
• Demographics
• Treatment of the participant and their sexual partner(s)
• Sexual behaviour since initial diagnosis:
  o Sexual intercourse
  o Condom use - always, inconsistent
  o Partner type - new partner(s), existing partner(s)
Genovar and MLST testing

**Quantitative real-time PCR (qPCR) assay**
- Identify chlamydia positive samples
- Differentiate into 3 distinct phylogenetic clades based on the *ompA* gene:
  - B group (comprising B/Ba, D, E, L1, and L2)
  - C group (comprising A, C, H, I, J, K, and L3)
  - Intermediate (I) group (comprising F and G)

**Multilocus sequence typing (MLST)**
- Differentiate between identical genovars from the same individual

**MLST analysis over 5 regions of the chlamydia genome**
- *hctB*, *CT682-pbpB*, *CT144*, *CT172*, *CT058*

Classification of repeat positive cases

Repeat positive cases were differentiated according to an algorithm using:
- Sexual behaviour data
- Chlamydia genotyping

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**New infection**

**Persistent infection**

**Possible treatment failure**

**Probable reinfection**

NA = not available
Results: Sample characteristics at baseline n=290

<table>
<thead>
<tr>
<th>Variable</th>
<th>Heterosexual men and women</th>
<th>MSM</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>189</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>Age (median) (IQR)</td>
<td>26 (22-29)</td>
<td>30 (27-37)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Born in Australia %</td>
<td>40.8</td>
<td>58.8</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Used condoms consistently in last 3 months %</td>
<td>6.3</td>
<td>37.6</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>&gt;5 partners in last 3 months %</td>
<td>7.4</td>
<td>39.6</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Anal/urethral symptoms %</td>
<td>48.7</td>
<td>43.6</td>
<td>0.41</td>
</tr>
<tr>
<td>Previous chlamydia diagnosis %</td>
<td>NA</td>
<td>18.8</td>
<td>0.01</td>
</tr>
<tr>
<td>Site of infection %</td>
<td>Rectal = 57.4</td>
<td>Urethral = 35.6</td>
<td>Both = 6.9</td>
</tr>
</tbody>
</table>

Genovar and MLST results

Of those with repeat infection (n=43):
- Paired genovar data available for 31 individuals
- 4 (13%) had a different genovar
- 27 (87%) had the same genovar
  - Of these 27, MLST further identified 2 new infections

Limitations

- Small sample
- Self-reported sexual behaviour
- Possible misclassifications in those who reported always using condoms (Jin, STI 2007)
- Not all specimens were available for genotyping
- If an individual has two episodes of chlamydia infection with the same genovar and the same MLST profile, we cannot differentiate between reinfection and treatment failure
Conclusions

- Repeat positivity was highest among MSM
- Different circulating genovars among MSM – consistent with literature (Herrmann, JCM 2015)
- Applying genotyping and behavioural data allowed us to further classify repeat infections
- Treatment failure appears to be more common in MSM with rectal chlamydia
- High repeat infection rates, particularly among MSM, highlight the importance of retesting around 3 months following treatment

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