Impact of the LNG-IUS on cervical persistence of *Chlamydia trachomatis* and vaginal microbiota in a baboon model

Liechty ER, Bergin IL, Bassis CM, Chai D, LeBar W, Young VB, Bell JD

September 15, 2015

Disclosures

I have no financial or industry disclosures

Background

- CT is the most common bacterial STI worldwide (~2 million cases annually in the US)
- Use of long-acting reversible contraception (particularly IUDs) is increasing among women in the US and worldwide
- Despite the increase in LARC use among women the IUD continues to suffer from historical misconceptions
- Using our established model of CT infection in the baboon makes studying this association prospectively possible

Study Design

LNG-IUS is associated with prolonged endocervical CT infection

![Study Design Diagram]

![Graph showing percent CT positive baboons over weeks after CT inoculation]
Why is the LNG-IUS associated with prolonged CT infection?

- Alterations in...
  - Vaginal commensal bacteria that contribute to host immunity

**Study Question**

Does the vaginal microbiome impact *Chlamydia trachomatis* in a baboon model?

LNG-IUS does not alter vaginal microbial diversity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Baseline</th>
<th>Post-IUD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shannon diversity index</td>
<td>3.04</td>
<td>2.91</td>
</tr>
<tr>
<td>observed OTUs</td>
<td>54</td>
<td>58</td>
</tr>
</tbody>
</table>

LNG-IUS associated with stabilization of vaginal microbial communities
CT infection does not persistently alter vaginal microbial diversity

<table>
<thead>
<tr>
<th>Shannon diversity index (median)</th>
<th>Observed OTUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (pre-CT)</td>
<td>2.64</td>
</tr>
<tr>
<td>Post-CT</td>
<td>2.55</td>
</tr>
</tbody>
</table>

CT does not alter community stability

<table>
<thead>
<tr>
<th>OTUs observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between baseline</td>
</tr>
</tbody>
</table>

CT in presence of LNG-IUS

<table>
<thead>
<tr>
<th>Shannon diversity index (median)</th>
<th>Observed OTUs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline (pre-IUD+/CT-)</td>
<td>3.02</td>
</tr>
<tr>
<td>Post-CT and IUD</td>
<td>2.88</td>
</tr>
</tbody>
</table>

CT in presence of LNG-IUS

<table>
<thead>
<tr>
<th>OTUs observed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between baseline</td>
</tr>
</tbody>
</table>

Conclusion

• Low rate of PID in both groups
• Lower tract clearance of CT was delayed in the IUD group as compared to no-IUD group
• LNG-IUS is associated with prolonged endocervical CT infection but altered colonization dynamics are not explained by changes in vaginal microbiota.

Conclusion

• Why is the LNG-IUS associated with prolonged CT infection?
• Alterations in...
  – Humoral or cell-mediated immunological responses due to exogenous progestin
  – Cervical mucous volume, thickness, or glycosylation
  – Vaginal commensal bacteria that contribute to host immunity
Acknowledgments

University of Michigan
  – Ingrid Bergin, Emma Liechty, William Lebar, Christine Bassis, Danny Sack, Mari Couasnon, Vince Young, Anna Cook, Scott McClellan, Emily Chen, Diane Wang

University of Washington
  – Dorothy Patton

Institute of Primate Research
  – David Aronoff
  – Daniel Chai, George Omondi, Atunga Nyachieo, Nicholas Kiulia, all of the animal staff members

Funding
  – NIH WRHR K12 HD06505
  – UM Dept. of OB/GYN

Hot off the press

Pathogens and Disease Advance Access published September 13, 2015

Title: The leucocytoclastic releasing intratissue system is associated with delayed endocervical clearance of Chlamydia trachomatis without alterations in vaginal microbiota

Authors: Liechty EE, Bergin EL, Bassis CM, Chai D, LeBar W, Young VB, Bell JD