Detection of Hepatitis C Virus (HCV) in semen from HIV-infected men who have sex with men (MSM) during acute HCV infection

Turner S1, Yip M2, Smith D3, Gianella S3, van Seggelen W4, Foster A1, Morey T1, Gilles R, Barbati Z1, Branch A1, Fierer D4

1 James Cook University School of Medicine
2 Monash School of Medicine
3 University of California
4 Icahn School of Medicine at Mount Sinai

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Epidemic of HCV in HIV-MSM

European AIDS Treatment Network (NEAT)

Sexual transmission of HCV in HIV-MSM

• Traditional view = HCV transmission via parenteral exposures
• HOWEVER: distinct absence of parenteral risk factors (eg. IDU)
• Incident HCV-infection associated with:
  • Receptive unprotected-anal-intercourse (UAI) 1,2,3
  • Receptive UAI with ejaculation (but not without) 4
  • Douching prior to anal intercourse 1

HCV in semen

• 15-20 studies
• Detection rates: 12-36% (chronic-HCV)

• Detection of HCV in semen associated with:
  • ? HIV-infection 5,6
  • ? Blood HCV viral load (VL) 5,7
  • ? Acute HCV infection 8

• Acute infection poorly characterized

Aim of study

• To compare levels of seminal HCV between HIV-infected MSM with acute & chronic HCV infection.
Methods

HIV-infected MSM from New York City

HIV-MSM with Acute-HCV

HIV-MSM with Chronic-HCV

• 3 x paired semen + blood samples taken at 2 weekly intervals
• HCV viral load quantified using qRT-PCR platforms:
  - Semen - Abbott m2000 [LLOQ 12 IU/mL]
  - Blood - Roche COBAS AMPLICOR [LLOQ 43 IU/mL]

Results – Baseline characteristics

<table>
<thead>
<tr>
<th></th>
<th>Acute</th>
<th>Chronic</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of participants</td>
<td>21</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>Median age (IQR)</td>
<td>36 (31-46)</td>
<td>52 (38-55)</td>
<td>0.007</td>
</tr>
<tr>
<td>HCV infection no.</td>
<td>17</td>
<td>12</td>
<td>0.271</td>
</tr>
<tr>
<td>Primary Re-infection</td>
<td>4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Genotype (%)</td>
<td>1a</td>
<td>20 (95)</td>
<td>9 (75)</td>
</tr>
<tr>
<td>Median blood HCV VL</td>
<td>5.5 (3.8-6.2)</td>
<td>6.6 (6.2-6.9)</td>
<td>0.006</td>
</tr>
<tr>
<td>(log IU/mL) (IQR)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median ALT, U/L (IQR)</td>
<td>231 (87-492)</td>
<td>62 (46-105)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

* IQR = interquartile range

Results – Detection of seminal HCV

<table>
<thead>
<tr>
<th>Detected</th>
<th>Not detected</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of participants (%)</td>
<td>11 (33)</td>
<td>12 (67)</td>
</tr>
<tr>
<td>No. of semen samples (%)</td>
<td>16 (27)</td>
<td>43 (73)</td>
</tr>
<tr>
<td>Median Age (IQR)</td>
<td>43 (35-49)</td>
<td>37 (33-46)</td>
</tr>
<tr>
<td>HCV Status</td>
<td>Acute HCV (%)</td>
<td>Chronic HCV (%)</td>
</tr>
<tr>
<td>8 (21)</td>
<td>30 (79)</td>
<td>8 (38)</td>
</tr>
<tr>
<td>Median blood HCV VL log IU/mL (IQR)</td>
<td>6.4 (6.2-6.9)</td>
<td>5.5 (4.3-6.4)</td>
</tr>
<tr>
<td>Median ALT, U/L (IQR)</td>
<td>107 (66-207)</td>
<td>99 (60-222)</td>
</tr>
</tbody>
</table>

* IQR = interquartile range

Results – Semen & Blood HCV VLs

Median seminal HCV VL

Acute: 1.32 log_{10} IU/mL

Chronic: 1.77 log_{10} IU/mL

P = 0.163

Discussion

• No significant differences between acute & chronic seminal HCV measures

• Results comparable to previous studies

• Seminal HCV levels likely determined by corresponding blood HCV level

• Blood HCV levels are highest during early ‘acute’ HCV
  ➢ Increased infectiousness

Discussion

“Ramp-Up period”

HCV-specific antibodies

Rehermann & Nascimbeni, 2005
Conclusion

- Epidemic of HCV in HIV-MSM is ongoing
- Seminal HCV has been implicated in sexual transmission
- Detection of seminal HCV during acute & chronic HCV-infection reinforces importance of protected sex amongst HIV-MSM
- Future research should focus on analysis of seminal HCV levels during the ‘ramp-up’ phase of acute HCV

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References