HIV and HBV/HCV co-infection

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Viral hepatitis: important health problem worldwide

It is well known: co-infection by HIV and HBV or HCV can modify the outcomes of such infections

Higher likelihood of chronic liver disease & greater risk of rapid evolution to liver fibrosis

HAART for HIV/AIDS treatment: increase the life expectancy of HIV-infected patients

Chronic liver disease became a common finding and a leading cause of death among coinfected patients

Buskin SE et al.: World J Gastroenterol 2011; 17:1807-16
Puoti M et al.: J Int Assoc Phys AIDS Care 2009; 8:3042
46,969 reported cases of viral hepatitis:

- Co-infection HIV/HBV: 1,318 cases – 2,8%
- Co-infection HIV/HCV: 3,032 cases – 6,45%
- HIV/HBV/HCV: 201 cases – 0,43%
- Prevalent risk factors: sexual contact with carriers (HIV/HBV); use of illicit drugs (HIV/HCV)

Farias N et al.: Epidemiol Serv Saúde 2012; 21:475-86
Programa Estadual de Hepatites Virais, CVE, CCD, SES de São Paulo
Confirmed cases of hepatitis C* (number and percentage) associated with HIV/AIDS Brasil 2007-2011

<table>
<thead>
<tr>
<th>HIV/Aids</th>
<th>Total (2007-2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n°</td>
</tr>
<tr>
<td>Sim</td>
<td>5513</td>
</tr>
<tr>
<td>Não</td>
<td>36100</td>
</tr>
<tr>
<td>Ignorado</td>
<td>8260</td>
</tr>
<tr>
<td>Total*</td>
<td>49873</td>
</tr>
</tbody>
</table>

2007 – 2011

49,873 (41,613) cases of hepatitis C* associated with HIV/AIDS

*anti-HCV and HCV-RNA (+)

Departamento de DST, Aids e Hepatites Virais – SVS – Ministério da Saúde
Boletim Epidemiológico Hepatites Virais; ano III – número 01 - 2012
Confirmed cases of hepatitis C associated with HIV/AIDS Brasil 2007-2011

2010 data*:

• **HCV genotypes:** gen 1 (67.7%), gen 3 (25.9%) and gen 2 (5.7%)

• **Age:** 40-44 years group, followed by the 45-49 years (younger than the age groups globally notified for hepatitis C)

• **Sources of HCV acquisition:** drug use (27.4%), transfusion (26.9%), sexual contact (18.5%), accidents at work (1.2%), household contact (1.1%), hemodialysis (0.9%), vertical transmission (0.3%), and other (23.7%)

*when available information*
Genotypic distribution of hepatitis C among hepatitis C and HIV co-infected patients in Brazil

<table>
<thead>
<tr>
<th>HCV genotype</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>68</td>
<td>68.7</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>4.0</td>
</tr>
<tr>
<td>3</td>
<td>26</td>
<td>26.3</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1.0</td>
</tr>
</tbody>
</table>

In conclusion: exposure to multiple risk factors associated with HCV transmission was common among HIV co-infected patients and an association between HCV genotype 3 and intravenous drug user was observed.

Prevalence of HIV/HCV co-infection in Brazil and associated factors: a review

- HCV and HIV share the same transmission routes, and co-infection is an unfavorable condition for the natural history of both viral diseases

- The knowledge of the extent of co-infection and associated risk factors is a vital tool for both prevention and control

- Aim: to review the literature examining the prevalence of HIV/HCV co-infection reported in studies conducted in Brazil, and identify the main risk factors associated with co-infection (electronic search: Medline, Lilacs and SciELO databases)

• 376 articles, 69 were selected for data extraction, 40 were reviewed: 36 cross-sectional, 3 cohort, 1 descriptive studies (48,791 subjects)

• Majority was male (71%) and young adults - mean age of 26,7 years

• Prevalence of HCV in individuals living with HIV: 20,3% in average; range: from 3,3% (serum samples) to 82,4% (drug users)

• Prevalence of HIV/HCV co-infection: highly variable, depending on the characteristics of the study population

• Risk factors associated with HIV/HCV co-infection: injection drug use and blood transfusion
Prevalence of HIV/HCV co-infection in Brazil and associated factors: a review

- 20 studies (13,894 subjects): prevalence of HCV co-infection among individuals living with HIV

- Average rate: **19,5%** (range: 3,3% to 54,7%)

- Higher than the rate of 11,8% by the Ministry of Health (Epidemiological Bulletin of Viral Hepatitis 2011)

- Reason: MH estimative based on HIV/AIDS reported cases, and may not be representative of the general population

Confirmed cases of hepatitis B* (number and percentage) associated with HIV/AIDS Brasil 2007-2011

<table>
<thead>
<tr>
<th>HIV/Aids</th>
<th>Total (2007-2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n°</td>
</tr>
<tr>
<td>Sim</td>
<td>3584</td>
</tr>
<tr>
<td>Não</td>
<td>50242</td>
</tr>
<tr>
<td>Ignorado</td>
<td>13365</td>
</tr>
<tr>
<td>Total</td>
<td>67191</td>
</tr>
</tbody>
</table>

2007 – 2011

67,191 (53,826) cases of hepatitis B*

5,3% (6,6%)

associated with HIV/AIDS

*at least one (+): HBsAG, anti-HBc IgM, HBeAg

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Boletim Epidemiológico Hepatites Virais; ano III – número 01 - 2012
Confirmed cases of hepatitis B associated with HIV/AIDS Brasil 2007-2011

2010 data*:

• **HBV genotypes:** test not routinely available

• **Age:** highest rates 40-44 years and 35-39 years

• **Sources of HBV acquisition:** sexual contact (52.9%), household contact (9.1%), vertical transmission (5.9%), blood transfusion (5.5%), drug use (4.3%), hemodialysis (0.7%), accidents at work (0.6%) and other (20.9%)

*when available information

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Boletim Epidemiológico Hepatites Virais; ano III – número 01 - 2012
Hepatitis B genotype G and high frequency of LMV-R mutations among HIV/HBV co-infected patients in Brazil

AIDS Outpatient Clinic - HC-FMUSP: 2,412 HIV patients

- HBsAg-reactive: 4.9%
- 22/59 patients (37.3%): positive viremia (HBV-DNA)
- 16/22: HBV genotyping:
  - A: 12 (75%)
  - G: two (12.5%)
  - D: one (6.25%)
  - F: one (6.25%)

Cristina da Silva A et al.: Mem Inst Oswaldo Cruz 2010; 105: 770-8
HBV in HIV population in Brazil: survey in Mato Grosso comparative analysis with other regions of Brazil

Prevalence of HBV infection in HIV-positive populations reported in different Brazilian studies

<table>
<thead>
<tr>
<th>Region (Main city)</th>
<th>n</th>
<th>Anti-HBc +ve (%)</th>
<th>HBsAg +ve (%)</th>
<th>IV drugs (%)</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>North (Belém)</td>
<td>406</td>
<td>51.0% (46.0–56.0)</td>
<td>7.9% (5.5–11.1)</td>
<td>10.6% (7.9–14.1)</td>
<td>2000</td>
</tr>
<tr>
<td>Central (Cuiabá)</td>
<td>1,000</td>
<td>40.0% (37.0–43.1)</td>
<td>3.7% (2.7–5.1)</td>
<td>2.4% (1.6–3.6)</td>
<td>2004</td>
</tr>
<tr>
<td>Southeast (Campinas)</td>
<td>226</td>
<td>44.0% (37.5–50.7)</td>
<td>5.3% (2.9–9.3)</td>
<td>29.0% (23.3–35.5)</td>
<td>1995</td>
</tr>
<tr>
<td>&quot; (Ribeirão Preto)</td>
<td>401</td>
<td>40.9% (36.1–45.9)</td>
<td>8.5% (6.0–11.8)</td>
<td>22.2% (18.3–26.6)</td>
<td>2002</td>
</tr>
<tr>
<td>&quot; (São Paulo)</td>
<td>1,693</td>
<td>38.6% (36.3–41.0)</td>
<td>5.7% (4.7–6.9)</td>
<td>-</td>
<td>1996</td>
</tr>
<tr>
<td>South (Florianópolis)</td>
<td>93</td>
<td>71.2% (60.7–79.9)</td>
<td>24.3% (16.3–34.5)</td>
<td>36.5% (26.9–47.2)</td>
<td>1999</td>
</tr>
</tbody>
</table>

HBV in HIV population in Brazil: survey in Mato Grosso comparative analysis with other regions of Brazil

- HBV infection prevalence: similar or slightly lower than that reported in other regions of Brazil
- In addition: less important role for drug injection in Mato Grosso compared to other regions of the country
- The high rate of nonvaccinated subjects among this HBV-unexposed/HIV-infected population is a matter of considerable health concern in this region
- Relationship between CD4 levels and HBV vaccine response: reinforces the need of keeping health care workers alert to this issue

Thank you
Brazil: co-infections circumstances:
 a) Western Amazon: hepatitis D
 b) Bahia: HTLV
Hepatitis delta in HIV/HBV co-infected patients in Brazil: is it important?

- São Paulo Metropolitan Region: 3.259 HIV cases => HBsAg (+): 154 cases (4.7%); in 86/154: only one (1.2%) anti-HDV (+) (HBV-DNA not detected, but HDV-RNA detected)
  
  **HIV/HBV co-infection: 4,7%** HIV/HBV/HDV co-infection: 1,2%

- Phylogenetic analyses: HDV genotype most closely related to HDV-1 sequences from Mediterranean European countries

- HDV infection is infrequent in the Southeast Region of Brazil; nevertheless HIV/HBV patients must be investigate for HDV infection (potential risk for HDV infection)

HCV and/or HBV infection: frequent among patients with retroviral infection. Risk factors & prevalence: distinct for each agent. Retroviral co-infection: increases the risk of AgHBs (+).

HTLV-1 infection seems to increase the likelihood of HCV spontaneous clearance