Epidemiology of Hepatitis C Infection

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Worldwide Prevalence of Hepatitis C

Hepatitis C in Figures

- Worldwide prevalence: \(\approx 3\% \ (170 \text{ M people})^{1}\)
- Rate of chronification: 75–85\%^{2}
- Rate of cirrhosis:
  - 10\% in 20 years
  - 20\% in 30 years^{2}
- Liver mortality (cirrhosis): 1–5\% / per year^{3}
- Hepatocarcinoma in cirrhotics: 1–4\% / per year^{2}

Distribution of Hepatitis C Genotypes

Distribution of HCV Genotype in the US

- Genotype 1: 74%
- Genotype 2, 3: 22%
- Genotype 4, 5, 6: 4%

Sources of Infection for Persons with Hepatitis C

- Injecting drug use: 60%
- Sexual: 15%
- Transfusion (before screening): 10%
- Other: 5%
- Unknown: 10%

*Nosocomial: Health-care work; Perinatal

Source: Centers for Disease Control and Prevention
Prevalence of Hepatitis C by Age & Ethnicity, in the US

Estimated Incidence of Acute HCV, U.S.

New Infections/100,000

Year


N~240,000/yr

Decline in injection drug users

Decline in transfusion recipients

N~30,000

Armstrong GL. Hepatology 2000;31:777-82
Alter MJ. Hepatology 1997;26:62S-65S

Centers for Disease Control and Prevention, 2005
## Prevalence of Hepatitis C in Spain

<table>
<thead>
<tr>
<th>Area</th>
<th>Population (n)</th>
<th>Prevalence*</th>
<th>Author</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataluña</td>
<td>General (2,154)</td>
<td>2.6%</td>
<td>Sola</td>
<td>2002</td>
</tr>
<tr>
<td>La Rioja</td>
<td>Urban (890)</td>
<td>2%</td>
<td>Sacristán</td>
<td>1996</td>
</tr>
<tr>
<td>Galicia</td>
<td>General (1,170)</td>
<td>1.6%</td>
<td>Riestra</td>
<td>2001</td>
</tr>
<tr>
<td>Murcia</td>
<td>General (2,203)</td>
<td>1%</td>
<td>Gª-Fulgueira</td>
<td>1996</td>
</tr>
<tr>
<td>Zamora</td>
<td>General (675)</td>
<td>0.7%</td>
<td>Chimeno</td>
<td>2001</td>
</tr>
<tr>
<td>Alicante</td>
<td>Drug addicts (832)</td>
<td>82%</td>
<td>Esteban</td>
<td>1997</td>
</tr>
<tr>
<td>Madrid</td>
<td>Immigrants</td>
<td>8.8%</td>
<td>López-Velez</td>
<td>2003</td>
</tr>
<tr>
<td>Spain</td>
<td>Estimated</td>
<td>2%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Around 70% of HCV-Ab positive are HCV-RNA positive

*according to HCV-Ab positivity
Prevalence of HCV infection in the United States

Risk factors

*%*p<0.05

Alter M. NEJM 1999
Prevalence of HCV infection in the US

Other risk factors

<table>
<thead>
<tr>
<th></th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marijuana</td>
<td>*</td>
</tr>
<tr>
<td>Cocaine</td>
<td>*</td>
</tr>
<tr>
<td>N sexual partners</td>
<td>&gt;50</td>
</tr>
<tr>
<td>Early sexual intercourse</td>
<td>*</td>
</tr>
</tbody>
</table>

*p < 0.05

Alter M. NEJM 1999
## Exposures not associated with acquiring HCV infection

<table>
<thead>
<tr>
<th>Exposure (previous 6 months)</th>
<th>Cases (n=148)</th>
<th>Controls (n=200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical procedures</td>
<td>30.4%</td>
<td>29.5%</td>
</tr>
<tr>
<td>Dental work</td>
<td>24.3%</td>
<td>23.5%</td>
</tr>
<tr>
<td>Health care work (no blood contact)</td>
<td>4.1%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Ear piercing</td>
<td>2.7%</td>
<td>3.0%</td>
</tr>
<tr>
<td>Tattooing</td>
<td>0.7%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Acupuncture</td>
<td>0</td>
<td>1.0%</td>
</tr>
</tbody>
</table>

Overlapping HCV & HIV epidemics

HIV

Hep C

40 million

175 million

10 million
HCV and HIV routes of transmission

- **Percutaneous**
  - Injection drug use
  - Transfusion, Transplant
  - Therapeutic
  - Occupational

- **Permucosal**
  - Sexual
  - Occupational

- **Vertical**

*Centers for Disease Control and Prevention*
### HCV and HIV in Figures in the US

<table>
<thead>
<tr>
<th></th>
<th>HCV</th>
<th>HIV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incidence¹⁻³</td>
<td>40,000</td>
<td>40,000</td>
</tr>
<tr>
<td>Prevalence¹⁻³⁻⁴</td>
<td>2.7 M</td>
<td>0.94 M</td>
</tr>
<tr>
<td>deaths/year¹⁻²⁻⁵</td>
<td>8,000⁻¹0,000</td>
<td>15,000</td>
</tr>
</tbody>
</table>

A new epidemic of acute HCV in HIV-positive men in South-East UK

London - 213 cases
- Royal Free Hospital - 53
- Chelsea & Westminster Hospital - 85
- University College Hospital - 75

Brighton - 25 cases

[Map with flags of the USA, France, Italy, Germany, and the Netherlands]
Acute hepatitis C outbreaks in HIV+ MSM, UK

Median number of different partners (12 months)

Cases (n=59) vs Controls (n=121)

*p<0.01

Danta M. CROI 2006 (abst 86)
Acute hepatitis C outbreaks in HIV+ MSM, UK

Group sex risk factors

- Group sex
- Receptive UAI
- Insertive UAI
- Insertive fisting
- Drugs

UAI: unprotected anal intercourse; *p<0.01

Danta M. CROI 2006 (abst 86)
Prevalence of Chronic Viral Hepatitis in HIV Infected Patients

2,168 patients at the Hospital Carlos III Cohort

- 59% HCV alone
- 36% HCV+HBV
- 1% HCV+HBV+Delta
- 1% HBV alone
- 3% None

Castellares, et al. J Hepatol (submitted)
Mean progression to cirrhosis among HIV+ is 25 years

3-fold faster in HIV pos than in HIV neg

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Benhamou et al. *Hepatology* 1999
Fibrosis in Patients with Chronic Hepatitis C and Elevated ALT

HIV negative (n=476)
HIV positive
- (n=914) by biopsy
- (n=408) by elastometry

2 Martin-Carbonero et al. CID 2004; 38: 128-33
## Risk of Cirrhosis and ESLD in HIV/HCV vs HCV alone

<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>RR of Cirrhosis (95% CI)</th>
<th>RR of ESLD (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makris et al.</td>
<td>138</td>
<td>3.9 (1.4-10.8)</td>
<td>4.21 (0.96-18.41)</td>
</tr>
<tr>
<td>Soto et al.</td>
<td>547</td>
<td>1.94 (0.92-4.1)</td>
<td>--</td>
</tr>
<tr>
<td>Pol et al.</td>
<td>514</td>
<td>2.6 (1.1-5.9)</td>
<td>--</td>
</tr>
<tr>
<td>Benhamou et al.</td>
<td>244</td>
<td>1.46 (0.76-2.83)</td>
<td>--</td>
</tr>
<tr>
<td>Eyster et al.</td>
<td>156</td>
<td>--</td>
<td>3.2 (0.6-17)</td>
</tr>
<tr>
<td>Telfer et al.</td>
<td>255</td>
<td>--</td>
<td>21.4 (2.6-174.5)</td>
</tr>
<tr>
<td>Lesens et al.</td>
<td>134</td>
<td>--</td>
<td>7.4 (2.2-25.5)</td>
</tr>
<tr>
<td><strong>Graham et al.</strong></td>
<td>1,988</td>
<td>2.07 (1.4-3.07)</td>
<td>6.14 (2.86-13.2)</td>
</tr>
</tbody>
</table>
Prevalence of Cirrhosis According to Liver Condition in HIV Infected Patients

2,168 patients at the Hospital Carlos III Cohort

<table>
<thead>
<tr>
<th>Condition</th>
<th>Cirrhosis (%)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>8.3 [7.2-9.5]</td>
<td></td>
</tr>
<tr>
<td>HCV</td>
<td>19.2 [16.4-21.9]</td>
<td></td>
</tr>
<tr>
<td>HBV</td>
<td>6.1 [0.5-11.7]</td>
<td></td>
</tr>
<tr>
<td>HCV+HBV</td>
<td>41.7 [13.8-69.6]</td>
<td></td>
</tr>
<tr>
<td>HCV+HBV+Delta</td>
<td>66.7 [44.9-88.4]</td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td>16.5 [13.5-19.6]</td>
<td></td>
</tr>
<tr>
<td>None/Unknown</td>
<td>1.1 [0.5-1.8]</td>
<td></td>
</tr>
</tbody>
</table>

No. of patients:
- All: 2,168
- HCV: 777
- HBV: 54
- HCV+HBV: 12
- HCV+HBV+Delta: 18
- Alcohol: 574
- None/Unknown: 1,055

Castellares, et al. J Hepatol (submitted)
Chronic Hepatitis C: Mortality and Cumulative Costs Estimates for 2010–2019 in the US

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deaths related</td>
<td>165,900</td>
</tr>
<tr>
<td>Deaths due to CHC</td>
<td>27,200</td>
</tr>
<tr>
<td>Cost</td>
<td>$10,700 M</td>
</tr>
</tbody>
</table>

Impact of Chronic Hepatitis C in Coming Years (1998→2008)

- Liver transplant: 528%
- Liver decompensation: 279%
- Liver related deaths: 223%
- Hepatocarcinoma: 68%
- Liver cirrhosis: 61%

Liver Transplant in the US

No. of patients

Calendar year


HCV related

Other causes

Chronic Hepatitis C

• Widely distributed
• Significantly prevalent in Western countries
• Frequently associated to HIV infection
• Source of clinical complications and mortality
• Impact on the health care system on the rise in coming years