Viral Hepatitis in Reproductive Health

20 March 2007

Dr José Bengoa       Dr Pierre Jean Malè
Geneva
<table>
<thead>
<tr>
<th>Topic</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>Epidemiology of Hepatitis B</td>
<td>Dr José Bengoa</td>
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<td>Treatment of VHB and VHC</td>
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<td>Vietnam Hepatitis B/C project</td>
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<tr>
<td>Viral Hepatitis and Pregnancy</td>
<td>Dr Pierre Jean Malè</td>
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Epidemiology and Prevention of Viral Hepatitis

Worldwide chronic carriers

VHB 350’000’000
VHC 200’000’000
Acute Viral Hepatitis A, B and C/NANB by Year, United States, 1952-2000

Reported cases per 100,000 population

Year


Hepatitis A

Hepatitis B

Hepatitis C/ NANB

Total

CDC
Viral Hepatitis – Historical Perspective

- "Infectious" transmitted enterically (A)
- "Serum" transmitted parenterally (B, D)
- "NANB" transmitted enterically (E)
- Other transmitted parenterally (C)

CDC
## Viral Hepatitis Overview

### Types of Viral Hepatitis

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source of virus</td>
<td>feces</td>
<td>blood/blood-derived body fluids</td>
<td>blood/blood-derived body fluids</td>
<td>blood/blood-derived body fluids</td>
<td>feces</td>
</tr>
<tr>
<td>Route of transmission</td>
<td>fecal-oral</td>
<td>percutaneous permucosal</td>
<td>percutaneous permucosal</td>
<td>percutaneous permucosal</td>
<td>fecal-oral</td>
</tr>
<tr>
<td>Chronic infection</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
</tr>
<tr>
<td>Prevention</td>
<td>pre-exposure immunization</td>
<td>pre/post-exposure immunization</td>
<td>blood donor screening; risk behavior modification</td>
<td>pre/post-exposure immunization; risk behavior modification</td>
<td>ensure safe drinking water</td>
</tr>
</tbody>
</table>
A, B, Cs of Viral Hepatitis

• **A**
  – fecal-oral spread: hygiene, drug use, men having sex with men, travelers, day care, food
  – **vaccine-preventable**

• **B**
  – sexually transmitted – 100x more infectious than HIV
  – blood-borne (sex, injection drug use, mother-child, and health care)
  – **vaccine-preventable**

• **C**
  – blood borne (injection drug use primarily)
  – 4-5 times more common than HIV
  – **NOT vaccine-preventable!**
Hepatitis B Virus
Geographic Distribution of Chronic HBV Infection

HBsAg Prevalence
- ≥8% - High
- 2-7% - Intermediate
- <2% - Low

MAP: CDC
Global Patterns of Chronic HBV Infection

- High (>8%): 45% of global population
  - lifetime risk of infection >60%
  - early childhood infections common

- Intermediate (2%-7%): 43% of global population
  - lifetime risk of infection 20%-60%
  - infections occur in all age groups

- Low (<2%): 12% of global population
  - lifetime risk of infection <20%
  - most infections occur in adult risk groups

CDC
Hepatitis B by Year (USA 1966-2000)

- Vaccine licensed
- HBsAg screening of pregnant women recommended
- Infant Immunization recommended
- OSHA Rule enacted
- Adolescent Immunization recommended
- Decline among MSM & HCWs
- Decline among injecting drug users

Cases per 100,000 Population

Source: NNDSS

Year


CDC
Hepatitis B – Clinical Features

- **Incubation period:**  
  Average 60-90 days  
  Range 45-180 days

- **Clinical illness (jaundice):**  
  <5 yrs, <10%  
  >5 yrs, 30%-50%

- **Acute case-fatality rate:**  
  0.5%-1%

- **Chronic infection:**  
  <5 yrs, 30%-90%  
  >5 yrs, 2%-10%

- **Premature mortality from chronic liver disease:**  
  15%-25%
Outcomes of HBV Infection

- **Asymptomatic**
  - Resolved Immune
    - Asymptomatic
    - Cirrhosis
      - Liver cancer
  - Chronic infection
    - Asymptomatic
    - Cirrhosis
      - Liver cancer

- **Symptomatic**
  - Acute hepatitis B
    - Resolved Immune
  - Chronic infection
    - Asymptomatic

CDC
Outcome of Hepatitis B Virus Infection by Age at Infection

- Chronic Infection (%)
  - Birth
  - 1-6 mos
  - 7-12 mos
  - 1-4 yrs
  - Older Children and Adults

- Symptomatic Infection (%)
  - Birth
  - 1-6 mos
  - 7-12 mos
  - 1-4 yrs
  - Older Children and Adults

CDC
Acute Hepatitis B Virus Infection with Recovery

Typical Serologic Course

Symptoms

HBeAg | anti-HBe
---|---

Total anti-HBc

IgM anti-HBc

HBsAg

anti-HBs

Titer

Weeks after Exposure

0 4 8 12 16 20 24 28 32 36 52 100

CDC
Progression to Chronic Hepatitis B Virus Infection
Typical Serologic Course

- IgM anti-HBc
- Total anti-HBc
- HBsAg
- HBeAg
- anti-HBe

Acute (6 months)
Chronic (Years)

Weeks after Exposure

CDC
HBV Modes of Transmission

- Sexual
- Parenteral
- Perinatal

CDC
## Concentration of HBV in Various Body Fluids

<table>
<thead>
<tr>
<th>High</th>
<th>Moderate</th>
<th>Low/Not Detectable</th>
</tr>
</thead>
<tbody>
<tr>
<td>blood, serum, wound exudates</td>
<td>semen, vaginal fluid</td>
<td>urine, feces, sweat, tears, breast milk</td>
</tr>
<tr>
<td></td>
<td>saliva</td>
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</table>
Risk Factors Associated with Reported Hepatitis B, 1990-2000, USA

- Blood transfusion: 0%
- Other*: 15%
- Unknown: 32%
- Multiple sex partners: 17%
- Medical Employee: 1%
- Household contact of hepatitis B patient: 2%
- Men who have sex with men: 6%
- Sexual contact with hepatitis B patient: 13%
- Injection drug use: 14%
- Hemodialysis: 0%

*Other: Surgery, dental surgery, acupuncture, tattoo, other percutaneous injury

Source: NNDSS/VHSP
## Prevalence of VHB

**HBV serologic markers in USA**

<table>
<thead>
<tr>
<th>Group</th>
<th>Prevalence</th>
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<tbody>
<tr>
<td>Chinese/SEA</td>
<td>13%</td>
</tr>
<tr>
<td>drug users</td>
<td>6%</td>
</tr>
<tr>
<td>homosexual males</td>
<td>6%</td>
</tr>
<tr>
<td>HIV infected</td>
<td>8%</td>
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<tr>
<td>pregnant females</td>
<td>0.4 – 1.5%</td>
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</table>
Phases of hepatitis B infection

- **immunotolerance**
  - virus is non pathogenic for liver cells
  - may last several years

- **immunoelimination**
  - active hepatitis, high ALT, fibrosis, cirrhosis
  - HBeAg positive chronic hepatitis

- **inactive carrier of HBsAg**
  - low viremia, HBeAg negative

- **reactivation**
  - viral mutation, HBeAg negative
Complications of viral hepatitis

Cirrhosis
slow progression over 30 – 40 years
in HBeAg + 3% per year

HCC (hepatocellular carcinoma)
a major cause of death in Asia
risk of 2% per year
increased risk in VHB if high viremia
Major Causes of Death among Men and Women in China

Jiang He, M.D., Ph.D., Dongfeng Gu, M.D., Xigui Wu, et al

Malignant Neoplasms

<table>
<thead>
<tr>
<th>Cancer Site</th>
<th>Mortality (per 100,000 person-yr)</th>
</tr>
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<tbody>
<tr>
<td>Lung</td>
<td>Men: 96.9  Women: 46.7</td>
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<tr>
<td></td>
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<tr>
<td>Liver</td>
<td>Men: 81.2  Women: 29.0</td>
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<td></td>
<td></td>
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<tr>
<td>Stomach</td>
<td>Men: 65.4  Women: 32.0</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Esophagus</td>
<td>Men: 43.7  Women: 19.1</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Colon and rectum</td>
<td>Men: 19.4  Women: 15.4</td>
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Take home messages

- Hepatitis B is a worldwide public health issue.
- Major country differences in prevalence exist.
- Transmission: sexual, perinatal, and parenteral.
- It is a vaccine preventable disease.
- Cirrhosis and liver cancer will represent a major challenge in terms of health care costs.
- Breakthroughs in therapy but very high cost.