Hepatitis B and C in Pregnancy

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Overview

- Epidemiology
- Clinical features
- Laboratory findings
- Screening
- Transmission Risks
- Perinatal Transmission
- Perinatal Prevention: Delivery, Feeding
- Infant Management
- Vaccination
Hepatitis B Virus

Chronic Hepatitis B

**HBsAg Prevalence**
- ≥8% - High
- 2-7% - Intermediate
- <2% - Low
Vaccine licensed HBsAg screening of pregnant women recommended Infant immunization recommended OSHA Rule enacted Adolescent immunization recommended

Prevalence Hepatitis B in U.S.

Cases per 100,000 Population

Year

78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95

0 10 20 30 40 50 60 70 80

Decline among MSM & HCWs Decline among IDU

Hepatitis B
Clinical Features

* Provisional date
Hepatitis B: Clinical Features

- **Incubation period:** Average 60-90 days
  Range 45-180 days
- **Clinical illness (jaundice):**<br>  - <5 yrs, <10%
  - ≥5 yrs, 30%-50%
- **Acute case-fatality rate:** 0.5%-1%
- **Chronic infection:**<br>  - <5 yrs, 30%-90%
  - ≥5 yrs, 2%-10%
- **Premature mortality from chronic liver disease:** 15%-25%

Outcome of Hepatitis B Infection by Age of Infection

- **Chronic Infection (%)**
  - Birth: 100%
  - 1-6 months: 80%
  - 7-12 months: 60%
  - 1-4 years: 40%
  - Older Children and Adults: 20%

- **Symptomatic Infection (%)**
  - Birth: 0%
  - 1-6 months: 20%
  - 7-12 months: 40%
  - 1-4 years: 60%
  - Older Children and Adults: 80%
**Acute HBV with Recovery**

- **Symptoms**
  - HBeAg
  - anti-HBe
- **Titer**
  - Total anti-HBc
  - HBsAg
  - IgM anti-HBc
  - anti-HBs

**Weeks after exposure**

**Chronic HBV**

- **Acute** (6 months)
  - HBeAg
- **Chronic** (Years)
  - anti-HBe
  - HBsAg
  - Total anti-HBc
  - IgM anti-HBc

**Weeks after Exposure**

**Years**
**Hepatitis B serology**

**Table 26.1 Interpretation of serological tests for hepatitis B**

<table>
<thead>
<tr>
<th>Serological tests</th>
<th>HBsAg</th>
<th>HBeAg</th>
<th>Anti-HBs</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>+</td>
<td>+</td>
<td>–</td>
<td>Acute hepatitis B infection or reactivation</td>
</tr>
<tr>
<td>+</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>Inactive carrier phase (majority)</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>“Resolved” or “Latent” (maybe DNA+)</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
<td>+</td>
<td>-</td>
<td>Window period of acute hepatitis B</td>
</tr>
</tbody>
</table>

**Note:** Anti-HBs, antibody against hepatitis B surface antigen; HBeAg, hepatitis B virus core antigen; HBeAg, IgM, immunoglobulin M against hepatitis B core antigen; HBeAg, IgG, immunoglobulin G against hepatitis B core antigen; HBsAg, hepatitis B virus surface antigen; IgM, immunoglobulin M.

**Saab Principles of Clinical Gastroenterology Chapter 26, 2008**

**Figure.** Natural history of chronic hepatitis B virus infection.

- **Mother-to-child transmission**
  - Immune-tolerant phase
    - HBV DNA + usu. HBeAg+
    - No/mild liver inflam
    - NI LFTs

- **Person-to-person transmission**
  - Immune-active phase
    - DNA+ usu. HBeAg+
    - ↑ LFT

- **Clearance of HBsAg**
  - Inactive carrier phase
    - Immd/no DNA usu. HBeAb+
    - NI LFTs
  - Cirrhosis
  - Hepatocellular carcinoma

HBsAg = hepatitis B surface antigen.

Hepatitis B Screening in Pregnancy

HBV Screening in Pregnancy

- Universal prenatal screening for HBsAg
- Only 35-65% HBsAg+ women identified when only “high-risk” screened
Hepatitis B Transmission

Concentration of Hepatitis B

<table>
<thead>
<tr>
<th></th>
<th>High</th>
<th>Moderate</th>
<th>Low/Not Detectable</th>
</tr>
</thead>
<tbody>
<tr>
<td>blood</td>
<td>semen</td>
<td>urine</td>
<td></td>
</tr>
<tr>
<td>serum</td>
<td>vaginal fluid</td>
<td>feces</td>
<td></td>
</tr>
<tr>
<td>wound exudates</td>
<td>saliva</td>
<td>sweat</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>tears</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>breastmilk</td>
<td></td>
</tr>
</tbody>
</table>
HBV Transmission

- Sexual
- Parenteral
- Occupational
- Perinatal

Table 3. Recommendations for Infected Persons Regarding Prevention of Transmission of HBV to Others

Persons who are HBsAg-positive should
- Have sexual contacts vaccinated
- Use barrier protection during sexual intercourse if partner not vaccinated or naturally immune
- Not share toothbrushes or razors
- Cover open cuts and scratches
- Clean blood spills with detergent or bleach
- Not donate blood, organs or sperms

Children and adults who are HBsAg-positive:
- Can participate in all activities including contact sports
- Should not be excluded from daycare or school participation and should not be isolated from other children
- Can share food, utensils or kiss others

ASSLD. Hepatology 2007
Hepatitis B
Perinatal Transmission

Perinatal Transmission of HBV

- Perinatal Transmission
  - <10% if HBeAb+
  - 15% if HBsAg+
  - 70-90% if HBsAg + and HBeAg +
    - 85-90% of infected infants → chronic HBV carriers
    - 25% of carriers die of CLD
- Timing of transmission
  - Majority of cases = intrapartum
  - Intrauterine infection: risk factors
    - HBeAg+ OR 17.1
    - Preterm labor OR 5.4
    - Invasive genetic testing???
Hepatitis B Evaluation and Treatment

Table 5. Evaluation of Patients with Chronic HBV Infection

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial evaluation</td>
<td>1. History and physical examination 2. Family history of liver disease, HCC 3. Laboratory tests to assess liver disease—complete blood counts with platelets, hepatic panel and prothrombin time 4. Tests for HBV infection—HBsAg, anti-HBs, HBV DNA 5. Tests to rule out viral infections—anti-HCV, anti-HDV (in persons from countries where HCV infection is common and in those with history of injection drug use), and anti-HRV in those at risk 6. Tests to screen for HCC—AFP at baseline and, in high risk patients, ultrasound 7. Consider liver biopsy to grade and stage liver disease—patients who meet criteria for chronic hepatitis</td>
</tr>
<tr>
<td>Suggested follow-up for patients not considered for treatment</td>
<td>• ALT ≥ 3-6 months, more often if ALT becomes elevated • If ALT levels are between 1-2 × ULN, recheck ALT q1-3 months; consider liver biopsy if age ≥ 40, ALT borderline or mildly elevated on serial tests. Consider treatment if biopsy shows moderate/severe inflammation or significant fibrosis • If ALT &gt; 2 × ULN for 3-6 months and HBsAg+, HBV DNA &gt; 20,000 IU/ml, consider liver biopsy and treatment. • Consider screening for HCC in relevant population (active HBVAg, center of care) • ALT q 3 months for 1 year, if persistently normal, ALT q 6-12 months • If ALT &gt; 1-2 × ULN, check serum HBV DNA level and exclude other causes of liver disease. Consider liver biopsy if ALT borderline or mildly elevated on serial tests or if HBV DNA persistently &gt;20,000 IU/ml. Consider treatment if biopsy shows moderate/severe inflammation or significant fibrosis • Consider screening for HCC in relevant population</td>
</tr>
</tbody>
</table>

ALT ULN = 19
for women

ASSLD Hepatology 2007; Loganathan Ind J Gastroent 2005; Prati Ann Int Med 2002
A

Management of Chronic HBV Infection*

HBsAg +

HBeAg

Positive

ALT < 1 X ULN
Q 3-6 mo ALT
Q 6-12 mo HBeAg
Consider biopsy if persistent or age > 40, Rx as needed

ALT 1-2 X ULN
Q 3 mo ALT
Q 6 mo HBeAg

ALT > 2 X ULN
Q 1-3 mo ALT, HBeAg
Treat if persistent Liver bx optional
Immediate Rx if jaundice or decompensated

* HCC surveillance if indicated

B

Management of Chronic HBV Infection*

HBsAg +

HBeAg

Negative

ALT > 2X ULN
HBV DNA > 20,000 IU/mL

ALT 1-2X ULN
HBV DNA 2,000-20,000 IU/mL

ALT < 1X ULN
HBV DNA < 2,000 IU/mL

Q 3 mo ALT & HBV DNA
Consider biopsy if persistent Rx as needed

Q 3 mo ALT X 3, Then Q 6-12 mo if ALT still <1X ULN

* HCC surveillance if indicated
Hepatitis B: Chemoprophylaxis in pregnancy?

Table. Criteria Useful in Determining for Whom Therapy Is Indicated

Patients for whom therapy is indicated
- Patients who have acute liver failure, cirrhosis and clinical complications, cirrhosis or advanced fibrosis and HBV DNA in serum, or reactivation of chronic HBV after chemotherapy or immunosuppression
- Infants born to women who are HBsAg-positive (immunoglobulin and vaccination)

Patients for whom therapy may be indicated
- Patients in the immune-active phase who do not have advanced fibrosis or cirrhosis

Patients for whom immediate therapy is not routinely indicated
- Patients with chronic hepatitis B in the immune-tolerant phase (with high levels of serum HBV DNA but normal serum ALT levels or little activity on liver biopsy)
- Patients in the inactive carrier or low replicative phase (with low levels of or no detectable HBV DNA in serum and normal serum ALT levels)
- Patients who have latent HBV infection (HBV DNA without HBsAg)

ALT = alanine aminotransferase; HBsAg = hepatitis B surface antigen; HBV = hepatitis B virus.
Lamivudine and HBIG ↓ MTCT

- RCT Lamivudine vs. placebo: maternal DNA >1000 mEq/ML
  - 150 women: LAM 100 BID at 32wks – 4wk postpartum vs. placebo
  - Infants HBV vax (+/- HBIG) [all infants in placebo arm got both]
  - Week 52 infant HBsAg + 18% vs. 39% (p=0.014)
  - Week 52 infant DNA+ 20% vs. 46% (p=0.003)
  - Drop-out rate: 13% LAM vs. 31% placebo

- RCT Antepartum HBIG or Lamivudine; HBsAg+, nl LFTs
  - 151 women: HBIG q4wks @ 28wk gestation until labor vs. LAM 100mg QD @ 28wk until PPD# 30 vs. control: no antepartum intervention
  - Intrauterine infection: neonatal HBsAg and/or HBeAg @ 24hr
    - HBIG 16%, Lamivudine 16% (p<0.05 vs. controls 33%)
  - 2 log ↓ maternal HBV DNA before labor in HBIG and LAM group
    - p<0.05 vs. controls

- Case series: 8 viremic pregnant ♀: LAM 150mg QD x4wks
  - 12.5% transmission vs. 28% (untreated historical controls)

- Cases of vertical HBV transmission despite HBV suppression on Lamivudine
- Future trial of LAM in pregnancy = planning phase

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Hepatitis B

Mode of Delivery

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Mode of Delivery and Hepatitis B

• Observational study; n=301
• All mothers HBsAg +
• 144 NSVD, 40 forceps/vacuum, 117 C-S
• All neonates received HBIG and HBV vax
• HBsAg and anti-HBs tests @ 1, 4, 7, 12 mos
• Infant HBsAg + by delivery mode
  – NSVD: 8.1%
  – Forceps/vacuum: 7.7%
  – Cesarean delivery: 9.7%

Hepatitis B
Breastfeeding
Breastfeeding and Hepatitis B

- Hepatitis B surface Ag found in breastmilk
  - Much lower levels than serum
- No apparent transmission to infants
  - Even before HBV vaccine available for exposed infants
- Observational study: n=369
  - 101 breastfed (mean 4.9 mos; 2wk-1yr); 268 formula
  - No differences in maternal HBeAg or LFT abnl
  - Neonatal infection by 9-15 months of age (HBsAg +)
    - 0% breastfed vs. 3% formula fed

www.cdc.gov (accessed 1/09); Hill
Ob Gyn 2002

Hepatitis B
Management of Exposed Infant
Management of HBV Exposed Infant

- HBIG to infant @ birth, 1-2 mos, and 6 mos
  - Ideally within 12 hours (ok within 7 days)
- HBV vax @ birth, 1-2 mos, and 6 mos
  - 65-96% efficacy
- HBIG + vax effectiveness
  - 85-95% at preventing chronic HBV
  - Non-responders probably in-utero MTCT

Hepatitis B Vaccination
HBV Vaccination in Pregnancy

- Considered safe in pregnancy
- Efficacy
  - 49% after 2 of 3 doses (HIV-neg pregnant women)
    - vs. 59-70% in non-pregnant
- Factors assoc with failure to seroconvert (pregnancy)
  - Smoking OR 7.5 (2.0-27.7)
  - BMI ≥ 34 OR 16.2 (1.7-154.7)
  - Age ≥ 25 yo OR 3.9 (1.1-14.4)
- Post-vaccination testing for certain groups
  - Known contacts, healthcare workers, infants born to HBsAg+ mothers
- 40mg dose if HIV+ or dialysis patient


Hepatitis C Virus
# Hepatitis C

## Clinical Features

**Incubation period**
- Average: 6-7 wks
- Range: 2-26 wks

**Acute illness (jaundice)**
- Mild (<20%)

**Case fatality rate**
- Low

**Chronic infection**
- 75%-85%

**Chronic hepatitis**
- 70% (most asx)

**Cirrhosis**
- 10%-20%

**Mortality from CLD**
- 1%-5%

## Features of HCV Infection
Risk Factors for Chronic HCV

- Increased alcohol intake
- Age > 40 years at time of infection
- HIV co-infection
- Genotype 1a
- Other possible risk factors
  - Male gender
  - Other co-infections (e.g., HBV)

Serologic Pattern of Acute HCV Infection with Recovery

- Anti-HCV
- HCV RNA
- ALT
- Symptoms +/-
- Time after Exposure (0-4 years, 0-6 months)

Mast 2005; Zanetti 1999; Zucotti 1995
Serologic Pattern of Acute HCV Infection with Progression to Chronic Infection

Time after Exposure

HCV RNA

ALT

Normal

0 1 2 3 4 5 6 1 2 3 4

Years

Months

Symptoms +/- anti-HCV

Hepatitis C Screening in Pregnancy
Perinatal HCV Screening

- **Indications**
  - Current or past IDU
  - Transfusion or organ transplant prior to July 1992
  - Long-term hemodialysis (patients and staff)
  - ↑ LFTs
  - Known exposure to HCV
  - HIV or HBV infection
  - History of piercing or tattoos
  - IVF participants with anonymous donors
  - Sexual partners of people with HIV, HBV, HCV
- **Universal screening**: $1.1 million/QALY
  - High risk screening will miss 50% of HCV + women

Clinical Course of HCV in Pregnancy

- **Conflicting data**
- **Overall, likely no significant change in clinical course**
  - Improvement of transaminase levels
  - Possible linear increase in viremia
- **Post-partum**
  - Mild ↑ ALT but not HCV-RNA
  - Histopathological exacerbation of HCV
Hepatitis C
Medical Management

HCV Management

• LFTs, (AFP), HCV RNA*, genotype*
• HAV and HBV serology → VAX if non-immune
• Avoid EtOH, hepatotoxic medication/herbs
• RUQ sono if ↑ LFTs
• Liver bx typically deferred until after pregnancy
• Standard HCV treatment in adults = contraindicated in pregnancy
  – Ribavirin + Interferon
  – Interferon
    • Potentially neurotoxic
  – Ribavirin: teratogenic and embryolethal in nearly all species
    • Found in semen of treated men
Hepatitis C Transmission

Transmission of HCV

• Percutaneous
  – Injection drug use
  – Clotting factors before viral inactivation
  – Transfusion, transplant from infected donor
  – Therapeutic (contaminated equipment, unsafe injection practices)
  – Occupational
• Permucosal
  – Perinatal
  – Sexual
Occupational Transmission of HCV

- Inefficiently transmitted
- Average incidence 1.8% following needle stick from HCV-positive source
  - Associated with hollow-bore needles
- Case reports of transmission from blood splash to eye
  - No reports of transmission from skin exposures to blood
- Prevalence 1-2% among health care workers
  - Lower than adults in the general population
  - 10 times lower than for HBV infection

Hepatitis C
Perinatal Transmission
Perinatal HCV Transmission

- **Timing of transmission**
  - Mostly intrapartum, however...
  - n=54 HCV infants: 31% HCV DNA+ w/in 3 days of life

- **Transmission risk:**
  - RNA neg 1-3% vs. RNA pos 4-6%
  - HIV-negative 5% (10% if HCV-viremic)
  - HIV-positive 17% (28% if HCV viremic)

- **Meta-analysis of HCV risk factors**
  - HCV viremia
  - HIV co-infection: OR 2.8 (1.8-4.4)
  - HCV viremic: HIV+ vs. HIV-: OR 2.0 (1.0-3.7)

- **Honolulu cohort: 244 exposed infants, adjusting for VL**
  - ROM > 6 hours: OR 9.3 (1.5-179.7)
  - Internal fetal monitoring: OR 6.7 (1.1-35.9)

Hepatitis C
Mode of Delivery
Delivery Route and HCV Transmission

- Prospective cohort 441 mother-child pairs
  - Elective c-section (n=31): 0%
  - Emergency c-section (n=54): 5.9%
  - NSVD (n=339): 7.7%
  - Elective C/S vs. NSVD/emergent C/S: OR 0 (0-0.87), no adjustment for HCV viremia (p=0.04)
    - Estimated probability of infection among infants w/ missing data
    - HCV RNA test results in 33% of women

- European Pediatric HCV Network
  - 1474 HCV+ (503 of whom HIV+)
  - C-section (elective/non-elective) vs. NSVD OR 0.7 (0.4-1.2)

- Cost-effective if ↓ HCV transmission by 77%
- Potentially cost-effective for HIV-HCV
  - Not adjusting for HCV viral load, not distinguishing elective C/S

**Hepatitis C Breastfeeding**
Breastfeeding and HCV

- HCV RNA found in breastmilk, but no apparent transmission
- Gibb cohort (n=441 mother-child pairs)
  - Bottlefed 6.7% vs. breastfed 7.7%; OR 1.5 (0.35-5.12)
- European Pediatric Hepatitis C Virus Network
  - N=HCV+ women
  - 35% (n=503) co-infected with HIV
  - Breastfed vs. Non-breastfed OR = 1.07, P = 0.83
- Honolulu cohort: n=244; 63 HCV+ breastfeeding
  - HCV transmission: Breastfed OR 0.8 (0.2-3.9)
  - 51% HCV RNA + milk → no transmissions
- ACOG, AAP, CDC support breastfeeding among HCV+ mothers
- Recommend pump/dump if cracked/bleeding nipples

Gibb 2000; Mast JID 2005; MMWR 1998

Hepatitis C
Management of Exposed Infant
Management of Infant Exposed to HCV

- Infant follow-up
  - HCV RNA PCR on 2 occasions 3-4 months apart after 2 months of age
  - Anti-HCV Antibody after 15-18 months
  - Don’t test umbilical blood for HCV Ab

Summary: Management of HBV in Pregnancy

- Universal HBsAg screening
- If HBsAg positive:
  - Consult with Hepatology
  - LFTs (remember ULN for ♀=19), HBeAg, HBV DNA
  - Others: HBsAb, HBeAb, HBcAb, HIV
  - HAV and HCV panel → HAV VAX if non-immune
  - Consider lamivudine if viremic
    - Work with Hepatologist b/c risk of viral rebound if d/c LAM
  - HBIG + HBV vaccination to infant
  - Trial of labor (avoid FSE??)
  - Breastfeeding NOT contraindicated
  - Vaccinate other household members, sexual partners
Summary: Management of HCV in Pregnancy

- Screening for HCV among high-risk women
- If HCV Ab positive:
  - Consult with Hepatology
  - LFTs, HCV RNA, HCV genotype (and HIV, of course)
  - Rpt HCV RNA at 6 months if RNA negative
  - HAV and HBV panel → VAX if non-immune
  - Trial of labor (consider c/section if HIV-coinfected)
  - Shorten duration of ROM, Avoid FSE
  - Breastfeeding NOT contraindicated

Resources

- UCSF Reproductive Infectious Disease Service
  - 24/7 pager: 415-443-8726
- CDC 2008 recommendations
  - http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5708a1.htm
- NIH Consensus Development Conference Statement: Management of Hepatitis B
- American Association for the Study of Liver Disease (AASLD)
  - www.aasld.org
  - Note corrections to Tables 2 and 10
- Advisory Committee on Immunization Practice
  - http://www.cdc.gov/nip/ACIP/default.htm
- Hep B Free San Francisco
  - http://www.sfhepbfree.org/home.php?nv=1
- www.hivandhepatitis.com
Acknowledgements

- Meg Autry
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- Natali Aziz
- Sara Brubaker
- Megan Huchko

### Table 12. Recommendations for Treatment of Chronic Hepatitis B

<table>
<thead>
<tr>
<th>HBsAg</th>
<th>HBV DNA (PCR)</th>
<th>ALT</th>
<th>Treatment strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>+</td>
<td>&gt;20,000 IU/ml</td>
<td>&gt;2 × ULN</td>
<td>Low efficacy with current treatment. Consider biopsy if ALT &gt; 4 times normal or with family history of HCC. Consider treatment if HBV DNA &gt; 20,000 IU/ml and biopsy shows moderate/severe inflammation or significant fibrosis.</td>
</tr>
<tr>
<td>+</td>
<td>&gt;20,000 IU/ml</td>
<td>&gt;2 × ULN</td>
<td>Consider liver biopsy prior to treatment. If compensated, immediate treatment if clinical or biochemical decompensation. IFNα or pegIFNα + LAM, ADV, ETV, or LdT may be used as initial therapy. LAM and LdT are preferred due to high rate of drug resistance. End point of treatment - Transplantation, liver biopsy, or virological cure.</td>
</tr>
<tr>
<td>-</td>
<td>&lt;2,000 IU/ml</td>
<td>1.2 × ULN</td>
<td>Consider liver biopsy and treat if liver biopsy shows moderate/severe necroinflammation or significant fibrosis.</td>
</tr>
<tr>
<td>-</td>
<td>&lt;2,000 IU/ml</td>
<td>&lt;1 × ULN</td>
<td>Consider liver biopsy and treat if liver biopsy shows moderate/severe necroinflammation or significant fibrosis.</td>
</tr>
</tbody>
</table>

**Abbreviations:** ALT, alanine transaminase; ULN, upper limit of normal; IFNα, interferon-α; pegIFNα, pegylated interferon-α; LAM, lamivudine; ADV, adefovir; ETV, entecavir; LdT, telbivudine
Management of Hepatitis B in OB clinic

**Vertical Transmission**
- Majority of transmission occurs intrapartum as opposed to intrauterine
- Combination passive immunization (HBIG) and active immunization (Hep B) vaccine in infant at birth, 1, and 6 months is 95% effective in preventing development of chronic Hep B
- Efficacy of HBIG/vaccine is about 90% in the setting of high maternal HBV viral load \(10^8\)
- C-section is not indicated to reduce vertical transmission
- Breastfeeding is safe in immunized infant
- Lamivudine appears safe in pregnant and breastfeeding women
- Risk of transmission to fetus due to amniocentesis is low and likely negligible, but may be higher in the setting of positive HBeAg and/or high HBV DNA levels. Prior to amino, check HBeAg and HBV DNA so as to be able to help the patient balance risks/benefits.
- Hep B that is acquired at birth or in infancy is much more likely to persist as chronic Hep B and more likely to progress to cirrhosis as compared to Hep B acquired as an adult

**Initial work-up when screening HBsAg is positive:**
- Check HBV DNA (viral load), HBeAg, HBeAb, HBcAb, HBsAb, LFTs, coags
- Check HIV, HCV Ab, HAV Ab (give Hep A vaccine if non-immune)
- RUQ sono if the history suggests perinatally acquired HBV, if HIV+, or if abnormal LFTs.

**Next steps based on LFTs and HBV DNA**
- Send to Wednesday HROB clinic if: AST/ALT >19 or HBV DNA \(\geq 10^5\)
- If AST/ALT < 19 and initial HBV DNA \(\leq 10^5\), recheck LFTs and HBV DNA at 24-28 wks, refer to Wed HROB as above
- Indications for referral to liver clinic: AST/ALT >19 and HBV DNA \(\geq 10^8\), or if woman considering lamivudine after HROB consult
- When to consider using lamivudine (in consultation with liver clinic): liver bx indicative of significant liver disease; 1) woman on anti-HBV therapy prior to pregnancy; 2) HBV DNA \(\geq 10^8\) (if normal LFTs, esp if HBeAg+) or 3) HBV DNA \(\geq 10^5\) and LFTs \(\geq 40\)

**Intrapartum management**
- Avoid FSE during labor
- All staff should practice universal precautions (including masks if near perineum)
- Family and others in L&D room should avoid contact with all blood and secretions, including touching newborn before bath. Discuss immunization with contacts if not done beforehand.
- Inform Peds re: need for HBIG and Hep B vax to exposed newborn

**RID pager number: 443-8726**
**GI consult: obtain through e-consult to ensure women get seen in a timely fashion.**

August 19, 2009