Elimination of Perinatal Hepatitis B Transmission

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Background

- Hepatitis B is an infection of the liver caused by the hepatitis B virus (HBV)
- HBV is found in body fluids of infected people, e.g., blood or serum, vaginal secretions, saliva, and semen
- An infant can acquire HBV from
  - Mother-to-child transmission (perinatal)
  - A chronically infected member of the household
Natural History of Perinatal Hepatitis B Virus (HBV) Infection

Infants have the greatest risk of chronic hepatitis B of any age group

Perinatal HBV infection; 99% asymptomatic*

- 90% chronic HBV; typically life-long
- 25% risk premature death; failure or liver cancer
- ~10% immune
- 0.5-2% HBV infections resolve/ year

*<1% develop fulminant acute hepatitis B

MMWR 2005;54(No.RR-16)
Why Eliminate Perinatal Hepatitis B?

- Protect babies from chronic hepatitis B (HBV) infection which can lead to liver failure or liver cancer
  - Most morbidity and mortality from hepatitis B occurs in people with chronic HBV infection
  - Treatment decreases liver damage and the chance of liver cancer, but there is no cure
  - People with chronic hepatitis B can unknowingly spread the infection

Infants at Risk for Perinatal Hepatitis B (HBV)

- All infants born to pregnant women with hepatitis B are at increased risk for perinatal HBV transmission

- Without intervention
  - 5-20% infants infected when mothers viral load is low (<2000 IU/mL; HBeAg\(^*\) -)
  - 70-90% infants infected when mothers viral load is high (>20,000 IU/mL; HBeAg +)

\(^*\)Hepatitis B “e” antigen (HBeAg) indicates active viral replication

MMWR 2005; 54 (No. RR-16), Apuzzio J et al. The Female Patient 2012;37:30-34
Identify Pregnant Women with Hepatitis B Infection

- Screen* for HBsAg* at first prenatal visit of each pregnancy
- A confirmed, positive (reactive) HBsAg test indicates acute or chronic hepatitis B
- Reassess risk for hepatitis B on admission to labor and delivery
- Place HBsAg laboratory report in mother and infants birthing records
- Report pregnant women with HBsAg-positive tests to public health

*Recommended by ACIP, USPSTF, ACOG, AAFP, AAP. *HBsAg, hepatitis B surface antigen
Care of Pregnant Women with Chronic Hepatitis B (HBV) Infection

- ACIP: Medical evaluation and possibly treatment of chronic HBV infection
- Evaluation includes
  - HBeAg* and/or HBV viral load, and liver enzymes (e.g., alanine aminotransferase)
  - Identifies highest risk women and infants
  - Manage women with chronic HBV with a provider experienced in HBV infection

*Hepatitis B “e” antigen (HBeAg) indicates active viral replication; HBV DNA, hepatitis B virus DNA. ALT = alanine aminotransferase
MMWR 2005; 54 (No. RR-16), Apuzzio J et al. The Female Patient 2012;37:30-34
Chronic Hepatitis B in Pregnancy

HBsAg and anti-HBs tests

HBsAg (-)

If anti-HBs (-) and at high risk consider vaccination of the pregnant woman during pregnancy or postpartum

HBsAg (+)

Order additional tests:
- ALT
- HBeAg, anti-HBe
- HBV DNA level

HBeAg (+)
- or-
- HBV DNA >20,000 IU/mL
- or-
- ALT elevated*

Refer to specialist immediately during pregnancy

HBeAg (-)
- HBV DNA <2,000 IU/mL
- ALT normal

Refer to specialist or primary care provider postpartum

Recommended screening of all household and sexual contacts

HBsAg (-) Anti-HBs (-)
Vaccinate

HBsAg (-) Anti-HBs (+)
Immune (No follow-up required)

HBsAg (+)
Primary care provider to evaluate and monitor

Recommended Approach for Hepatitis B Virus (HBV) Screening, Evaluation, Vaccination, and Referral of Pregnant Women

*New norms establish elevated ALT as ≥19 IU/L for women, ≥30 IU/L for men

Abbreviations: ALT, alanine aminotransferase; HBsAg, hepatitis B surface antigen; anti-HBs, antibody to HBsAg; HBeAg, hepatitis B e-antigen; anti-HBe, antibody to HBeAg.

Apuzzio J, et al. The Female Patient 2012;37:30-34
Estimated Number of Births to HBsAg*-Positive Pregnant Women
United States, 1993-2009

*HBsAg = hepatitis B surface antigen
Infant Post-Exposure Prophylaxis to Prevent Perinatal Hepatitis B Transmission

- Hepatitis B vaccine and hepatitis B immune globulin (HBIG) within 12 hours of birth
- Timely completion hepatitis B vaccine series
- Post-vaccination serology* (HBsAg and anti-HBs)
- If necessary, revaccinate and retest

*At ≥9 months of age, 1-2 months after the last dose of vaccine test for HBsAg (hepatitis B surface antigen) and anti-HBs (antibody to HBsAg.) MMWR 2005;54(No. RR-16)
Efficacy of Infant Hepatitis B Post-Exposure Prophylaxis

- Efficacy 85-95%
- Breakthrough infections
  - 5-15% infants born to women with high viral load (>200,000 IU/mL, \( >10^8 \) copies/mL, HBeAg* +)
  - To prevent perinatal hepatitis B breakthrough infections, clinical trials are assessing the safety and efficacy of prenatal antiviral treatment for women with high viral load

*Hepatitis B “e” antigen (HBeAg) indicates active viral replication. NIH Clinical Trials-http://clinicaltrials.gov/ct2/results?term=pregnancy%2C+hepatitis+B&Search=Search
A Comprehensive Immunization Strategy to Eliminate Transmission of Hepatitis B Virus Infection in the United States

Recommendations of the Advisory Committee on Immunization Practices (ACIP)
Part 1: Immunization of Infants, Children, and Adolescents

INSIDE: Continuing Education Examination
U.S. Perinatal Hepatitis B Prevention Programs (PHBPP)

- CDC created in 1990 to educate, assess, and assist in the elimination of perinatal hepatitis B transmission
- Programs in 64 public health jurisdictions (50 states, 6 cities, 8 territories and freely associated island nations)
- PHBPP coordinators foster collaboration with healthcare providers, laboratories, hospitals, nursery personnel, and families

http://www.cdc.gov/hepatitis/HBV/PerinatalXmtn.htm
Objectives of the U.S. Perinatal Hepatitis B Prevention Programs

- Identify HBsAg-positive pregnant women through reports to perinatal coordinators
- Ensure timely initiation and completion of infant post-exposure prophylaxis and post-vaccination testing
- Encourage universal hepatitis B vaccination starting at birth ("birth dose") as a safety net

http://www.cdc.gov/hepatitis/HBV/PerinatalXmtn.htm
Successes

- 1994-2009, case-managed >167,000 HBsAg*-positive pregnant women and their infants (~1/2 estimated number)
- >95% infants received hepatitis B vaccine and HBIG by <24 hours of life
- Post-vaccination testing increased from ~24% to >58%
- Perinatal chronic hepatitis B infections decreased from ~2.5% to <1%

*HBsAg, hepatitis B surface antigen; Smith E et al. Pediatrics 2012;129:609-16; CDC. Unpublished data from the Perinatal Hepatitis B Prevention Program
Hepatitis B Professional Materials

http://www.cdc.gov/hepatitis/HBV/PDFs/PerinatalAlgorithm-Prenatal.pdf
Perinatal Hepatitis B Materials – 12 Languages

http://www.cdc.gov/hepatitis/HBV/PerinatalXmtln.htm#section6
Perinatal Hepatitis B Audio-Visual Education

http://www.cdc.gov/hepatitis/Partners/Perinatal/PeriHepB-Education.htm
Summary - Pregnant Women

- Screen for HBsAg* at first prenatal visit of each pregnancy

- When HBsAg-positive (reactive)
  - Notify Perinatal Hepatitis B Prevention Program Coordinators
  - Ensure HBsAg reports are in birthing facility records
  - Assess the women’s liver disease; refer to specialist as appropriate
  - Evaluate household and sexual contacts

* HBsAg, hepatitis B surface antigen; MMWR 2005; 54(No. RR-16)
Infants

- Administer timely hepatitis B post-exposure prophylaxis
- Assess outcomes 1-2 months after the final dose of vaccine at ≥9 months of age; test for both HBsAg* and anti-HBs†
- Monitor outcomes of clinical trials to reduce or eliminate “breakthrough” perinatal hepatitis B infections

*HBsAg, hepatitis B surface antigen. For women with unknown HBsAg-status, recommendations differ for infants <2000 grams and ≥2000 grams birth weight. †anti-HBs, antibody to HBsAg. See MMWR 2005; 54(No. RR-16)
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