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Peripartum care for mothers diagnosed with hepatitis B during pregnancy: A survey of provider practices

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Abstract

Objectives—Hepatitis B (HBV) remains a significant public health burden, despite effective therapy. Routine HBV screening is recommended during pregnancy to reduce the risk of vertical transmission, but the rates of follow-up care peripartum are low. The aim of this study was to evaluate physician practices and knowledge regarding HBV in women diagnosed perinatally.

Methods—A survey was distributed to obstetricians and midwives within the Partners HealthCare system at Brigham and Women's Hospital and Massachusetts General Hospital.

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Results—Of 118 survey respondents (response rate 56%), 97% reported that they always tested for hepatitis B, and 77% referred new diagnoses of HBV during pregnancy to a HBV specialist for further care. Only 10% of respondents reported that there was formal referral mechanism in place to facilitate follow-up care for mothers diagnosed with hepatitis B infection. 91% of survey respondents selected hepatitis B surface antigen as the correct screening test, and 76% selected hepatitis B immune globulin (HBIG) with vaccination for the newborn as the correct prophylaxis regimen. Only 40% and 51% of respondents accurately identified serologies that were consistent with acute and chronic infection, respectively.

Conclusion—Routine screening for HBV in this population presents an important opportunity to identify cases and to reduce the public health burden of this disease. Providers were somewhat knowledgeable about HBV, but the lack of formal referral mechanism may explain why HBV follow-up is suboptimal in this healthcare system. Supplemental provider education and formal linkage to care programs may increase rates of follow-up HBV care.

Keywords

Hepatitis B; linkage to care; peri-partum care

INTRODUCTION

The prevalence of hepatitis B virus (HBV) infection in the United States is estimated to be as high as 2.2 million persons, and HBV remains a significant public health hazard (Kowdley 2012). To reduce the risk of vertical transmission, routine HBV screening is recommended during pregnancy so that antiviral treatment can be started if necessary and the newborn can receive prophylaxis at the time of delivery (Lin & Vickery, 2009). Prophylaxis for the children of HBV positive women consists of administering hepatitis B immune globulin (HBIG) within 12 hours of delivery and the first dose of the vaccine series prior to discharge from the hospital. Adherence rates to this practice are nearly universal in the United States and have been highly effective in preventing vertical transmission (Kubo et al., 2014; Smith 2012).

However, not all women who are found to have HBV during pregnancy are referred to specialized care for follow-up care of their hepatitis, despite current recommendations (ACOG 2007). A retrospective study at Partners HealthCare system, the largest healthcare system in Massachusetts, found that 47% of women diagnosed with HBV perinatally had follow-up with an HBV specialist, but only 19% had appropriate HBV-related laboratory tests within 1 year of their HBV diagnosis (Chang 2015). A subsequent analysis of the Massachusetts Virtual Epidemiologic Network, a statewide surveillance database, showed that postpartum maternal HBV follow-up laboratory testing occurred in 50% of Massachusetts women — higher than previously estimated but nonetheless suboptimal (Chang 2016). Why this disparity exists in post-natal maternal care remains unclear.

Both the American Congress of Obstetricians and Gynecologists (ACOG) and Centers for Disease Control and Prevention (CDC) recommend that all patients who test positive for hepatitis B be evaluated by referral to or in consultation with a physician experienced in the management of chronic liver disease, typically gastroenterology/hepatology or infectious

diseases clinic (ACOG 2007, Weinbaum 2008). Inadequate follow-up for these women places them and their close contacts at risk for developing future complications of HBV infection, including cirrhosis, portal hypertension, and hepatocellular carcinoma (HCC). Also, lack of appropriate specialist care during pregnancy may lead to uncontrolled viremia, which increases the risk of vertical transmission and reduces the efficacy of post-exposure prophylaxis.

The consequences of chronic HBV infection can often be effectively prevented with existing antiviral therapies (Terrault 2016). In addition, the identification, monitoring, and treatment of chronic HBV infection are important public health measures to prevent and reduce the risk of transmission.

As a follow-up to our prior study at Partners HealthCare, the aim of our current study is to evaluate physician and midwife practices and knowledge regarding HBV in women diagnosed perinatally. We hypothesize that physician practices, such as lack of a formal referral mechanism to an HBV specialist, and lack of knowledge regarding HBV may be contributors to suboptimal rates of follow-up care.

MATERIALS AND METHODS

Participant Recruitment

Obstetricians and gynecologists were invited to participate in a survey to evaluate their clinical practices and general knowledge of HBV. The survey was distributed to all 210 obstetricians and midwives within the Partners HealthCare system at BWH and Massachusetts General Hospital (MGH) in 2014. Partners HealthCare is a not-for-profit, integrated health care system comprised of several hospitals, community health centers, and numerous other health related services.(HealthCare, 2016) The two founding institutions, Brigham and Women's Hospital (BWH) and Massachusetts General Hospital (MGH), serve as major teaching affiliates for Harvard Medical School and perform most of the deliveries at Partners, approximately 6,500 and 4,000 deliveries a year, respectively, accounting for approximately 50% of all deliveries in Boston (Massachusetts DPH 2015).

Providers were recruited by e-mail and provided a link to the survey, which was hosted on Research Electronic Data Capture (REDCap). REDCap is a secure, HIPAA-compliant web-based application that supports data capture for research studies (Harris 2009). Two follow-up e-mail reminders were used to improve response rate, and a small incentive was offered to participants for completing the survey. Responses were collected from September to October 2014.

Answers to knowledge questions were made available to participants after completion of the study as an educational intervention, with the goal of improving physician knowledge and referral rates to specialist care.

Provider Survey

A survey was developed by the investigators and reviewed by three other faculty members from the Division of Gastroenterology and Department of Obstetrics and Gynecology at

BWH. A pilot survey was administered to 10 physicians, including both trainees and attendings, and adjustments were made that were incorporated into a final version (Supplemental Table 1).

Statistical Analysis

Data analysis was performed using SAS software version 9.4 (Cary, NC). Statistical analyses were performed by using the independent samples t-test and Wilcoxon signed rank test for continuous variables, and the chi-square test or the Fisher two-tailed exact test for categorical variables. We developed a logistic regression model based on our survey question responses to identify predictors for referral to an HBV specialist. A two-sided alpha of 0.05 was considered significant. The study was approved by the Partners HealthCare Institutional Review Board.

RESULTS

Participant Characteristics

Out of 210 obstetrical providers, 118 responses were received, for a 56% response rate. The sociodemographic characteristics of the survey respondents are outlined in Table 1. The average age was 40.1 years (standard deviation [SD] 10.5), 91% were female, and 82% were white. Specialties represented included general obstetrics and gynecology (58%), midwives (22%), and maternal-fetal medicine (19%), with the majority of respondents reporting 100% time in clinical care. Trainees comprised 30% of the respondents.

Providers' Clinical Practice

Providers estimated the prevalence of hepatitis B infection in their pregnant patients to be approximately 2% (IQR 1–5%). The median percentage of patients to whom hepatitis B immune globulin (HBIG) was administered during delivery was 0% (IQR 0–2%), with concordance in percentages in only 33% of responses. For comparison, the actual HBV prevalence at Partners was ~0.3%.

Nearly all survey respondents (97%) reported that they always tested for hepatitis B, and 77% referred new diagnoses of HBV during pregnancy to an HBV specialist for further care (Table 2). Only 10% of survey respondents reported that a referral mechanism was in place to facilitate follow-up care or referrals for women diagnosed with HBV infection. Options that would trigger a positive response for this question included an electronic reminder, paper reminder, or other mechanism specified by the respondent. In contrast, 46% of respondents reported that a formal mechanism was in place for women diagnosed with gestational diabetes.

Hepatitis B knowledge

Regarding the screening and management of HBV, 76% of providers were aware that the state of Massachusetts requires all women to be screened for hepatitis B during pregnancy, and 67% were aware that hepatitis B was a reportable disease (Table 4). When asked about the workup and management of hepatitis B, 91% of survey respondents selected hepatitis B

surface antigen as the correct screening test, and 76% selected HBIG with vaccination for the newborn as the correct prophylaxis regimen for newborns (Table 4).

When asked to select the recommended laboratory tests for HBV-positive women during pregnancy (HBV DNA, HBV e antigen, and liver function tests), 78% of providers identified the correct tests. However, only 37% of providers answered at least six of seven counseling questions correctly or reported that they would refer to a specialist. Most providers recommended screening close contacts for hepatitis B (68%) and counseled patients to limit alcohol intake (73%) (Table 3).

Of six basic knowledge questions regarding hepatitis B infection, 30% of survey respondents correctly answered at least five. Only 40% and 51% of respondents accurately identified serologies that were consistent with acute and chronic infection, respectively. On the sixth question, 94% of respondents correctly identified pan-negative serology testing (HbsAg-, HbcAb-, HbsAb-) as a patient who was unvaccinated and would be susceptible to hepatitis B infection.

A multivariable logistic regression model to identify predictors for referral to specialist care did not reveal predictors based on provider demographics, provider specialty, the providers' role as the primary care provider, or the number of correctly answered HBV knowledge questions (Supplemental Table 2). The variable “% of effort spent in clinical care” had an insufficient number of responses to be included in the regression model.

DISCUSSION

Our survey of provider practices demonstrates variation in peripartum care for women diagnosed with HBV during pregnancy. Most survey respondents did screen for HBV in their pregnant patients and did refer to a specialist or primary care provider if HBV infection was detected. General knowledge about HBV infection and interpretation of serologies was suboptimal. The appropriate laboratory tests, including liver chemistry, HBV DNA, and hepatitis B e antigen, were ordered consistently during pregnancy. A follow-up care plan or referral mechanism in place for HBV-positive women after pregnancy appeared to be unusual; nonetheless, 77% of our survey respondents did report that they do routinely refer to an HBV specialist.

These findings may explain the results of our prior study, in which 47% of women had follow-up with an HBV specialist, and only 19% met care guidelines within 1 year of diagnosis.⁶ These follow-up rates are lacking, particularly in contrast to the robust follow-up programs in place for their infants. The national Perinatal Hepatitis B Prevention Program, which oversees programs on the state and city level, reports 94.9% adherence to the recommended prophylaxis for infants of HBV-positive women, and at least 77.7% completion rates of the hepatitis B vaccine series by 12 months of age.³

The suboptimal knowledge and counseling scores revealed by this survey highlight the need for ongoing HBV education among practicing obstetric providers. Even within a prominent healthcare system, provider knowledge regarding appropriate HBV diagnosis and management was lacking — highlighting the need for all providers to consider their own

knowledge of the subject. Though usually not specialists in HBV, obstetric providers are the primary point of contact for women during pregnancy, and should be able to appropriately diagnose HBV, interpret HBV screening tests, and recognize when specialty referral is indicated.

Aside from the above knowledge gaps, best practices for HBV follow-up and specialty referral may not be well-advertised — inclusion in national society guidelines, public health recommendations, or even quality measures may increase patient and provider awareness and thus linkage to care. Remarkable progress has been made to ensure that infants born to HBV-positive women receive appropriate prophylaxis and vaccination — similar programs and referral processes may also benefit their mothers.

Our study was limited to providers in a single healthcare system affiliated with 2 academic medical centers, which may not be entirely generalizable. Additionally, with a response rate of 56%, our cohort may reflect some selection bias, as providers who opt to participate may be more knowledgeable about HBV. These biases would generate results that overestimate the degree of knowledge and follow-up care for HBV — that is, general awareness of HBV may be even lower outside of this sample, and the findings of our study may have been even more dramatic. Provider practices on a national scale may be addressed in future study.

The demographics of the survey respondents did reflect the makeup of the clinical network and the providers to whom the survey was distributed, i.e. 91% women, 82% white. Overall, the survey respondents represented a wide range of obstetrical providers in Massachusetts, with a primarily clinical practice. However, the statewide prevalence of HBV in Massachusetts is low, and provider knowledge and experience may be greater in areas where HBV is more prevalent.

Our multivariable model did not identify predictors of referral to specialist care for HBV-positive women, which may be related to the small sample size of the study, or unmeasured variables not captured in the survey. With 118 survey responses, only limited number of predictors could be entered into the regression model, due to risk of over-specification. Nonetheless, opportunities to assess follow-up care for women diagnosed with HBV are scarce, and this survey provides a greater understanding of the gaps in knowledge and the medical system where health care may improve for this population. Provider-level factors that influence referral practices and access to specialty care are unlikely to be unique to this healthcare system.

Routine screening for HBV in pregnant women presents a valuable public health opportunity to identify cases and to reduce the cumulative risk of liver dysfunction, hepatocellular carcinoma, and liver-related death, not only among the women themselves, but also their close contacts. An interdisciplinary approach and a focus on linkage to care will be essential to addressing the care cascade for these patients. Supplemental provider education and established referral mechanisms may increase rates of follow-up HBV care for this population and help to alleviate the health burden of this disease.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Significance

This study builds on prior data from our group regarding suboptimal follow-up care for mothers diagnosed with hepatitis B infection during pregnancy (Chang AJOG 2015). We administered a survey of practicing obstetric providers at two large academic centers in Massachusetts and identified gaps in knowledge and resources regarding the peripartum diagnosis and management of new hepatitis B infection.

Table 1

Demographic information for survey respondents

Characteristic	N=118
Age in years, mean (standard deviation)*	40.1 (10.5)
Sex, n (%)	
Female	108 (91)
Male	9 (8)
No answer	1 (1)
Race, n (%)	
White	97 (82)
Black	7 (6)
Asian	5 (4)
More than one race	4 (3)
No answer	5 (4)
Ethnicity, n (%)	
Hispanic	9 (8)
Not Hispanic	95 (80)
No answer	14 (12)
Site, n (%)	
Brigham and Women's Hospital	44 (37)
Massachusetts General Hospital	43 (36)
Both	29 (25)
No answer	2 (2)
Specialty, n (%)	
General OB/GYN	68 (58)
Maternal-fetal medicine	22 (19)
Midwife	26 (22)
No answer	2 (2)
Training status, n (%)	
Trainee	36 (30)
Not trainee	80 (68)
No answer	2 (2)
Years in practice if not a trainee, median (IQR) ^a	12 (IQR 6–18)
Percent of effort in clinical care if not a trainee, median (IQR) ^a	100 (IQR 85–100)
Practice as primary care provider, n (%)	
Yes	31 (26)
No	85 (72)
No answer	2 (2)

^aMissing values excluded

Table 2

Survey results: clinical practices of practicing obstetricians and midwives at Partners Healthcare

Clinical practices	
HBV screening during pregnancy, n (%)	
Always	103 (97)
Sometimes, if high risk	3 (3)
Never	0 (0)
Trimester that screening occurs, n (%)	
1st	103 (97)
2nd	2 (2)
3rd	0 (0)
Any	1 (1)
Estimated % of mothers with HBV, median (IQR)	2 (IQR 1–5)
Estimated % of newborns given HBIG, median (IQR)	0 (IQR 0–2)
Agreement in percentages, n (%)	33 (33)
Management of mothers with HBV, n (%)	
Refer to HBV specialist	82 (77)
Refer to primary care provider	10 (9)
Self-manage	9 (8)
No management in most cases	5 (5)
Test ordered in women with HBV (or patient referred), n (%)	
Hepatitis B DNA	98 (92)
Hepatitis B e antigen	97 (94)
Hepatic function panel during pregnancy	105 (100)
Hepatic function panel postpartum	91 (88)
Follow-up care or referral mechanism in place, n (%)	
Mother with HBV	
Yes	11 (10)
No	48 (45)
Do not know	47 (44)
Newborn with HBV	
Yes	22 (21)
No	16 (15)
Do not know	68 (64)
Consent for prophylaxis obtained	
Yes	43 (41)
No	12 (12)
Do not know	49 (47)

Missing values excluded

Table 3

Counseling practices of practicing obstetricians and midwives at Partners Healthcare

Patient education	
Avoid breastfeeding (if not taking antiviral medications)?	
Yes	19 (18)
No ^a	78 (74)
No, I refer to a specialist	8 (8)
Avoid casual contact (e.g. sharing food, water, utensils)?	
Yes	11 (10)
No ^a	90 (86)
No, I refer to a specialist	4 (4)
Recommend condoms for intercourse with a monogamous partner?	
Yes	67 (64)
No ^a	34 (32)
No, I refer to a specialist	4 (4)
Avoid or limit alcohol intake?	
Yes ^a	76 (73)
No	22 (21)
No, I refer to a specialist	6 (6)
Recommend screening close contacts for hepatitis B (e.g. household, sexual, and needle-sharing contacts)?	
Yes ^a	70 (68)
No	23 (22)
No, I refer to a specialist	10 (10)
Recommend consulting their healthcare providers before starting new medicines, including over-the-counter and herbal medicines?	
Yes ^a	66 (63)
No	31 (30)
No, I refer to a specialist	8 (8)
Recommend hepatitis A vaccination?	
Yes ^a	46 (44)
No	40 (38)
No, I refer to a specialist	19 (18)

Missing values excluded

^aCorrect answer

Table 4

Hepatitis B knowledge of practicing obstetricians and midwives at Partners Healthcare

Hepatitis B knowledge	
Does your state require that women be screened for hepatitis B during pregnancy?	
Yes	78 (76)
No	24 (24)
In your state, is hepatitis B a reportable disease?	
Yes	69 (67)
No	34 (33)
Correct screening test used (HBsAg), n (%)	93 (91)
Correct prophylaxis regimen selected, n (%)	79 (76)
Correct prophylaxis timing selected, n (%)	68 (64)
Q1: Isolated positive core antibody	
Correct	57 (54)
Wrong	36 (34)
Do not know	12 (11)
Q2: immune due to natural infection	
Correct	63 (59)
Wrong	40 (38)
Do not know	3 (3)
Q3: acute infection	
Correct	42 (40)
Wrong	55 (52)
Do not know	9 (8)
Q4: immune due to vaccination	
Correct	89 (84)
Wrong	15 (14)
Do not know	2 (2)
Q5: chronic infection	
Correct	54 (51)
Wrong	43 (41)
Do not know	9 (8)
Q6: susceptible to hepatitis B	
Correct	100 (94)
Wrong	3 (3)
Do not know	3 (3)

Missing values excluded