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PREGNANCY, LABOR, AND PERINATAL OUTCOMES IN PREGNANT WOMEN WITH HEPATITIS C VIRUS INFECTION

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ABSTRACT: Hepatitis C virus (HCV) infection in pregnancy presents unique challenges in maternal and perinatal care. This prospective, multicenter observational study evaluates the impact of maternal HCV infection on pregnancy outcomes, labor complications, and perinatal results. A total of 550 pregnant women, including 220 HCV-positive and 330 HCV-negative controls, were enrolled from January 2019 to December 2021. Data were collected on maternal demographics, pregnancy complications, mode of delivery, and neonatal outcomes. The HCV-positive group exhibited a significantly higher rate of gestational diabetes, preterm delivery, and intrahepatic cholestasis of pregnancy (ICP). Additionally, adverse perinatal outcomes, including lower birth weights and increased neonatal intensive care unit (NICU) admissions, were observed in the HCV-positive cohort. Multivariate analysis confirmed maternal HCV infection as an independent risk factor for preterm birth (OR 2.1, 95% CI 1.4–3.2, $p < 0.001$) and low birth weight (OR 1.8, 95% CI 1.2–2.7, $p = 0.004$). These findings underscore the importance of targeted antenatal surveillance and intervention in HCV-positive pregnancies to improve maternal and neonatal outcomes [1].

Keywords: Hepatitis C, pregnancy outcomes, perinatal outcomes, preterm delivery, intrahepatic cholestasis, neonatal intensive care

INTRODUCTION

Background - Hepatitis C virus (HCV) infection is a significant public health issue worldwide, affecting an estimated 71 million individuals. In women of reproductive age, HCV poses additional concerns regarding maternal health and perinatal outcomes. While vertical transmission rates of HCV are generally low, maternal infection has been associated with adverse pregnancy outcomes including gestational diabetes, preterm labor, and intrahepatic cholestasis of pregnancy (ICP). The complex interplay between maternal HCV infection and the physiological changes of pregnancy may contribute to an increased risk of both obstetric

complications and neonatal morbidity [2].

Rationale - Despite advances in HCV treatment, many women become pregnant with chronic HCV infection, and the optimal management of these cases remains controversial. Recent studies suggest that HCV infection may predispose pregnant women to a spectrum of complications; however, comprehensive data on labor and perinatal outcomes are limited. An in-depth analysis is needed to elucidate the clinical implications of HCV in pregnancy, to guide prenatal counseling and management strategies.

Objective - This study aims to evaluate the effect of maternal HCV infection on: Pregnancy complications, including gestational diabetes, ICP, and hypertensive disorders. Labor and delivery outcomes, with a focus on mode of delivery and intrapartum complications. Perinatal outcomes, including birth weight, preterm delivery, and NICU admission rates [3].

MATERIALS AND METHODS

Study Design and Setting - This was a prospective, multicenter observational study conducted at four tertiary care hospitals with specialized maternal–fetal medicine units. The study period spanned from January 2019 to December 2021. Ethical approval was obtained from the institutional review boards of all participating centers, and written informed consent was obtained from all study participants.

Participants - A total of 550 pregnant women were recruited and stratified into two cohorts:

HCV-Positive Group (n = 220): Women with documented HCV infection (confirmed via HCV RNA and antibody testing) prior to or during early pregnancy.

Control Group (n = 330): HCV-negative pregnant women, matched by age and parity.

Inclusion criteria were: Singleton pregnancy. Gestational age ≤ 14 weeks at enrollment. No co-infection with hepatitis B or HIV.

Exclusion criteria included: Multiple gestations. Pre-existing chronic conditions such as renal disease or autoimmune disorders that could confound outcomes. Inadequate prenatal follow-up (loss to follow-up >20%).

Data Collection - Maternal and perinatal data were collected prospectively through medical record reviews and structured interviews at designated prenatal visits (first, second, and third trimesters) and during the postpartum period. Collected data included:

Maternal Data: Age, body mass index (BMI), parity, HCV viral load, liver function tests, and antenatal complications (gestational diabetes, ICP, preeclampsia).

Labor and Delivery Data: Mode of delivery, duration of labor, indications for cesarean section, and intrapartum complications.

Neonatal Data: Gestational age at delivery, birth weight, Apgar scores, and NICU

admissions.

Statistical Analysis - Data analysis was performed using SPSS version 27.0. Continuous variables were summarized as mean ± standard deviation (SD) and compared using Student's t-test. Categorical variables were expressed as frequencies and percentages and compared using chi-square or Fisher's exact tests. Multivariate logistic regression analyses were used to identify independent predictors of adverse outcomes. A p-value of <0.05 was considered statistically significant [4].

RESULTS

Demographic and Baseline Characteristics - The mean maternal age was 30.8 ± 5.2 years in the HCV-positive group and 30.1 ± 5.0 years in the control group (p = 0.18). BMI, parity, and other baseline characteristics were similar between groups (Table 1).

Table 1. Baseline Characteristics of the Study Population (n = 550)

Variable	**HCV-Positive (n = 220)**	**Controls (n = 330)**	**p-value**
Mean Age (years)	30.8 ± 5.2	30.1 ± 5.0	0.18
Body Mass Index (kg/m²)	24.9 ± 3.4	24.7 ± 3.2	0.45
Primiparous (%)	55%	53%	0.67
HCV Viral Load (IU/mL)*	1.2 × 10^6 ± 0.5 × 10^6	–	–

**Viral load data are available only for the HCV-positive group.*

Maternal Outcomes - Pregnancy complications were significantly more frequent in the HCV-positive cohort: Gestational Diabetes: Observed in 18% of HCV-positive women versus 10% in controls (p = 0.01). Intrahepatic Cholestasis of Pregnancy (ICP): Diagnosed in 12% versus 5% (p = 0.005). Hypertensive Disorders: Preeclampsia occurred in 9% of HCV-positive women compared to 6% of controls (p = 0.18, not statistically significant).

Labor and Delivery Outcomes - The mode of delivery and intrapartum complications showed some differences: Cesarean Section Rate: 35% in HCV-positive versus 30% in controls (p = 0.20). Preterm Labor: Significantly higher in the HCV-positive group (15% vs. 8%, p = 0.01). Prolonged Labor: No significant difference was noted between groups.

Perinatal Outcomes - Adverse neonatal outcomes were more common in the HCV-positive group: Birth Weight: Mean birth weight was 2850 ± 400 g in HCV-positive neonates compared to 3050 ± 350 g in controls (p < 0.001). NICU Admissions: Required for 18% of neonates in the HCV-positive group versus 10% in controls (p = 0.008). Apgar Scores: At 5 minutes, scores were marginally lower in the HCV-positive group (7.8 ± 0.9 vs. 8.2 ± 0.8, p = 0.02).

Multivariate Analysis - Multivariate logistic regression identified maternal HCV infection as an independent predictor for: Preterm Delivery: OR 2.1, 95% CI 1.4–3.2, p < 0.001. Low Birth Weight (<2500 g): OR 1.8, 95% CI 1.2–2.7, p = 0.004.

Other significant factors included maternal age and BMI, although these were comparable between groups.

DISCUSSION

Principal Findings - Our study indicates that HCV infection in pregnancy is associated with a higher incidence of adverse maternal and perinatal outcomes. Specifically, HCV-positive women exhibited increased rates of gestational diabetes, ICP, and preterm labor, which in turn correlated with lower birth weights and increased NICU admissions [5].

Pathophysiological Considerations - The mechanisms by which HCV may adversely affect pregnancy include chronic hepatic inflammation, altered hormonal metabolism, and an immune-mediated response that could exacerbate metabolic and inflammatory pathways during gestation. These factors may predispose to conditions like ICP and preterm labor [6]. Additionally, maternal HCV infection may affect placental function, thereby contributing to fetal growth restriction.

Comparison with Previous Studies - Our findings align with several recent reports that have linked maternal HCV infection with increased risks of preterm delivery and low birth weight. However, discrepancies exist in the literature regarding hypertensive disorders and cesarean section rates. Our multivariate analysis reinforces that HCV infection itself is an independent risk factor for certain adverse outcomes, even after controlling for confounding variables.

Clinical Implications - Given the elevated risk profile observed, routine screening for HCV in early pregnancy and subsequent close monitoring is recommended. Strategies such as targeted management of gestational diabetes and ICP, along with tailored prenatal care, may help mitigate adverse outcomes. Moreover, multidisciplinary care involving hepatologists, obstetricians, and neonatologists is essential for optimizing both maternal and neonatal health.

Strengths and Limitations - Strengths: Prospective multicenter design enhances generalizability. Comprehensive data collection across prenatal, intrapartum, and neonatal periods. Use of multivariate analysis to adjust for potential confounders [7].

Limitations: The observational design limits causal inferences. Sample size, though adequate, may not detect less common outcomes. Data on HCV treatment status and duration of infection were not uniformly available.

Future Directions - Further research is warranted to assess the impact of antiviral therapies administered prior to or during pregnancy on maternal and perinatal outcomes. Longitudinal studies are needed to evaluate the long-term developmental outcomes in children born to HCV-positive mothers. Randomized controlled trials would also help establish optimal management protocols for this high-risk population.

CONCLUSION

Maternal HCV infection is associated with a significantly increased risk of adverse pregnancy and perinatal outcomes, including preterm delivery, low birth weight, and increased NICU admissions. These findings underscore the need for enhanced prenatal surveillance and multidisciplinary management of HCV-positive pregnancies. Early identification and intervention may mitigate these risks and improve outcomes for both mothers and their infants.

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