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ORIGINAL ARTICLE

HCV and Pregnancy: Prevalence, Risk Factors, and Pregnancy Outcome in North Indian Population: A Case–Control Study

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Abstract

Objectives The study was carried out to investigate the prevalence, risk factors, and Pregnancy outcome in anti-HCV-positives pregnant women admitted for delivery in the Department of Obstetrics & Gynecology of Guru Gobind Singh Medical College and Hospital, Faridkot between January 2010 and January 2013.

Setting Department of obstetrics and Gynaecology of GGS Medical College and Hospital, Faridkot.

Material and Methods A case–control study design was selected for the study. A total of 1412 pregnant women presenting in the labor room of our hospital between January 2010 and January 2013 were subjected to anti-HCV testing by third generation ELISA. Age, parity, and gestational age-matched controls were taken from the women delivering during the same time frame who tested negative for hepatitis C. All the subjects and controls were non-reactive for HIV and HBsAg as well. Risk factors and pregnancy outcome were compared with the control group. Approval was taken from ethic committee of the institute. The women who consented to participate in the study were evaluated on the basis of a questionnaire for the presence of

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risk factors of hepatitis C and pregnancy outcome. Women with the known previous liver disease were excluded from the study. Data were analyzed using SPSS for Windows version 16.0. $p < 0.05$ was considered significant.

Results Forty patients tested positive for anti-HCV antibodies among 1,412 patients subjected to anti-HCV testing during study period. 40 patients were taken as controls, who were negative for anti-HCV antibodies. Prevalence of HCV during pregnancy was 2.8 % in our study. Among the risk factors studied, previous surgery and blood transfusion were the statistically significant risk factors. There was history of previous major surgery in 16 cases versus 4 controls and was statistically significant (p value 0.002) at $p < 0.05$. History of blood transfusion was present in 4 versus 2 among cases and controls, respectively, and statistically significant (p value 0.004) at $p < 0.05$. Sexual transmission was not the risk factor as none of the spouse of the pregnant women was positive for HCV antibodies. Neonatal outcome was similar in both groups. Pregnancy complications i.e., Pregnancy-induced hypertension and antepartum hemorrhage were significantly higher in study group compared to control group.

Conclusion Incidence of hepatitis C virus infection in pregnancy is 2.8 %. Surgical procedures, blood transfusion, are the major risk factors for transmission. There are no identifiable risk factors in 35 % of cases. Pregnancy complications like Pregnancy-induced hypertension and antepartum hemorrhage are more common in HCV-positive mothers. Neonatal outcome is not affected. Universal screening of all pregnant women should be done for HCV as many patients may not have any risk factor.

Keywords Hepatitis C virus · Pregnancy · Perinatal transmission · Prevalence

Introduction

Hepatitis C is a global health problem and affects 2–3 % of the world population [1]. The prevalence of anti-HCV in pregnant women in developed countries ranges from 0.14 to 4.4 % [2, 3]. The seroprevalence of anti-HCV antibody in pregnancy in Indian population is 1.03 % [4]. Risk factors of hepatitis C virus infection include intravenous drug abuse, exposure to blood and component transfusion, previous surgeries, and sexual transmission. However, in 40 % of the cases, no risk factor can be identified [5]. Approximately, 7–8 % of hepatitis C virus-positive women transmit hepatitis C virus to their offsprings [6]. With rising incidence of HCV in our country, a significant number of pregnant women are affected with HCV, and there is little research regarding the impact of HCV on Pregnancy outcome. Previous studies have focused on perinatal transmission of HCV infection, but effect on HCV infection on pregnancy complications and the neonatal health have not been studied much. Therefore, objective of our study was to evaluate the Prevalence, risk factors, and role of HCV infection in maternal complications and neonatal health.

Materials and Methods

A total of 1,412 pregnant women presenting in the labor room of our hospital between January 2010 and January 2013 were subjected to anti-HCV testing by third generation ELISA. Age, parity, and gestational age-matched controls were taken from the women delivering during the same time frame who were negative for hepatitis C. All the cases and controls were non-reactive for HIV and HBsAg as well. Risk factors and pregnancy outcome were compared with the control group. The women who consented to participate in the study were evaluated on the basis of a questionnaire for the presence of risk factors of hepatitis C and pregnancy outcome. Women with the known previous liver disease were excluded from the study.

Data were analyzed using SPSS for Windows version 16.0. $p < 0.05$ was considered significant.

Results

The study was carried out among 1,412 pregnant women who came for delivery to the obstetric emergency department at Guru Gobind singh Medical college and Hospital between January 2010 and January 2013. All were tested for HCV seroprevalence in the study period, and 40 women were HCV positive. An equal number of anti-HCV negative women delivering during same time were taken as controls. Prevalence of HCV during pregnancy was 2.8 % in our study. Mean age was 25.97 and 26.35 years in study group and control group, respectively. Sixteen were primigravida, 24 were multigravida in study group, 15 women were primigravida, and 25 were multigravida in control group. Patients belonging to rural area were 29 versus 24 in study and controls (Table 1). Previous surgery blood transfusion and were the most significant risk factors. History of previous major surgery was in 16 cases and in 4 controls and was again statistically significant (p value 0.002) at $p < 0.05$. History of blood transfusion was present in 4 versus 2 among cases and controls, respectively, and this difference has been found to be statistically significant (p value 0.004) a $p < 0.05$. Sexual transmission was not the risk factor as none of the spouse of the pregnant women was positive for HCV antibodies. There was no identifiable risk factor in 35 % of the cases. Risk factors

Table 1 Frequency distribution of socio-demographic variables

Age (yrs)	Cases ($N = 40$)	Percentage	Controls ($N = 40$)	Percentage
17–20	2	5	4	10
21–25	18	45	22	55
26–30	12	30	8	20
31–35	6	15	4	10
≥35	2	5	2	5
Mean age (SD)	25.97 (4.667)		26.35 (5.077)	
Parity	Cases ($N = 40$)	Percentage	Controls ($N = 40$)	Percentage
Primipara	16	40	15	37.5
Multipara	24	60	25	65.5
Residence	Cases ($N = 40$)	Percentage	Controls ($N = 40$)	Percentage
Rural	29	72.5	24	60
Urban	11	27.5	16	40

Table 2 Risk factors related to HCV during pregnancy

Blood transfusion	4	2	0.040	S
Dilatation & curettage	6	5	0.108	NS
Abortions	8	3	0.104	NS
Prev. Surgery	16	4	0.002	S
Dental procedure	1	NIL	0.108	NS

Table 3 Mode of delivery

VD	17	26	0.045	S
CS	23	12	0.036	S

VD vaginal delivery, *CS* cesarean section

Table 4 Neonatal Outcome

Neonatal outcome	Cases	Controls	Level of significance	Remarks
Birth weight (kg)	2.56	2.29	0.067	NS
Still birth	2	5	0.846	NS
NND	8	15	0.732	NS
Birth asphyxia	2	0	0.152	NS
NICU stay	8	15	0.732	NS
Neonatal jaundice	2	0	0.152	NS
Prematurity	6	4	0.487	NS

NND Neonatal death, *NICU* neonatal intensive care unit

Table 5 Complications of pregnancy

Pregnancy complications	Cases	Controls	*p* value	Level of significance
PIH	5	0	0.040	**S**
APH	2	0	0.020	**S**
Anemia	12	11	0.805	NS
Preterm labor	12	15	0.478	NS
Abortions	8	3	0.105	NS

are shown in Table 2. There were significantly more women who delivered by cesarean section in study group compared to control group (23 vs 12, *p* 0.036, Table 3). Neonatal outcome was similar in both groups (Table 4). Pregnancy complications i.e., Pregnancy-induced hypertension and antepartum hemorrhage were significantly higher in study group compared to control group (Table 5).

Discussion

We found the prevalence of pregnant women positive for anti-HCV antibodies to be 2.8 % in our study which is almost double the reported the prevalence of 1.03 % in a study from North India [4]. Our study also found a slightly higher rate of infection among women living in rural areas than in urban areas, though this difference was not significant among the cases and controls. Higher infection rates among rural residents may be partially explained by the higher prevalence of anemia among rural women and

differential exposure of these groups to the use of contaminated needles or syringes during treatment suggesting that parenteral exposure continues to be a major transmission route for HCV infection. Prevalence in western countries ranges from 0.14 to 4.4 % [2, 3] which is comparable to developing countries like India.

Most of the patients in our study group were multigravida. They might be at increased risk because of their past pregnancies, hospital admissions, past surgeries, obstetrical procedures, and blood transfusions. A study from Pakistan also reported more prevalence among the multigravida [7].

Major risk factors for hepatitis C include blood and component transfusion, intravenous drug use, and sexual transmission. Surgical operations, dental procedure with inadequately sterilized instruments, and reused syringes have been well-known risk factors for HCV transmission [8]. Transmission between sexual partners of persons with chronic HCV infection with no other risk factors for infection is about 5 % (range, 0–15 %) [9, 10], and rates of IVDU in HCV-positive women range from 32 to 50 % [11]. Intravenous drug abuse is the major risk factor in United States. Dental procedure is also associated with increased risk, but we found one case in our study [12]. History of surgical operation was recorded as risk factors as seen in other studies. Our study also showed that the history of previous surgery, blood transfusion, dental surgery, and history of injection are risk factors of HCV in pregnant women.

In a study from Pakistan, when previous vaginal deliveries with episiotomy, previous surgery, and D&C were taken as independent variables, only past history of surgical procedures was found to be the most important factor for transmission of hepatitis C virus infection [7]. In our study, history of previous delivery and D&C were found to be the risk factors for transmission of HCV infection. Although there were many factors associated with HCV infection in univariate analysis, multivariate analysis found only 4 independent risk factors.

Few studies of HCV and pregnancy have ascertained pregnancy outcomes. Increased risks for obstetric complications associated with HCV infection have not been noted in previous studies, but these were limited by small sample sizes [8, 9]. In present study, there were a significantly higher number of patients with pregnancy-induced hypertension and antepartum hemorrhage in study group compared to controls. Studies evaluating prematurity, however, have been contradictory; two studies found no difference in HCV-positive women while another found high rates of prematurity and spontaneous abortion in acute disease [12, 13]. However, preterm labor, premature rupture of membranes, and no of abortions were not significantly different among the groups in our study.

There is paucity of data on neonatal adverse outcome associated with maternal HCV. The literature quotes similar neonatal outcome in affected and unaffected mothers [8, 9, 13]. In our study, also there was no significant difference in birth weight, neonatal jaundice, birth asphyxia, small for gestational age babies among the study, and control group.

Pregnancy does not deteriorate HCV disease progression as there is no change in liver functions and level of viremia during pregnancy [14]. In our study, all patients had normal level of serum transaminases and total bilirubin. This observation supports the hypothesis of immune-mediated effect of pregnancy on liver cell necrosis in anti-HCV-positive women [9].

Routine antenatal HCV screening is not mandatory in India. But identification of HCV in infected pregnant women is important because of their risk of the long-term complications of infection, potential effects of infection on pregnancy, and risk of transmission to their infants [15].

In the general population, the screening for HCV is restricted to high risk groups and is not recommended for asymptomatic adults who are not at increased risk. However, if the screening was restricted to high risk group pregnant women, 35 % of those with no risk factors of HCV infection would be missed.

Conclusion

Incidence of hepatitis C virus infection is on the rise. Surgical procedures, blood transfusion, are the major risk factors for transmission, but sexual route is uncommon route of transmission. There are no identifiable risk factors in 35 % of cases. Pregnancy complications like Pregnancy-induced hypertension and antepartum hemorrhage are more common in HCV-positive mothers. Although neonatal outcome is not affected, this infection has serious long-term effects on health of both mother and child. Pregnancy does not induce the deterioration of liver function. Preventive measures include adequate sterilization of surgical instruments and intensive screening of blood and component for transfusion and mass campaign creating awareness in the public, and health workers can reduce the incidence of this infection. Universal screening of all pregnant women should be done for HCV as many patients may not have any risk factor.

Compliance with ethical requirements and Conflict of interest All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5). Informed consent was obtained from all patients for being included in the study. An ethical clearance has also been taken from the institutional ethical committee.

The authors of the article Lajya Devi Goyal, Sharanjit Kaur, Neerja Jindal and Harpreet Kaur declare that they have no conflict of interest.

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