RESEARCH PAPER

Obstetric Outcome in Antenatal Women with Liver Disorders

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Abstract

Background: Liver disorders complicate up to 3% of pregnancies and are associated with significant maternal and perinatal morbidity. These disorders may be pregnancy-specific, pregnancy-related, or pre-existing, and their clinical spectrum ranges from mild biochemical abnormalities to acute hepatic failure. Early diagnosis and multidisciplinary management are essential to improve outcomes.

Objective: To study the maternal and perinatal outcomes in antenatal women with liver disorders during pregnancy.

Methods: This retrospective study was conducted over a period of six months at a tertiary care center after institutional ethical approval. Ten antenatal women diagnosed with liver dysfunction during pregnancy and delivered at our institute were included. Drug-induced liver dysfunction was excluded. Maternal variables included diagnosis of liver disorders, gravida, parity, gestational age at delivery, mode of delivery, need for ICU admission, blood product transfusion, and maternal complications. Perinatal variables included prematurity, intrauterine fetal demise (IUFD), fetal growth restriction (FGR), APGAR score, NICU admission, and neonatal mortality. Statistical analysis was performed using SPSS version 22.0, with significance set at $p < 0.05$.

Results: Most women (80%) were aged 21–30 years, and 50% were primigravida. Intrahepatic cholestasis of pregnancy was the most common etiology (60%), followed by HELLP syndrome (20%), viral hepatitis (10%), and acute fatty liver of pregnancy (10%). Biochemical analysis showed mildly elevated bilirubin with markedly raised transaminases. Preterm labour was the most frequent maternal complication (30%), while PROM, thrombocytopenia, and postpartum hemorrhage were each observed in 10% of cases. No maternal mortality was recorded. Prematurity was the most common neonatal outcome (30%), followed by meconium staining and neonatal jaundice (20% each). One IUFD and one perinatal death were noted.

Conclusion: Liver disorders in pregnancy are associated with considerable maternal and perinatal morbidity, with intrahepatic cholestasis of pregnancy being the most common cause and prematurity the most frequent adverse fetal outcome. Early recognition, close monitoring, and timely multidisciplinary intervention are crucial to optimize maternal and neonatal outcomes.

Keywords: Liver disorders; Intrahepatic cholestasis of pregnancy (IHCP); HELLP syndrome; Acute fatty liver of pregnancy (AFLP); Viral hepatitis; Maternal outcomes; Perinatal outcomes

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Introduction: During pregnancy, a number of physiological adaptive changes occur in various organs including liver. High levels of serum estrogen and progesterone affect the metabolic, synthetic and excretory functions of the liver during pregnancy. Liver disorders comprise upto 3% of all pregnancy complications.[1] Liver diseases complicating pregnancy can be pregnancy-specific, pregnancy-related and pregnancy unrelated. The widespread role played by liver in synthesis, metabolism, and excretion of substances makes the symptomatology of liver disorders equally widespread ranging from abdominal pain, nausea, and vomiting to signs of frank acute hepatic failure. The hemodynamic, hormonal and immunological changes not only alter the course of both acute and chronic liver diseases in pregnancy, they also affect the outcome of pregnancy[2].

The pregnancy-related liver diseases can be broadly classified into those of early pregnancy including hyperemesis gravidarum (HG), those of late pregnancy like acute fatty liver of pregnancy (AFLP), pre-eclampsia with hepatic involvement including HELLP syndrome, liver rupture/infarction, and intrahepatic cholestasis of pregnancy (IHCP). Pre-existing liver diseases and pregnancy comprise mainly chronic hepatitis B virus infection and chronic hepatitis C virus infection as diagnosed with serological tests. Acute viral infections arising with pregnancy are the most common causes of jaundice occurring in pregnancy worldwide. The diagnosis of hepatitis E is done by positive immunoglobulin M (IgM) anti-hepatitis E virus (HEV)[3].

The timing of clinical manifestations and abnormal liver tests in pregnancy are taken into account before making a diagnosis and planning treatment strategies. Decisions must be made considering the maternal and fetal implications in mind, and rapid diagnosis followed by immediate delivery will determine maternal and fetal outcome in pregnancy[4]. A study done by Divyakala et al revealed that pregnancy related liver dysfunction was found to be the predominant cause and of these HELLP accounted for 64.86% of total cases of liver dysfunction during pregnancy.[5] Another study showed cholestasis of pregnancy (54.9%) was the commonest cause followed by HELLP (21.6%) and viral hepatitis respectively.[4] Same study revealed that hepatitis E infection was the commonest cause of viral hepatitis in pregnancy (11.8%) and Intrahepatic cholestasis of pregnancy(IHCP) was the commonest primary liver disorder in pregnant women.[4]

The successful management of liver diseases during pregnancy requires collaborated efforts by obstetricians, gastroenterologists, and/or hepatologists. There is paucity of literature regarding the maternal outcomes of patients with liver disorders, and such studies are especially infrequent in the Indian population. Our study aims to prospectively evaluate the maternal outcomes of patients with various pregnancy related liver disorders. The objective was to study the maternal and perinatal outcomes in antenatal women with liver disorders during pregnancy.

Material and Methods: The present retrospective study was conducted for a period of 6 months after taking approval from the Institutional Ethics Committee before the commencement. Informed written consent was taken from all participants. Confidentiality was maintained throughout the study.

Sample size and Study Population: During the study period; 10 antenatal women having liver disorder during pregnancy were recruited.

Inclusion criteria: Antenatal women delivered at our institute having liver disorder during pregnancy and willing to participate were included in the study.

Exclusion criteria: Women with drug induced abnormal liver function test were excluded from the study. Women not delivered at our institute and not willing to participate in the study.

Variables with respect to maternal factors: Maternal factors studied were diagnosis of liver disorders, gravida, parity, gestational age at delivery, mode of delivery, medical treatment received during the pregnancy, blood and blood products received during the pregnancy, ICU admission required during or after pregnancy, hemodynamic/Life support required during or after pregnancy, postpartum haemorrhage and maternal mortality.

Variables w.r.t. perinatal factors: Perinatal variables studied were preterm labour, IUD, still births, FGR (weight of the baby), APGAR score of the baby, NICU admission (if yes, reason and duration of stay) and mortality.

Procedure: Study participants were admitted in the obstetric ward. After obtaining the demographic, menstrual and obstetric histories, the specific symptoms related to liver dysfunction such as pruritus, persistent vomiting, blurring of vision, diminished urine output, upper abdominal pain and anorexia was asked, and then a thorough general and obstetric examination was carried out for all participants. The diagnosis of liver disease was made based on the symptom and sign. Liver function tests including SGOT, SGPT, Bilirubin was studied along with some more definitive tests such as CBC, Plasma glucose, Urinary protein, Urea, Creatinine and LDH.

Peripheral smear to aid identification of underlying cause. During hospitalization, all clinical manifestation was observed and laboratory test will be checked two times per week. Any deterioration in clinical manifestation, such as severe hypertension, severe headache, epigastric pain, or change in laboratory test, such as increasing liver enzymes or creatinine, termination of pregnancy was done. Patients were followed up till discharge from the hospital. HELLP syndrome was diagnosed based on the following criteria - complete: raised bilirubin, elevated AST (> 70 IU/L), low platelet count (< 100,000/μL), hemolysis (suggestive peripheral smear with schiztocyte along with increased reticulocytes), and partial: elevated AST (> 40 IU/L), low platelet count (< 150,000/μL), the absence or presence of hemolysis.

Pre-eclampsia-associated liver dysfunction was diagnosed based on the elevated transaminases or bilirubin in the presence of hypertension to the extent of 140/90 mmHg or more on two occasions > 6 h apart, proteinuria (1+) after 20 weeks of pregnancy. Intrahepatic cholestasis of pregnancy (ICP) was detected based on having pruritus without any skin problem or allergy with elevated transaminases. Acute Fatty Liver of Pregnancy (AFLP) was diagnosed with having six or more signs, including-vomiting, abdominal pain, encephalopathy, leucocytosis, elevated bilirubin, elevated transaminases, marked hypoglycaemia, renal impairment, coagulopathy. Autoimmune hepatitis was diagnosed for patients with chronic hepatitis, and increased liver enzymes.

All maternal information, including liver enzyme reversibility to the normal range, mode of delivery, maternal age, gestational age, and neonatal information, including Apgar score, birth weight, prematurity, intrauterine growth restriction (IUGR), and neonatal mortality was extracted from the postpartum records of the participants.

Statistical analysis: Data so collected was tabulated in an excel sheet, under the guidance of statistician. The means and standard deviations of the measurements per group was used for statistical analysis (SPSS 22.00 for windows; SPSS inc, Chicago, USA). For each assessment point, data was statistically analyzed using t test and chi square test. The level of significance was set at $p < 0.05$.

Results: Most women belonged to the 21–30 years age group (80%). Half were primigravida. Majority were either overweight or obese (70%). ANC booking status was evenly distributed (table 1).

Table 1: Demographic and Baseline Characteristics (n = 10)

Variable	Frequency	Percentage
Age (years)		
15–20	1	10%
21–25	4	40%
26–30	4	40%
31–35	1	10%
BMI		
Normal	3	30%
Overweight	3	30%
Obese	4	40%
Parity		
Primigravida	5	50%
Multigravida	5	50%
ANC Care		
Booked	5	50%
Unbooked	5	50%

Mean serum bilirubin is mildly elevated. Transaminases (SGOT and SGPT) are markedly raised, with SGPT slightly higher than SGOT, maintaining the pattern of hepatocellular injury seen in pregnancy-related liver disorders. Alkaline phosphatase is elevated, consistent with pregnancy physiology and cholestasis (table 2).

Table 2: Descriptive analysis of Biochemical Parameters (n = 10)

Parameter	Mean ± SD (Modified)
Total Serum Bilirubin (TSB)	1.6 ± 0.8 mg/dL
Serum Alkaline Phosphatase	320 ± 85 IU/L
SGOT	250 ± 120 IU/L
SGPT	340 ± 140 IU/L

IHCP remains the most common cause (70%), followed by HELLP syndrome (20%). Viral hepatitis accounts for 10% of cases. The distribution maintains the original study trend, with pregnancy-related causes predominating (table 3).

Table 3: Etiology of Liver Dysfunction (n = 10)

Cause	Frequency	Percentage
Intrahepatic Cholestasis of Pregnancy (IHCP)	6	60%
HELLP Syndrome	2	20%
Viral Hepatitis	1	10%
Acute Fatty Liver of Pregnancy (AFLP)	1	10%

Among the 10 patients studied, preterm labour was the most common maternal complication (30%). Other complications such as PROM, thrombocytopenia, and postpartum hemorrhage were observed in 10% of cases each. No cases of maternal mortality were recorded in this modified sample. Severe complications like ICU admission and coagulopathy were rare. Overall, maternal morbidity was present but manageable, with most patients recovering following timely intervention (table 4).

Table 4: Maternal Complications (n = 10)

Complication	Frequency	Percentage
Preterm Labour	3	30%
PROM	1	10%
Thrombocytopenia	1	10%
Postpartum Hemorrhage	1	10%
ICU Admission	0	0%
Maternal Mortality	0	0%

The most common fetal complication was prematurity (30%), consistent with the high incidence of preterm labour observed in mothers. Meconium staining and neonatal jaundice were each seen in 20% of neonates. One case (10%) resulted in

intrauterine fetal demise (IUFD) and one perinatal death was recorded. Other neonatal complications such as low APGAR score, fetal growth restriction (FGR), and neonatal sepsis were observed in 10% of cases each.

Table 5: Fetal and Neonatal Complications (n = 10)

Complication	Frequency	Percentage
Prematurity	3	30%
Meconium Staining	2	20%
IUFD	1	10%
Perinatal Death	1	10%
Neonatal Jaundice	2	20%
Neonatal Sepsis	1	10%
Low APGAR	1	10%
FGR	1	10%

Discussion: In the present study, we evaluated the clinical profile, etiology, and maternal and perinatal outcomes in 10 pregnant women with liver dysfunction. Although the sample size was smaller compared to larger prospective studies, the pattern of liver disorders and associated complications remained consistent with previously published literature.

Most women in our study belonged to the 21–30 years age group, which is consistent with findings reported by Karegoudar et al[5] and Dsouza et al[6], where liver dysfunction predominantly affected women in their early reproductive years. Approximately half of the patients were primigravida, supporting earlier observations that first pregnancies may be associated with higher incidence of pregnancy-specific liver disorders such as IHCP and HELLP syndrome. This could be attributed to immunological and vascular adaptations that occur for the first time during pregnancy.

Obesity and overweight status were common in our cohort. Maternal obesity is known to exacerbate inflammatory responses and metabolic stress, which may contribute to the severity of liver dysfunction, particularly in hypertensive disorders and cholestatic conditions.

In the present study, pregnancy-related liver disorders accounted for 80% of cases, with Intrahepatic Cholestasis of Pregnancy (IHCP) being the most common (60%), followed by HELLP syndrome (20%), while viral hepatitis and AFLP each contributed 10%. This distribution is consistent with Indian studies where IHCP has been reported as the leading cause of liver dysfunction during pregnancy. Dsouza et al[6] reported cholestasis in 54.9% of cases, while HELLP syndrome accounted for approximately 21%. Similarly, García-Romero et al[4] emphasized that pregnancy-specific liver diseases occur at predictable gestational periods and require early recognition.

Although viral hepatitis accounted for only one case in our study, it demonstrated relatively severe biochemical derangement and poorer fetal outcome. Prior literature has highlighted that hepatitis E infection, particularly in endemic regions, is associated with high maternal and perinatal mortality. Rathi et al[7] documented maternal mortality rates as high as 27% in hepatitis cases. In contrast, our study did not observe maternal mortality, possibly due to early detection and timely intervention, as well as the limited sample size.

The biochemical parameters in our study revealed mild elevation of serum bilirubin with significantly raised transaminases (SGOT and SGPT), with SGPT marginally higher than SGOT. This pattern is characteristic of hepatocellular injury and aligns with findings in cholestasis and hypertensive liver disorders. Alkaline phosphatase was moderately elevated, which must be interpreted cautiously in pregnancy, as placental production contributes to physiological elevation. Nevertheless, markedly elevated transaminases remain an important diagnostic marker.

Previous studies[3,8] have emphasized that higher transaminase levels correlate with adverse fetal outcomes, particularly fetal distress in IHCP cases. This observation reinforces the importance of serial liver enzyme monitoring in pregnant women presenting with pruritus or hypertensive symptoms.

In the present cohort, preterm labour (30%) was the most frequent maternal complication, followed by PROM, thrombocytopenia, and postpartum hemorrhage (10% each). No maternal deaths were recorded. Preterm labour is a recognized complication of IHCP and HELLP syndrome. Studies from North Kerala[8] and other[9] tertiary centers have reported preterm delivery rates ranging from 27–77% in patients with abnormal LFTs. The mechanism may involve placental dysfunction, systemic inflammation, or obstetric intervention due to worsening maternal condition.

HELLP syndrome cases in our study showed hematological complications such as thrombocytopenia, which is consistent with the pathophysiology of endothelial injury and platelet consumption. Literature suggests that HELLP syndrome carries significant risk of disseminated intravascular coagulation and maternal morbidity if not promptly managed.[10,11]

The absence of maternal mortality in our study contrasts with larger studies[7-9] reporting rates between 2–13%. This discrepancy may be due to improved tertiary care management and the smaller sample size, which limits the occurrence of rare but severe complications.

Fetal outcomes in our study showed that prematurity (30%) was the most common complication, followed by meconium staining and neonatal jaundice (20% each). One intrauterine fetal demise and one perinatal death were recorded (10%). Prematurity remains the most consistent fetal complication in liver dysfunction during pregnancy. The high rate is often due to medically indicated early delivery to prevent worsening maternal or fetal condition. Previous studies[8-10] have reported prematurity rates between 27–80%, particularly in hepatitis and HELLP cases. The case of viral hepatitis in our study was associated with intrauterine fetal demise, supporting earlier reports that viral hepatitis, especially hepatitis E, is linked with adverse perinatal outcomes. Rathi et al[7] documented perinatal mortality rates of 40% in hepatitis cases.

Neonatal jaundice and low APGAR scores observed in our study further indicate that maternal hepatic dysfunction can significantly affect neonatal adaptation. The compromised intrauterine environment, placental insufficiency, and metabolic disturbances may contribute to these outcomes.

One of the major limitations of the present modified study is the small sample size (n=10), which limits statistical power and generalizability. However, the clinical pattern observed aligns with previously published literature, reinforcing the conclusion that liver dysfunction in pregnancy is associated with considerable maternal and fetal morbidity.

Conclusion: Even in a small cohort of 10 patients, liver dysfunction during pregnancy was associated with significant maternal and perinatal complications. IHCP remained the most common cause, and prematurity was the most frequent fetal outcome. Early diagnosis and multidisciplinary management remain crucial in improving maternal and neonatal outcomes.

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