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Pregnancy Outcome in Non-Cirrhotic Portal Hypertension

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Abstract

Background: Non-cirrhotic portal hypertension (NCPH) is an uncommon but clinically significant condition encountered during pregnancy. Although hepatic function is generally preserved, pregnancy in women with NCPH is associated with an increased risk of maternal and fetal complications due to portal hypertension and hyper splenism. Advances in multidisciplinary management have improved pregnancy outcomes; however, evidence from Indian tertiary care centres remains limited.

Objectives: To evaluate the maternal, fetal, and neonatal outcomes of pregnancies complicated by non-cirrhotic portal hypertension managed at a tertiary care centre.

Methods: A retrospective observational study was conducted in the Department of Obstetrics and Gynaecology in collaboration with the Department of Medical Gastroenterology at Raichur Institute of Medical Sciences, Karnataka, India. Pregnant women diagnosed with NCPH and managed between January 2021 and June 2026 were included. Clinical, obstetric, maternal, and neonatal data were retrieved from hospital records and analysed using SPSS version 26.0. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequencies and percentages.

Results: Twenty pregnant women with NCPH were included. The mean maternal age was 26.8 ± 3.7 years, and the mean gestational age at delivery was 37.4 ± 2.1 weeks. Splenomegaly was present in all women, while thrombocytopenia and anaemia occurred in 85% and 70% of pregnancies, respectively. Variceal bleeding occurred in 10% of women, preterm labour in 20%, mild preeclampsia in 10%, and postpartum haemorrhage in

15%. No maternal deaths were recorded. Neonatal outcomes were generally favourable, with low birth weight observed in 30% of neonates, respiratory distress syndrome in 20%, hyper bilirubinaemia in 15%, transient tachypnoea of the newborn in 10%, and hypoxic-ischemic encephalopathy in 5%. Most pregnancies resulted in successful maternal and neonatal outcomes.

Conclusion: Pregnancy in women with non-cirrhotic portal hypertension remains high risk because of complications related to portal hypertension and hyper splenism. Nevertheless, favourable maternal and neonatal outcomes can be achieved with early diagnosis, regular antenatal surveillance, multidisciplinary management, and delivery at a tertiary care centre.

Keywords: Non-Cirrhotic Portal Hyper Tension, Pregnancy, Extra Hepatic Portal Vein Obstruction, Maternal Outcome, Neonatal Outcome, Portal Hyper Tension, Thrombocytopenia, Variceal Bleeding.

Introduction

Non-cirrhotic portal hypertension (NCPH) is an important cause of portal hypertension in developing countries, particularly in South Asia, where extra hepatic portal vein obstruction (EHPVO) and non-cirrhotic portal fibrosis (NCPF) constitute the predominant etiologies. Unlike cirrhosis, hepatic synthetic function is generally preserved in NCPH, allowing maintenance of normal fertility and making pregnancy increasingly common in affected women.[1] Despite preserved liver function, pregnancy in women with NCPH remains a high-risk clinical condition because physiological increases in plasma volume, cardiac output, and portal venous blood flow during pregnancy may exacerbate portal hypertension, increasing the risk of variceal hemorrhage, hyper splenism, thrombocytopenia, anemia, and other maternal complications.[1–3]

Historically, pregnancy in women with portal hyper tension was associated with considerable maternal and fetal morbidity and mortality, primarily due to gastro intestinal hemorrhage and postpartum hemorrhage.[4] However, advances in multidisciplinary obstetric care, endoscopic surveillance, prophylactic endoscopic variceal ligation, non-selective beta-blocker therapy, improved anesthetic techniques, and neonatal intensive care have substantially improved pregnancy outcomes over the past two decades. Consequently, pregnancy is no longer considered an absolute contraindication in women with well-compensated NCPH when managed at tertiary care centres by a multidisciplinary team.[2,4,5]

The largest systematic review and meta-analysis evaluating pregnancy outcomes in women with NCPH demonstrated low maternal mortality despite persistent maternal and fetal morbidity. The pooled incidence of variceal bleeding, postpartum hemorrhage, preterm birth, low birth weight, and neonatal intensive care unit admission were reported as 9.6%, 4.7%, 21.6%, 18.7%, and 15.5%, respectively, highlighting the need for vigilant antenatal surveillance and individualized management.[6] Similarly, recent cohort studies from India and Europe have reported favorable maternal survival with low rates of variceal bleeding when women undergo preconception optimization, regular antenatal monitoring, and timely endoscopic intervention.[3,7,8] These studies also emphasize that cesarean delivery should be reserved for obstetric indications rather than portal hypertension alone, while careful management of thrombocytopenia and coagulopathy remains essential to minimize hemorrhagic complications.[2,7,9]

Although the available literature suggests encouraging maternal and neonatal outcomes, most published studies comprise retrospective single-centre experiences with relatively small sample sizes, and evidence from developing countries remains limited. Furthermore, variations in disease etiology, antenatal management, timing of diagnosis, and access to specialized hepatology services contribute to heterogeneity in reported outcomes.[6] Therefore, the present study was undertaken to evaluate the maternal and neonatal outcomes of pregnancies complicated by non-cirrhotic portal hypertension at a tertiary care centre and to compare the findings with existing published literature.

Material and Methods

A retrospective observational study was conducted in the Department of Obstetrics and Gynaecology in collaboration with the Department of Medical Gastroenterology at Raichur Institute of Medical Sciences (RIMS), Raichur, Karnataka, India. The study included pregnant women with non-cirrhotic portal hypertension (NCPH) who received antenatal care and delivered at the institute between January 2021 and June 2026. Institutional Ethics Committee approval was obtained before commencement of the study.

All consecutive pregnant women diagnosed with NCPH during the study period who fulfilled the eligibility criteria were included. A total of 20 women constituted the study population. Pregnant women diagnosed with NCPH either before conception or during the index pregnancy, who were managed and delivered at the study centre and had complete medical records, were included in the analysis. Women with portal hypertension secondary to liver cirrhosis, chronic liver disease, hepatic malignancy, or other causes of cirrhotic portal hypertension, as well as those with incomplete clinical records, were excluded.

The diagnosis of NCPH was established based on clinical assessment, laboratory investigations, abdominal Ultrasonography with Doppler examination, and upper gastrointestinal endoscopy. Ultrasonography was used to identify portal vein abnormalities, including portal vein thrombosis, portal cavernoma, or portal vein fibrosis, while upper gastrointestinal endoscopy was performed to evaluate the presence and grade of oesophageal or gastric varices. Clinical features such as splenomegaly, hyper splenism, ascites, and previous episodes of variceal bleeding were also considered during diagnosis. Patients with radiological or clinical evidence of liver cirrhosis or parenchymal liver disease were excluded.

Data were retrieved retrospectively from inpatient case records, antenatal records, labour room registers, operation theatre records, neonatal intensive care unit (NICU) records, and the Medical Gastroenterology department database using a predesigned data collection proforma. Maternal demographic characteristics, including age, gravidity, parity, gestational age at diagnosis, gestational age at delivery, and booking status, were recorded. Clinical variables included the etiology of NCPH, presenting symptoms, history of variceal bleeding, endoscopic findings, splenomegaly, ascites, haematological parameters, liver function tests, and treatment received, including non-selective beta-blockers, endoscopic variceal ligation, blood component transfusion, and other supportive measures.

Maternal outcomes assessed included variceal bleeding during pregnancy, thrombocytopenia requiring platelet transfusion, anaemia requiring blood transfusion, hypertensive disorders of pregnancy, antepartum haemorrhage, mode of delivery, postpartum

haemorrhage, intensive care unit admission, maternal complications, and maternal mortality.

Fetal and neonatal outcomes included gestational age at birth, birth weight, Apgar scores at one and five minutes, preterm birth, fetal growth restriction, neonatal intensive care unit admission, respiratory distress syndrome, neonatal hyperbilirubinaemia, hypoxic - ischaemic encephalopathy, stillbirth, and neonatal mortality. The primary outcome measures were maternal and fetal/neonatal outcomes among women with NCPH.

The collected data were entered into Microsoft Excel and analysed using the Statistical Package for the Social Sciences (SPSS) software, version 22.0. Continuous variables were expressed as mean ± standard deviation (SD) , while categorical variables were presented as frequencies and percentages. Patient confidentiality was maintained throughout the study by anonymi sing all personal identifiers, and the data were used solely for research purposes in accordance with institutional ethical guidelines.

Results

A total of 20 pregnant women with non-cirrhotic portal hypertension were included in the study. The mean maternal age was 26.8 ± 3.7 years, and the mean gestational age at delivery was 37.4 ± 2.1 weeks. Primigravidae constituted a slight majority of the study population (55.0%), while 45.0% were multigravidae. Thirteen women (65.0%) had been diagnosed with non-cirrhotic portal hypertension prior to pregnancy, whereas the diagnosis was established during the current pregnancy in seven (35.0%) women. The mean neonatal birth weight was 2.71 ± 0.46 kg. (Table 1)

Splenomegaly was the most common clinical mani festation at the time of diagnosis, being observed in 50.0% of the patients, followed by variceal bleeding in 40.0%. Thrombocytopenia and anaemia were present in 35.0% and 30.0% of women, respectively, while abdominal pain was reported in 15.0%. As several patients presented with more than one clinical feature, the cumulative percentages exceeded 100%. (Table 2)

Splenomegaly was present throughout pregnancy in all women (100.0%). Thrombocytopenia was the most frequent hematological complication, affecting 85.0% of patients, followed by anaemia in 70.0%. Variceal bleeding during pregnancy occurred in 10.0% of women. Mild preeclampsia was observed in 10.0%, while preterm labour complicated 20.0% of pregnancies. Multiple complications were documented in several patients during the antenatal period. (Table 3)

The majority of women (80.0%) had an uncomplicated postpartum course. Postpartum haemorrhage occurred in 15.0% of patients and was managed conservatively with appropriate medical treatment and blood transfusion where indicated. One patient (5.0%) developed ascites associated with pleural effusion during the postnatal period and recovered following appropriate supportive management. No maternal deaths were recorded during the study period. (Table 4)

Overall fetal and neonatal outcomes were favourable. Low birth weight was the most common neonatal complication, occurring in 30.0% of newborns, followed by meconium-stained liquor (25.0%) and respiratory distress syndrome (20.0%). Hyper bilirubinemia was observed in 15.0% of neonates, whereas transient tachypnoea of the newborn occurred in 10.0%. Hypoxic ischemic encephalopathy was documented in one neonate (5.0%). Since some neonates experienced more than one complication, the cumulative frequencies exceeded the total number of births. (Table 5)

Table 1: Demographic Characteristics (n = 20)

Characteristic	Number (%)
Mean age	26.8 ± 3.7 years
Mean gestational age at delivery	37.4 ± 2.1 weeks
Parity	
Primigravida	11 (55.0)
Multi gravida	9 (45.0)
Cases diagnosed during pregnancy	7 (35.0)
Cases diagnosed prior to pregnancy	13 (65.0)
Mean birth weight	2.71 ± 0.46 kg

Table 2: Clinical Manifestations at Diagnosis (n = 20*)

Clinical manifestation	Number (%)
Variceal bleed	8 (40.0)
Splenomegaly	10 (50.0)
Thrombocytopenia	7 (35.0)
Anaemia	6 (30.0)
Pain abdomen	3 (15.0)

*More than one clinical manifestation was present in some patients.

Table 3: Complications During Pregnancy (n = 20*)

Complication	Number (%)
Splenomegaly	20 (100.0)
Thrombocytopenia	17 (85.0)
Anaemia	14 (70.0)
Variceal bleed	2 (10.0)
Mild preeclampsia	2 (10.0)
Preterm labour	4 (20.0)

*Some patients experienced more than one complication.

Table 4: Complications During Postnatal Period (n = 20)

Complication	Number (%)
Postpartum haemorrhage	3 (15.0)
Ascites with pleural effusion	1 (5.0)
No complication	16 (80.0)

Table 5: Fetal and Neonatal Outcomes (n = 20*)

Fetal/Neonatal complication	Number (%)
Me conium-stained liquor	5 (25.0)
Respiratory distress syndrome (RDS)	4 (20.0)
Low birth weight	6 (30.0)
Hyperbilirubinemia	3 (15.0)
Transient tachypnoea of newborn (TTN)	2 (10.0)
Hypoxic ischemic encephalopathy (HIE)	1 (5.0)

*Some neonates had more than one complication.

Discussion

The present study demonstrates that favourable maternal and neonatal outcomes can be achieved in pregnancies complicated by non-cirrhotic portal hypertension (NCPH) with multidisciplinary management at a tertiary care centre. Although maternal complications related to portal hypertension and hyper splenism were common, no maternal mortality was observed, consistent with recent evidence suggesting that pregnancy is no longer contraindicated in women with well-compensated NCPH managed by experienced multidisciplinary teams. [4–8]

The mean maternal age in our cohort (26.8 ± 3.7 years) was comparable to previous Indian studies by Jacob et al. (24.3 years) and Sandya et al. (25.5 years), reflecting the predominance of NCPH among young women of reproductive age with preserved hepatic function.[2,9] Unlike cirrhosis, fertility is generally maintained in NCPH because hepatic synthetic function remains intact, explaining the increasing number of successful pregnancies reported in recent years.[1]

Splenomegaly, thrombocytopenia and anaemia were the predominant maternal manifestations in our study. Splenomegaly was present in all women, while thrombocytopenia and anaemia affected 85% and 70% of patients, respectively. Similar observations have been reported by Jacob et al., who documented splenomegaly in 78.5% and thrombocytopenia in 60.7% of pregnancies, while Sandya et al. observed these abnormalities in nearly all patients.[2,9] These findings reflect hypersplenism secondary to portal hypertension and emphasise the importance of regular haematological surveillance and timely correction of cytopenias during pregnancy.

Variceal bleeding remains the most serious maternal complication of NCPH because pregnancy-related Haemodynamic changes increase portal venous pressure. In our study, variceal bleeding occurred in 10% of women, which closely corresponds with the pooled incidence of 9.6% reported in the recent systematic review and meta-analysis by Giri et al.[6] The relatively low incidence compared with historical studies is likely attributable to improved antenatal care, routine endoscopic surveillance, prophylactic endoscopic variceal ligation and beta-blocker therapy before or during pregnancy.[2,5,6]

Preterm labour occurred in 20% of pregnancies in our cohort, comparable to the pooled preterm birth rate of 21.6% reported by Giri et al.[6] and lower than the 35.7% reported by Jacob et al.[2] Hypertensive disorders were uncommon, with mild preeclampsia occurring in only 10% of women, consistent with previous reports

indicating that pregnancy-induced hypertension is not directly related to portal hypertension.[6]

Postpartum haemorrhage occurred in 15% of women in the present study. Although this was higher than the pooled estimate of 4.7% reported in the meta-analysis,[6] all cases were managed successfully with uterotonics and blood component therapy without major morbidity. The relatively higher incidence may be explained by the high prevalence of thrombocytopenia and hypersplenism in our cohort. Similar favourable maternal outcomes despite postpartum haemorrhage have been described in other Indian series.[2,9] Importantly, no maternal deaths occurred, in agreement with recent multicentric studies and systematic reviews demonstrating that maternal mortality has become exceedingly rare with contemporary multidisciplinary management.[2,3,6]

Neonatal outcomes were generally favourable. Low birth weight was the most frequent neonatal complication (30%), followed by respiratory distress syndrome (20%) and hyperbilirubinaemia (15%). These findings are comparable with previous reports demonstrating an increased risk of prematurity and low birth weight in pregnancies complicated by NCPH.[2,6] Jacob et al. similarly reported high rates of preterm birth and neonatal intensive care admission, largely attributable to prematurity rather than severe neonatal compromise.[2] The absence of neonatal mortality in our study further supports the improving perinatal outcomes reported in recent literature.

The mode of delivery should continue to be guided by obstetric indications rather than portal hypertension alone. Previous studies have consistently shown no advantage of routine caesarean section in women with stable portal hypertension, and operative delivery may increase the risk of haemorrhage in thrombocytopenic patients.[2,4,6,9] Therefore, careful in dividualisation of the delivery plan remains essential.

The favourable outcomes observed in our study are likely attributable to early diagnosis, antenatal endoscopic surveillance, optimisation of haematological parameters, availability of blood products and coordinated multidisciplinary care involving obstetricians, gastroenterologists, anesthesiologists and neonatologists.

These findings reinforce current evidence that pregnancy in women with well-compensated NCPH can be successfully managed in specialised tertiary centres.

The present study is limited by its retrospective design and relatively small sample size, which may limit generalisability. Nevertheless, it adds valuable data from an Indian tertiary care centre and supports the growing evidence that favourable maternal and neonatal outcomes are achievable with appropriate multidisciplinary management.

In conclusion, pregnancies complicated by non-cirrhotic portal hypertension remain high-risk because of thrombocytopenia, anaemia and portal hypertension-related complications. However, maternal mortality is extremely low, and favourable fetal outcomes are achievable with preconception counselling, antenatal endoscopic surveillance, multidisciplinary care and delivery in tertiary care centres. These findings are consistent with contemporary evidence and support an individualized approach to pregnancy management in women with NCPH. [2, 3, 6, 7]

Conclusion

Pregnancy in women with non-cirrhotic portal hypertension remains a high-risk condition because of complications related to portal hypertension, hyper splenism, thrombocytopenia, and anaemia. However, the

present study demonstrated that favourable maternal and neonatal outcomes can be achieved with timely diagnosis, close antenatal surveillance, multidisciplinary management, and delivery at a tertiary care centre. Although maternal complications such as variceal bleeding, preterm labour, and postpartum haemorrhage were encountered, they were successfully managed without maternal mortality. These findings support an individualized approach to pregnancy management in women with non-cirrhotic portal hypertension and emphasize the importance of coordinated care involving obstetricians, gastroenterologists, anesthesiologists, and neonatologists.

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