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Pregnancy Outcomes in Cirrhosis: A Focus on Hypersplenism

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Abstract **Original Research Article**

Introduction: Pregnancy in cirrhotic patients is rare due to endocrine disorders from chronic liver disease, which significantly reduce fertility. Cirrhosis during pregnancy also increases maternal and fetal risks. This study aimed to assess pregnancy outcomes in cirrhotic patients at our hepatology unit and investigate the impact of hypersplenism on these outcomes. ***Methods:*** This retrospective observational study was conducted from January 2014 to September 2024. Women diagnosed with cirrhosis (prior to pregnancy or during the first trimester) based on hepatic elastography or liver biopsy, and who received consistent prenatal and gastrointestinal care at our medical center, were included. Women with chronic liver disease without cirrhosis or irregular follow-up were excluded. Cases were divided into two groups: successful pregnancies and those resulting in fetal loss. Data were analyzed using Jamovi version 2.0.0.0 software. Qualitative data were reported as counts and percentages, and quantitative data as median (IQR) or mean (± standard deviation). ***Results:*** Nine pregnancies in cirrhotic patients were included. The median age was 27 years (range:26-31). Two pregnancies were successful, with thrombocytopenia, splenomegaly, and grade I esophageal varices in both cases. These were complicated by late prematurity, with instrumental vaginal delivery to minimize risks. Seven pregnancies resulted in fetal loss (median age: 29 years, range: 24-37). Obstetric complications included early and late spontaneous abortions, HELLP syndrome, and intrauterine fetal death. No maternal deaths occurred. ***Conclusion:*** This study underscores the challenges in managing pregnancies in cirrhotic women, particularly the role of hypersplenism, and highlights the need for careful monitoring and individualized care.

Keywords: pregnancy; cirrhosis; hypersplenism; pregnancy outcomes.

INTRODUCTION

Cirrhosis is a progressive liver disease characterized by fibrosis and the loss of normal hepatic architecture, often resulting in compromised liver function and a range of systemic complications [1]. Despite its high morbidity and mortality, pregnancy in women with cirrhosis remains a relatively rare occurrence, which is likely due to the low prevalence of cirrhosis in women of reproductive age and the reduced fertility associated with cirrhosis in women. The incidence of cirrhosis in pregnancy is estimated to be approximately 1 in 5,950 pregnancies, and women with pre-existing cirrhosis face increased risks for both maternal and fetal complications [2,3].

Pregnancy in cirrhotic patients is associated with unique challenges. The endocrine disturbances resulting from liver dysfunction such as altered levels of sex hormones, insulin resistance, and coagulopathy can significantly affect fertility and pregnancy outcomes [4].

Additionally, complications like portal hypertension, esophageal varices, ascites, and hypersplenism further complicate the management of pregnancy in these women. Hypersplenism, characterized by splenomegaly and decreased platelet count due to increased sequestration of blood cells in the spleen, is a common manifestation in cirrhosis [5]. The presence of hypersplenism has been hypothesized to influence pregnancy outcomes, potentially contributing to spontaneous abortions, preterm labor, and fetal growth restrictions. The role of hypersplenism in influencing pregnancy outcomes remains an area of limited study. While some reports suggest that splenomegaly and thrombocytopenia are associated with increased risk of

adverse outcomes in cirrhotic pregnancies, the exact mechanisms remain unclear [6].

The aim of this study was to assess pregnancy outcomes in patients with cirrhosis within our hepatology unit and to investigate the impact of hypersplenism on these outcomes.

METHODS

Patient Selection and Study Design

This study is a retrospective, observational cohort study conducted over a ten-year period, from January 2014 through September 2024. It falls under the category of epidemiological research, aiming to describe pregnancy outcomes in women diagnosed with liver cirrhosis and to explore the potential influence of hypersplenism on these outcomes.

Participants were selected based on clearly defined eligibility criteria. Inclusion was limited to women who had a confirmed diagnosis of cirrhosis either prior to conception or during the first trimester of pregnancy. The diagnosis of cirrhosis was established through the evaluation of hepatic tissue stiffness using elastography or confirmed by liver biopsy. Furthermore, only those patients who underwent both gastrointestinal and obstetric consultations at our medical facility were considered. Continuous and consistent prenatal care, beginning within the first trimester and maintained throughout the pregnancy, was also a prerequisite for inclusion in the study.

Exclusion criteria were set to eliminate confounding factors and ensure a more homogeneous study population. Women who had other forms of chronic liver disease that did not meet the criteria for cirrhosis were excluded. In addition, patients who failed to attend regular follow-up appointments, either for gastrointestinal or prenatal care, were also not considered for inclusion in the analysis.

The study population was subsequently divided into two distinct cohorts based on pregnancy outcomes. The first group included women whose pregnancies resulted in successful live births. The second group consisted of cases that ended in fetal loss.

The study was conducted following the guidelines outlined in the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist.

Data Collection

Patient medical records were thoroughly reviewed retrospectively to extract both demographic and clinical information relevant to the study. Laboratory data—including biochemical and hematological parameters—were obtained at the end of the first trimester of pregnancy to provide a consistent time point for comparison.

In addition to laboratory investigations, imaging and endoscopic evaluations were performed. Spleen size was measured using abdominal ultrasound, and the presence of ascites was noted at the same time, at the conclusion of the first trimester of pregnancy. Furthermore, in accordance with clinical guidelines, all patients underwent an esophagogastroduodenoscopy (EGD) during the second trimester to screen for the presence and severity of esophageal varices, a common complication associated with portal hypertension in cirrhotic patients.

Outcome Measurements

The primary aim of this study was to assess maternal and fetal outcomes in pregnant women affected by liver cirrhosis. A secondary objective was to analyze the potential impact of hypersplenism—manifesting through splenomegaly and thrombocytopenia—on pregnancy outcomes, including fetal viability and complications.

Statistical Analysis

All statistical analyses were performed using Jamovi software, version 2.0.0.0. Baseline characteristics of the study participants were summarized separately for each group using descriptive statistical methods. Categorical variables were reported as frequencies and percentages, while continuous variables were expressed as means with corresponding standard deviations (mean ± SD).

Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki and was approved by our local scientific committee on February 13th, 2024 at Mohammed V Military Teaching Hospital in Rabat. Written informed consent was obtained from all participants prior to their inclusion in the study.

RESULTS

A total of nine pregnancies in patients with cirrhosis were identified during the study period. The median age of the patients was 27 years [26-31]. The cases were categorized into two groups: the first group consisted of successful pregnancies, while the second group included pregnancies that resulted in fetal loss. Patients' characteristics are resumed in table 1.

In the first group, there were two cases. The patients, aged 26 and 27 years, both presented with thrombocytopenia (platelet count: 80,000/mm^3), splenomegaly (14cm) on abdominal ultrasound, and grade I esophageal varices under primary prophylaxis. The Child-Pugh score was A5 in one case and A7 in the other. Both pregnancies were complicated by late prematurity. Instrumental vaginal delivery was performed in both cases to minimize pushing efforts and

reduce the risk of bleeding and other complications, including those associated with laparotomy in cirrhotic patients.

In the second group, the median age was 29 years [24-37]. The median platelet count was 24857 elements/mm3 [17000-30000]. On abdominal ultrasound, the mean size of the spleen was 20 ± 1.46cm. Two cases were on secondary prevention and five cases had grade II esophageal varices without red signs and were receiving on primary prophylaxis. We evaluated the Child-Pugh score at the end of the first trimester of pregnancy and found: one case A6, two cases B9, two cases C10, one case C11. Obstetrically, we recorded four early spontaneous abortions, two late spontaneous abortions (one of which was complicated by HELLP Syndrome) and one case of in utero fetal death.

No maternal deaths were recorded in our cohort.

Table 1: Patients' characteristics

	GROUP 1 (n=2)	**GROUP 2 (n=7)**
Median age	26 years	29 years [24-37]
Platelet count	80 000 elements/mm3	24 857 elements/mm3 [17000-30000]
splenomegaly	14 cm	20 ± 1.46cm
Esophageal varices	grade I esophageal varices under primary prevention	Two cases were on secondary prevention and five cases had grade II VO without red signs on primary prevention
Child-Pugh Score	one case A5, one case A7	one case A6, two cases B9, two cases C10, one case C11
complications	late prematurity	four early spontaneous abortions, two late spontaneous abortions (including one case of HELLP Syndrome) one case of fetal death in utero
Mode of delivery	instrumental vaginal delivery	-

DISCUSSION

Hypersplenism is characterized by the excessive and premature sequestration of platelets in an enlarged spleen, which can lead to thrombocytopenia [7]. The results of our study highlight the impact of liver disease on maternal and fetal outcomes, and the influence of hypersplenism as a potential independent factor influencing the success of these pregnancies. Platelets play a crucial role in clot formation, which is essential for maintaining placental attachment and preventing bleeding at the implantation site. Low platelet counts can result in inadequate placental perfusion, increasing the risk of complications such as spontaneous abortion or fetal growth restriction. Pregnancy itself induces hypercoagulability, and when combined with the underlying coagulopathy associated with cirrhosis, this further heightens the risk of miscarriage [8].

Portal vein flow, which significantly increases during pregnancy, is responsible for the worsening of portal hypertension [9]. It can also have a detrimental effect on overall circulation, including uterine blood flow, which is vital for both the establishment and maintenance of pregnancy. Insufficient uterine blood flow can compromise placental development and function, leading to early pregnancy loss and other obstetric complications such as preeclampsia, intrauterine growth restriction and fetal death in utero [8].

Splenomegaly may restrict the growth and expansion of the uterus, impair placental blood flow, or alter maternal hemodynamics, all of which could contribute to poor pregnancy outcomes. The potential for pregnancy loss, preeclampsia, and intrauterine fetal death in cirrhotic patients with hypersplenism further emphasizes the need for targeted clinical management strategies [10].

Diminished liver function can lead to endocrine imbalances, further impairing pregnancy and contributing to miscarriage. In terms of liver function, the Child-Pugh scores at the end of the first trimester were notably higher in the second group. Studies have shown that more advanced liver disease, as indicated by a higher Child-Pugh and Meld scores, is associated with worse pregnancy outcomes, including preterm birth, spontaneous abortion, and fetal growth restriction [11,12]. The relatively lower Child-Pugh scores in the successful pregnancy group (A5 and A7) suggest that women with less severe liver dysfunction may have a higher chance of successful pregnancy outcomes.

It is true that no maternal deaths were recorded in our study, however, maternal mortality in cirrhotic pregnancies, though rare, is significantly higher compared to the general population [3].

The decision to opt for instrumental vaginal delivery in our patients is supported by evidence suggesting that vaginal delivery is preferred when the fetus is viable, to avoid the risks of bleeding, infection and poor wound healing associated with cesarean sections in cirrhotic patients [8,13]. Additionally, the decision to reduce pushing efforts and to use forceps or vacuum extraction is primarily related to the increased intra-abdominal pressure during the second stage of

labor. The repeated Valsalva maneuvers can exacerbate the risk of variceal rupture and bleeding [14].

Up to 30% of pregnant women with cirrhosis experience bleeding from esophageal varices, with the risk escalating to 50–78% in the presence of pre-existing varices. The American College of Gastroenterology recommends screening for esophageal varices is in the second trimester, after the completion of organogenesis in the first trimester and before the increased risk of bleeding during delivery [15].

Consequently, pregnant women with cirrhosis should be managed in a multidisciplinary environment, with coordination between maternal-fetal specialists and gastroenterology/hepatology specialists.

CONCLUSION

The results of this study underscore the challenges faced in managing pregnancies in women with cirrhosis. Hypersplenism, as evidenced by thrombocytopenia and splenomegaly, appears to play a significant role in the adverse pregnancy outcomes observed, especially in patients with more advanced liver disease. The findings are consistent with the literature, which highlights the importance of careful monitoring and tailored management of cirrhotic pregnancies to improve maternal and fetal outcomes. Further research with larger cohorts is needed to better understand the mechanisms behind these outcomes and optimize management strategies.

Conflict of Interest:

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Consent To Participate:

The study was conducted in accordance with the Declaration of Helsinki and was approved by our local scientific committee on February 13th, 2024 at Mohammed V Military Teaching Hospital in Rabat. Written informed consent was obtained from all participants prior to their inclusion in the study.

Availability of Data and Materials:

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Authors' Contributions:

Dr BENASS conceptualized the study, designed the methodology, performed data analysis, and wrote the initial manuscript draft. All authors contributed to patient recruitment, data collection and manuscript revision. Dr TAMZAOURTE reviewed the study design, supervised the data collection and approved the final manuscript.

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