

Severe dengue in obstetric patients: A two-year analysis of critical complications and maternal-fetal outcomes in a general hospital in Mazatlán, Mexico

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Abstract

Introduction: Dengue infection represents a growing threat to maternal health in endemic regions, with potential progression to severe disease and critical complications during pregnancy.

Objective: To determine the prevalence, severity, and maternal-fetal outcomes of dengue infection in pregnant and postpartum women.

Materials and methods: A retrospective observational study was conducted, including 79 obstetric patients with serologically confirmed dengue infection at a general hospital in Mazatlán, Mexico, between 2023 and 2024. Clinical features, laboratory parameters, disease severity (World Health Organization [WHO] classification), and outcomes were analyzed.

Results: Hospital prevalence was 2.1%. Severe

dengue occurred in 8.8% of cases, and 18.9% presented warning signs, with the highest frequency in the third trimester (49.4%). Laboratory findings showed moderate thrombocytopenia (mean 120,270/ μ l; nadir 9,000/ μ l) and significant elevations of aspartate aminotransferase (AST) and lactate dehydrogenase (LDH), indicating systemic involvement. Obstetric hemorrhage occurred in 8.9% of patients. The cesarean rate was 50.6%, mainly due to fetal distress. Maternal mortality was 2.5%, with a near-miss rate of 3.8%.

Conclusion: Dengue in pregnancy carries a significant risk of critical complications. Early recognition, biomarker-based risk stratification, and timely critical care management are essential to improve outcomes.

Keywords: Dengue, pregnancy, severe dengue, critical care, maternal outcomes.

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Introduction

Dengue virus (DENV) infection has become a critical threat to obstetric safety worldwide, especially in tropical and subtropical regions. (1) In Mexico, the epidemiological panorama has undergone a drastic change. At the end of 2023, confirmed cases increased by 340% compared to the previous year, with a significant proportion of cases categorized as severe dengue. (2) This escalation is particularly alarming in the obstetric population, where DENV infection is associated with up to a 451-fold increase in the risk of maternal death and a significantly higher incidence of severe postpartum hemorrhage. (3,4)

From a critical care perspective, physiological adaptations of pregnancy such as increased plasma volume, basal tachycardia, and gestational thrombocytopenia create a "mask effect" that complicates

early clinical recognition of plasma leakage and hemodynamic instability. (5) The transition from dengue with warning signs to severe dengue is characterized by a rapid systemic inflammatory response, leading to capillary leak syndrome, ascites, and pleural effusion, which can culminate in refractory shock and multiple organ failure. (6,7)

In addition, the impact extends to the feto-placental unit. The virus-induced pro-inflammatory cytokine storm can trigger placental abruption, fetal distress, and preterm delivery, frequently forcing clinicians to make high-risk decisions about terminating pregnancy in a context of severe coagulopathy. (8,9)

Despite their clinical relevance, there is a paucity of data on the specific behavior of dengue markers—such as lactic dehydrogenase (LDH) and transaminases as predictors of critical outcomes in the Mexican obstetric population. (10)

The present study aimed to identify the prevalence and clinical complications of dengue in pregnant and postpartum women in a high-incidence center in Mazatlán, Sinaloa, providing essential information for the hemodynamic management and triage of critically ill obstetric patients.

Materials and methods

Non-probabilistic convenience sampling was used. Quantitative cross-sectional, retrospective, observational, and descriptive research was carried out in the gynecology and obstetrics service of a general hospital in Mazatlan, with the method of information collection, which was carried out with a review of files with data from pregnant and postpartum patients diagnosed with dengue, who complied with the period of years 2023 and 2024.

The data were obtained from pregnant or postpartum patients diagnosed with dengue by serology, hospitalized in the tocosurgery area and the gynecology and obstetrics floor, at a general hospital in Mazatlán, during the period from January 01, 2023, to December 31, 2024.

Inclusion criteria

Pregnant and postpartum patients with a confirmatory diagnosis of dengue by serology.

Exclusion criteria

Pregnant and postpartum patients who do not have complete information in the file.

Technique and procedures

This study protocol was presented to the Ethics and Research Committee of the hospital in the study area with folio No. CEI-2025-027. A data search was conducted in the hospital's computer system to

identify pregnant or postpartum women with immunological impairment due to *Aedes aegypti* mosquito bites who were hospitalized from January 2023 to December 2024. After this review of clinical records under the criteria of interest and inclusion, data were collected using the described variables of interest and captured in a statistical database in an Excel sheet.

A sociodemographic data card was used, consisting of 4 questions on age, marital status, education, and place of residence. In addition to a data collection form through the electronic clinical record, which was made up of 14 variables of interest, such as the patient's age, place of reference, number of pregnancies, gestational age, associated clinical picture, diagnostic method, days of stay in the intensive care unit, changes in laboratory biochemical values, category of dengue according to the World Health Organization (WHO), as well as obstetric and fetal complications, designed in Excel sheet for its usefulness.

Statistical analysis

The SPSS version 25 statistical package was used. The information was analyzed using descriptive statistics and measures of central tendency for numerical variables. The results were presented in tables and graphs for understanding. For non-normal variables, we used Pearson's chi-square test; for normally distributed variables, we used the Mann-Whitney U test.

Ethical issues

No risks have been considered, and no fundamental principles have been violated in the conduct of this investigation, which has been carried out solely by collecting information from existing records and medical records/electronic files, and the confidentiality of the information has been maintained. Thus, the researcher was the only one authorized to handle the data obtained exclusively for the study and registered before the ethics committee of the General Hospital of Mazatlán "Dr. Martiniano Carvajal", with folio CEI-2025-027.

Results

In this research, the sample comprised 79 patients diagnosed with dengue during pregnancy and the puerperium at a general hospital in Mazatlán over 2 years, with an average age of 24 years (range 13–41). Regarding schooling, 10% (n=8) were primary school, 42% (n=33) were secondary school, 43% (n=34) had completed high school, and only 5% (n=4) had a bachelor's degree. Regarding civil status, 10% (n=8) were single, 42% (n=33) were mar-

ried, 43% (n=34) were widowed, and only 5% (n=4) were divorced. The most frequent group was common-law (68.7%), followed by single (22.5%), and finally, married (8.7%).

Among the most frequent clinical manifestations, fever was present in 64.5% (n=51) of the cases, followed by headache, myalgia and arthralgia, retroocular pain, and mucosal bleeding (**Table 1**).

Clinical classification and severity spectrum

During the study period, a hospital prevalence of 2.1% was observed among the obstetric population. According to the WHO severity classification, 8.8% (n=7) of patients developed severe dengue, characterized by severe plasma leakage and organ dysfunction. In addition, 18.9% (n=15) presented dengue with alarm data, requiring close hemodynamic follow-up to prevent progression to shock (**Table 2**). The greatest vulnerability was identified during the third trimester, representing 49.4% (n=39), followed by the second trimester 31.6% (n=25), the first trimester 11.4% (n=9), and 7.6% (n=6) already in the puerperium stage.

Biomarkers of organ dysfunction and critical thresholds

Laboratory analysis revealed significant systemic involvement. A non-parametric distribution (Kolmogorov-Smirnov, $p < 0.01$) was confirmed for the most critical variables (**Table 3**):

- Liver injury: Aspartate aminotransferase (AST) levels were markedly elevated, with a mean of 180.8 U/l and a peak of 1801 U/l, indicating severe acute hepatitis.
- Tissue damage and hemolysis: Lactate dehydrogenase (LDH) levels, a key predictor of severity in critical care, were 539.6 U/l (range 2969 U/l).
- Hematologic collapse: Although the mean platelet count was 120,270/ μ l, extreme cases of thrombocytopenia as low as 9000/ μ l were reported, significantly increasing the risk of hemorrhagic shock.

Maternal-fetal outcomes and mortality

The escalation of the disease caused serious obstetric complications. Obstetric hemorrhage was present in 8.9% of patients, closely linked to the critical thrombocytopenia window. The study recorded a maternal mortality rate of 2.5% and a maternal near-miss rate of 3.8%, highlighting the lethal potential of the virus when it progresses to multiorgan failure (**Table 4**).

Regarding childbirth, the cesarean section rate was 50.6%, driven mainly by acute fetal distress

(12.3%). This high rate of surgical intervention in hemodynamically unstable patients underscores the challenge of managing surgical risk versus fetal salvage in the intensive care setting.

Discussion

The present study confirms that dengue in obstetric patients is an entity of high clinical impact in endemic contexts, with a spectrum ranging from mild forms to critical disease with multiorgan involvement. The observed hospital prevalence (2.1%), as well as the proportion of dengue with warning signs (18.9%) and severe dengue (8.8%), are comparable with recent reports in Latin America, where pregnancy has been identified as an independent risk factor for adverse outcomes. (11,12)

From a pathophysiological perspective, our findings support the progression model of severe dengue characterized by an exacerbated inflammatory response, endothelial dysfunction, and increased capillary permeability. In the context of pregnancy, these mechanisms are enhanced by hemodynamic adaptations such as plasma volume expansion and changes in coagulation, resulting in a "masking effect" that makes it difficult to identify the critical phase early. (13) The presence of severe thrombocytopenia (up to 9000/ μ l) and the frequency of obstetric hemorrhage (8.9%) in our cohort reflect this state of coagulopathy and vascular fragility, widely described in the literature. (14)

A relevant finding of this study was the significant alteration of biomarkers of organ damage. The marked elevation of AST (up to 1801 U/l) and LDH (up to 2969 U/l) suggested severe liver and tissue involvement, which has been associated with increased risk of admission to intensive care units, need for vasopressor support, and mortality in patients with severe dengue. (15) In this sense, the integration of these biomarkers in clinical assessment could improve early risk stratification and optimize decision-making in resource-limited scenarios.

The distribution of cases by gestational age showed a higher frequency in the third trimester (49.4%), which is consistent with international studies reporting greater severity in advanced stages of pregnancy, possibly due to a more pronounced proinflammatory state and greater hemodynamic demand. (16,17) This finding has important clinical implications, as it suggests the need for closer surveillance and stricter hospitalization criteria in this group.

Regarding obstetric outcomes, the high rate of cesarean sections (50.6%), mainly due to acute fetal compromise, reflected the complexity of clinical management in these patients. Decision-making in

this context involved a balance between maternal stabilization and the need for urgent obstetric intervention, particularly in scenarios of hemodynamic instability and coagulopathy. These results were consistent with the literature, where an increase in preterm delivery, fetal distress, and perinatal death has been documented in pregnant women with dengue. (18)

Throughout the study, there were 2 maternal deaths, so it could be determined that, based on the results, the maternal mortality ratio was 61.85 maternal deaths per 100,000 live births (0.062%), which was below the national level, which was found at 5.6% in 2024, while in 2023 it was 2.2%. (19) In Mexico, it has been documented that dengue can contribute significantly to extreme maternal morbidity, particularly in regions with high endemicity. (20,21) Globally, it has been estimated that dengue during pregnancy significantly increases the risk of maternal death and serious complications, consolidating it as an entity of relevance in public health. (1,18)

From a critical care medicine perspective, these findings emphasize the need to implement early detection strategies, including identifying warning signs and monitoring key biomarkers. Timely referral to intensive care units and multidisciplinary management are critical to improving outcomes. Likewise, the development of predictive models that integrate clinical and laboratory variables could represent a valuable tool for real-time decision-making. (15,22,23)

Conclusions

Dengue in pregnancy emerges as a condition of high interest for obstetric critical medicine, due to its ability to evolve rapidly towards hemodynamic instability, organ dysfunction, and maternal-fetal adverse outcomes. In this cohort, the presence of dengue with warning signs and severe forms, together with significant alterations in biomarkers such as transaminases, LDH, and deep thrombocytopenia, evidences a pattern of systemic disease with the potential for critical deterioration.

The association with complications such as obstetric hemorrhage, high rate of surgical interventions under conditions of instability, and maternal mortality underscores the complexity of clinical management in this group. These findings reinforce that the obstetric patient with dengue should be considered a potentially critical patient, in whom progression to multiple organ failure can occur rapidly and silently. In this context, early identification of warning signs, the use of biomarkers as risk-stratification tools, and timely referral to intensive care units are key to optimizing outcomes. A multidisciplinary approach and the implementation of specific protocols are essential to improve maternal and perinatal survival in endemic regions.

In conclusion, dengue in pregnancy represents a relevant challenge for obstetric critical medicine, where early recognition and timely intervention can make the difference between recovery and progression towards fatal outcomes.

Table 1. Frequencies and percentages of clinical manifestations

Clinical manifestations	<i>f</i>	%
Fever	51	64.5
Headache	15	18.9
Myalgias and arthralgias	8	10.1
Retroocular pain	4	5.0
Mucosal bleeding	1	1.2

Table 2. Frequency and percentage of cases of dengue in pregnant and postpartum patients according to classification

Classification of dengue	<i>f</i>	%
With warning signs	15	18.9
No warning signs	57	72.1
Severe	7	8.8

Table 3. Biomarkers of organ dysfunction and critical thresholds

Variable	Minimum value	Maximum value	\bar{X}	Mdn	OF	V	p
Maternal age (years)	13	41	24.07	24.00	5.80	33.66	0.261
Pregnancies (number)	1	6	2.24	2.00	1.26	1.59	0.000
Gestational age (weeks)	6.2	41	26.8	28.4	9.68	93.75	0.006
Hospital stay (days)	1	11	4.27	4.00	2.45	6.05	0.000
Platelets ($\times 10^3/\mu\text{l}$)	9	343	120.20	104	73.45	5396.34	0.077
Leukocytes ($\times 10^3/\mu\text{l}$)	1.3	12.9	4.7	4.1	2.46	6.05	0.000
Hematocrit (%)	24	46.6	33.3	33	4.22	17.77	0.000
AST (U/l)	9	1801	180.8	81	313.47	98265.31	0.000
ALT (U/l)	7	803	117.8	61.5	164.59	27090.60	0.000
LDH (U/l)	187	2969	539.6	427	440.01	193513.7	0.000

Legend: \bar{X} =average; Mdn=core value; OF=outliers; V=dispersion (variance); AST:aspartate aminotransferase; ALT=alanine aminotransferase; LDH=lactate dehydrogenase.

Table 4. Frequency and percentage of mortality in pregnant and postpartum women due to dengue

Prevalence mortality	<i>f</i>	%
Survivor	77	97.5
Death	2	2.5

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