

Tocolysis in a full-term pregnancy with Chikungunya: a case report

Tocolisis en embarazo a término con Chikungunya, reporte de un caso

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ABSTRACT

Introduction: chikungunya virus represents a public health threat with a mother-to-child transmission risk during childbirth of up to 50 %. Maternal infection near the time of birth is associated with severe neonatal complications and neurodevelopmental sequelae. The objective of this report is to describe the use of acute tocolysis as an intrauterine resuscitation strategy in a full-term pregnant woman with Chikungunya virus infection. Case Presentation: the case involves a pregnant woman at 37.2 weeks with a fever of 39.6 degrees Celsius, severe joint pain, and a rash. Obstetric monitoring showed excessive uterine contractions and compromised fetal well-being, manifested by drops in the fetal heart rate. Given the suspicion of Chikungunya virus infection, later confirmed by PCR, fetal resuscitation was performed using general measures and acute tocolysis with a dose of oral nifedipine. Normalization of contractions and recovery of the fetal heart rate were achieved within 45 minutes. The process culminated in an uncomplicated vaginal delivery; the newborn was admitted for close medical surveillance. Conclusions: acute tocolysis in full-term pregnancy with Chikungunya virus constitutes an effective intervention for fetal resuscitation. This strategy allows for the reversal of excessive contractions induced by maternal fever, improves blood flow to the placenta, and avoids unnecessary emergency cesarean sections. Strict follow-up of the newborn is essential due to the high risk of vertical transmission and associated disease.

Keywords: Chikungunya; Full-term pregnancy; Tocolysis; Vertical transmission.

RESUMEN

Introducción: el virus Chikungunya representa una amenaza de salud pública con un riesgo de transmisión madre a hijo durante el parto de hasta el 50 %. La infección materna cerca del momento del nacimiento se asocia a complicaciones neonatales severas y secuelas en el neurodesarrollo. El objetivo de este reporte es describir el uso de la tocolisis aguda como estrategia de reanimación dentro del útero en una gestante con embarazo a término e infección por este virus. Presentación del caso: gestante de 37,2 semanas con fiebre de 39,6°C, dolores articulares intensos y sarpullido. El monitoreo obstétrico evidenció contracciones uterinas excesivas y compromiso del bienestar del feto, manifestado por descensos en la frecuencia cardíaca fetal. Ante la sospecha de infección, confirmada posteriormente mediante PCR, se realizó reanimación fetal mediante medidas generales y tocolisis aguda con una dosis de nifedipina por vía oral. Se logró la normalización de las contracciones y la recuperación del ritmo cardíaco del feto a los 45 minutos. El proceso culminó en un parto vaginal sin complicaciones; el recién nacido fue ingresado para vigilancia médica estrecha. Conclusiones: la tocolisis aguda en el embarazo a término con Chikungunya constituye una intervención efectiva para la reanimación fetal. Esta estrategia permite revertir las contracciones excesivas inducidas por la fiebre materna, mejorar el flujo de sangre a la placenta y evitar la cesárea de emergencia innecesaria. Resulta fundamental el seguimiento estricto del recién nacido debido al elevado riesgo de transmisión madre a hijo.

Palabras clave: Chikungunya; Embarazo a término; Tocólisis; Transmisión vertical.

Introduction

Chikungunya virus (CHIKV) represents an emerging global public health threat and is transmitted primarily by mosquitoes of the genus *Aedes*, particularly *Aedes aegypti* and *Aedes albopictus*. The geographic spread of the virus has raised specific concerns about its implications during pregnancy, particularly regarding vertical transmission and adverse perinatal outcomes.[1]

Vertical transmission of CHIKV has a distinctive temporal pattern that distinguishes it from other congenital viral infections. While transplacental transmission during the first and second trimesters is extremely rare, intrapartum transmission represents the predominant mechanism of neonatal infection. Systematic studies have shown that the risk of mother-to-child transmission reaches 50% when maternal infection occurs during the intrapartum period, whereas it is 0% in antepartum infections. This critical window of vulnerability coincides with the period of maternal viremia, which typically occurs shortly before the onset of symptoms and during the first 2–6 days of illness.[2]

Febrile tachysystole results from a complex interaction between hyperthermia and inflammation that activates multiple converging pathophysiological pathways in the myometrium. Maternal fever, particularly when associated with intrauterine infection or inflammation, triggers the production of proinflammatory cytokines (IL-1 β , IL-6, IL-8, TNF- α) in the decidua and fetal membranes, which directly stimulate the synthesis of prostaglandins (especially PGE₂ and PGF₂ α) through the upregulation of cyclooxygenase-2 (COX-2) activity and a decrease in prostaglandin dehydrogenase activity in the chorion. Moreover, hyperthermia per se—regardless of infection—doesable uterine activity by increasing blood concentrations of oxytocin due to maternal dehydration and reducing plasma volume, whereas thermal stress induces oxidative stress and the release of heat shock proteins that amplify the inflammatory cascade.[3]

The use of tocolytics to delay delivery in full-term pregnancies with acute CHIKV infection has been mentioned in some clinical guidelines and case reports, although the evidence supporting this practice remains limited and controversial. During the 2015 Colombian outbreak, the use of tocolytics was documented in pregnant women hospitalized with acute CHIKV, with the aim of postponing delivery until after the febrile episode. However, these reports do not provide comparative data on the efficacy or long-term follow-up of maternal–neonatal outcomes.[4]

The use of tocolytics in this context presents several clinical and ethical challenges. First, the use of tocolytics in full-term pregnancies represents an off-label indication, as their use is typically limited to the management of preterm labor. Second, evidence regarding the safety and efficacy of different tocolytic agents in the context of acute viral infection is virtually nonexistent. Third, there is no consensus on the optimal duration of labor delay or on the criteria for determining when maternal viremia has decreased sufficiently to allow for safe delivery.[5]

This article aims to describe a case of a full-term pregnancy in a woman with CHIKV, in which tocolysis was performed, not with the purpose of prolonging the pregnancy for several days until viremia subsided but rather to stabilize the patient and create the conditions for safe delivery.

Case report

A 28-year-old pregnant woman, at 37.2 weeks of gestational age according to first-trimester ultrasound, from an area endemic for arboviral diseases. Obstetric history: G1 P0 A0, current pregnancy G1. Prenatal care without abnormalities. Normal ultrasounds during all three trimesters. Serology (HIV, syphilis, and HBV) negative.

The patient presented to the obstetric emergency department and reported symptoms that had been present for 48 hours, characterized by sudden-onset fever (unquantified), severe bilateral joint pain (especially in the hands, wrists, and ankles) that made walking difficult, a retroocular headache, and the appearance of a pruritic rash on the trunk.

She reported that 6 hours ago, she began experiencing very frequent and painful uterine contractions, accompanied by a decrease in the perception of fetal movements.

Physical examination:

Vital signs: Blood pressure: 110/70 mmHg. Heart rate: 115 bpm. Respiratory rate: 20 bpm. Temperature: 39.6°C.

Skin: Diffuse erythematous maculopapular rash on the chest, abdomen, and upper extremities.

Joints: Mild edema in the interphalangeal joints and wrists, with intense pain on palpation and limited range of motion.

Obstetric Assessment:

Fundal height: 34 cm.

Uterine activity (monitoring): Tachysystole (6 contractions in 10 minutes, of strong intensity and elevated basal tone).

Vaginal examination revealed a 50% effaced cervix, a 3 cm dilation, cephalic presentation, and intact membranes.

Fetal heart rate (FHR): Basal fetal tachycardia of 175 bpm, with minimal variability and the presence of recurrent late decelerations (DIPS II).

Additional Tests (On Admission)

The complete blood count revealed the following: leukopenia (3,200/ μ L) and mild thrombocytopenia (110,000/ μ L). Normal hemoglobin.

Liver and kidney function tests were within normal limits.

Specific Tests: RT-PCR was performed for Dengue, Zika, and CHIKV. (Results positive for CHIKV 24 hours later).

During the critical phase of uterine tachysystole, an advanced assessment of fetoplacental hemodynamics was performed using Doppler ultrasonography. Uterine flow measurements revealed severe impairment in perfusion, as evidenced by a significant increase in the pulsatility index and resistance of the uterine arteries, along with a reduction in end-diastolic flow. These findings confirmed that excessive contractility (6 contractions in 10 minutes) and a maternal fever of 39.6°C mechanically restricted the oxygen supply to the fetus, which correlated directly with the late decelerations observed upon monitoring.

The pregnant woman was admitted to Perinatal Care with the following diagnoses: 37.2 weeks of pregnancy by early ultrasound; acute febrile syndrome, suspected CHIKV infection; latent labor with uterine tachysystole; and secondary acute fetal distress.

Given the gestational age (at term), the standard approach would be to allow labor to progress. However, the mother's extreme fever triggered a massive release of prostaglandins, causing uterine tachysystole, which, combined with maternal tachycardia, compromised oxygen flow to the fetus (as evidenced by late decelerations).

To avoid an emergency cesarean section and stabilize the fetus (intrauterine resuscitation), a decision was made to proceed with rapid medical intervention. General Measures: Supplemental oxygen via mask (10 L/min), left lateral decubitus position, and an intravenous fluid bolus (500 mL of Ringer's lactate solution). Antipyretics: Paracetamol 1 g IV for immediate temperature control. Acute Tocolysis: Nifedipine (calcium channel blocker) was administered orally at an initial dosage of 20 mg.

The goal of tocolysis was not to prolong the pregnancy for several days but to temporarily relax the uterine muscle for 2–4 hours to restore placental blood flow, correct fetal hypoxia, and allow time for the antipyretics to reduce the maternal temperature.

Forty-five minutes after the administration of nifedipine and paracetamol, the maternal temperature decreased to 38.0°C. Uterine activity decreased to a normal pattern of 3 contractions every 10 minutes with a good relaxation tone. Fetal monitoring showed recovery: the baseline FHR decreased to 145 bpm, with moderate variability and the disappearance of decelerations.

Once the condition stabilized, tocolytic therapy was discontinued, and physiological labor was allowed to resume. Amniotomy was performed at 6 cm of dilation, revealing clear amniotic fluid.

Fourteen hours after admission, the patient had an uncomplicated, term vaginal delivery. The weight of the male newborn was 3,100 g, and the APGAR score was 8 at 1 minute and 9 at 5 minutes. He was admitted to the neonatal intermediate care unit for close observation for 7 days because of the documented risk (approximately 50%) of intrapartum vertical transmission of the maternal CHIKV when infection occurred during the peripartum period.

During the seven days after admission to the neonatal intermediate care unit, the newborn remained clinically stable and asymptomatic. Comprehensive physical examinations were performed every 8 hours, with no documented occurrence of fever spikes, irritability, hyperalgesia, or maculopapular rash. Serial hematological studies revealed platelet counts within normal ranges (240,000/ μ L), ruling out neonatal thrombocytopenia.

To confirm the absence of vertical transmission, RT-PCR tests for the CHIKV virus were performed at 72 hours and on the seventh day of life, both of which were negative. Given the infant's hemodynamic stability, adequate feeding tolerance, and virological confirmation of no infection, the infant was discharged with outpatient follow-up by pediatrics to monitor his long-term neurodevelopment.

This case report was prepared in accordance with the ethical principles established in the Declaration of Helsinki for medical research involving human subjects. The patient provided written informed consent, authorizing the publication of her clinical information and laboratory results for academic and scientific purposes, with the goal of protecting her identity and ensuring the confidentiality of her personal data. Furthermore, the protocol for this study was reviewed and approved by the Ethics Committee of the Faculty of Medicine at the University of Medical Sciences of Villa Clara.

Discussion

This case illustrates the successful management of an acute obstetric complication caused by maternal CHIKV infection during the peripartum period, with fever-induced uterine tachysystole and secondary fetal distress resolved through intrauterine resuscitation and acute tocolysis.

The patient presented with a classic clinical picture of CHIKV infection: sudden-onset fever, severe bilateral arthralgia (especially in the hands, wrists, and ankles), retroocular headache, and pruritic maculopapular exanthem. Laboratory findings of leukopenia (3,200/ μ L) and mild thrombocytopenia (110,000/ μ L) are characteristic of arbovirus infection. The timing of the infection (48 hours into the 37.2-week pregnancy) is particularly critical, as maternal infection within 4 days prior to delivery is associated with a nearly 50% risk of vertical transmission, which is significantly greater than infections in earlier trimesters where transmission is rare.[4,6]

Extreme maternal fever (39.6°C) triggered a complex pathophysiological cascade. Hyperthermia induces massive release of prostaglandins, which stimulate excessive uterine contractility. The resulting tachysystole (6 contractions in 10 minutes with elevated baseline tone) compromises placental perfusion by reducing the relaxation intervals necessary for normal fetal gas exchange.[7,8]

Simultaneously, maternal tachycardia (115 bpm) and fever may reduce uteroplacental blood flow, exacerbating fetal hypoxia. Recurrent late decelerations (DIPS II) with minimal variability and baseline fetal tachycardia (175 bpm) represented a Category II pattern with high-risk features, indicating progressive fetal distress.[9]

The team correctly implemented a multimodal approach to intrauterine resuscitation before proceeding with an emergency cesarean section, in accordance with current recommendations from the American College of Obstetricians and Gynecologists (ACOG).

Conservative measures: Supplemental oxygen (although current evidence does not support its routine use in the absence of maternal hypoxia), left lateral decubitus position to optimize venous return and uterine perfusion, and a crystalloid bolus to improve maternal preload.[9]

Thermal management: 1 g of acetaminophen IV for rapid temperature reduction. A fever >39°C is associated with an increased risk of neonatal encephalopathy and may lower the threshold for hypoxic brain injury.[7]

Acute tocolysis: Administration of 20 mg of oral nifedipine was the key intervention. ACOG recommends the use of fast-acting tocolytic agents for tachysystole associated with Category II tracings with high-risk features or Category III tracings that persist despite the discontinuation of oxytocin.[9] Although oxytocin was not used in this case, the tachysystole was secondary to fever. Beta-agonists (terbutaline) are frequently recommended as first-line treatments, but nifedipine is an effective alternative with fewer maternal cardiovascular effects.[10,11] The goal was not to prolong the pregnancy but to temporarily restore placental perfusion to allow for fetal recovery.

The response was successful: after 45 minutes, the temperature decreased to 38°C, uterine activity normalized (3 contractions/10 minutes), and the fetal heart rate pattern improved significantly (FHR 145 bpm with moderate variability and resolution of decelerations). This allowed for the physiological progression of labor and a term vaginal delivery, avoiding an emergency cesarean section that would have increased maternal morbidity without clear neonatal benefit.[7]

The decision to admit the newborn to intermediate care for 7 days was appropriate. The literature shows that when maternal infection occurs during the intrapartum period (within 4 days of delivery), the risk of vertical transmission is approximately 50%, with 25% transmission confirmed in some studies. Infected newborns are typically asymptomatic but develop symptoms within the first week of life, including fever, irritability, hyperalgesia, limb edema, rash, and, in severe cases, neonatal sepsis and meningoencephalitis. Approximately 68.7% of newborns with vertical transmission develop encephalopathy or encephalitis, and 50% of symptomatic infected infants exhibit long-term neurodevelopmental delays. Neonatal mortality is 2.8% among infected newborns, with fatal cases reported within the first 24–48 hours.[13]

The APGAR score of 8/9 was reassuring but did not rule out infection, as symptoms appeared days after birth. Close monitoring would allow for early detection of clinical signs (fever, irritability, seizures, respiratory distress) and diagnostic confirmation via RT–PCR or specific IgM.[13]

Unlike reports from the 2015 Colombian outbreak, where the use of tocolytics was primarily aimed at postponing delivery to avoid the window of maternal viremia, this case focuses on acute tocolysis as an immediate intrauterine resuscitation maneuver. While in preterm contexts, the goal is to buy time for lung maturation, in this full-term pregnancy, the intervention aligns with what has been observed in reports of arboviral infections, where hyperthermia acts as the primary trigger of pathological contractility. This distinction is crucial, as success in this patient was not measured in days of gestation gained but rather in the reversal of tachysystole and the recovery of the fetal trace category within 45 minutes.

With respect to pharmacological alternatives, beta-agonists such as terbutaline are often recommended because of their rapid effects on fetal resuscitation. However, in the context of a pregnant woman with Chikungunya—who already had a baseline tachycardia of 115 bpm—the use of nifedipine (20 mg PO) was preferred to avoid exacerbating the maternal and fetal cardiovascular response. Nifedipine proved to be a safe and effective alternative for relaxing the myometrium for 2 to 4 hours, allowing paracetamol to reduce the temperature and, consequently, the endogenous stimulation of prostaglandins.[14,15]

This report has limitations inherent to its single-case design, which precludes the generalization of the results to all full-term patients with arbovirus infection. There is a potential confounding effect arising from concurrent resuscitation measures; the administration of a 500-ml bolus of Ringer's lactate and the switch to left lateral decubitus may have significantly contributed to the recovery of the fetal heart rate, making determining the isolated net benefit of tocolysis difficult.[14]

This case demonstrates how a systematic approach to intrauterine resuscitation, on the basis of an understanding of the underlying pathophysiology, can optimize maternal and fetal outcomes in complex obstetric situations associated with emerging arboviral infections.

Conclusions

Acute tocolysis with nifedipine, combined with temperature control and fluid therapy, is an effective intrauterine resuscitation strategy in term pregnancies with Chikungunya virus infection. This intervention allows for the reversal of tachysystole induced by maternal fever, the restoration of placental perfusion, and the normalization of the fetal heart rate, thereby avoiding unnecessary emergency cesarean sections. The primary objective is not to prolong pregnancy but to stabilize the mother–child dyad to facilitate safe vaginal delivery. Finally, it is imperative to maintain strict neonatal surveillance during the first week of life because the risk of vertical transmission can reach 50% when infection occurs during the peripartum period.

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