EMERGENCIASPediátricas
Vol. 5. No. 3

Emergencias Pediátricas. 2026; 5(3): –

CLINICAL CASE

Neonatal alloimmune thrombocytopenia: a case report

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Received April 5, 2026
Accepted June 16, 2026
Published November 20, 2026

Keywords:
Neonatal Alloimmune Thrombocytopenia
Human Platelet Antigens
Intracranial Hemorrhage

Abstract

Neonatal alloimmune thrombocytopenia (NAIT) is the leading cause of severe isolated thrombocytopenia in clinically stable, full-term newborns. It results from the transplacental transfer of maternal alloantibodies directed against fetal human platelet antigens (HPA) inherited from the father. It is considered a true pediatric hematologic emergency because of the significantly high risk of intracranial hemorrhage (ICH).

We present the case of a 23-day-old neonate who presented to the emergency department with progressive purpura and generalized petechiae. Initial evaluation revealed severe thrombocytopenia in a patient who was otherwise clinically stable. Given the clinical suspicion, treatment with platelet transfusion and intravenous immunoglobulin was initiated, along with transfontanelle ultrasonography; the patient showed a favorable clinical response. Identification of anti-HPA alloantibodies subsequently established the diagnosis of neonatal alloimmune thrombocytopenia.

In emergency departments, NAIT is often mistaken for late-onset neonatal sepsis, delaying specific treatment. This report emphasizes the need for a high index of suspicion in clinically stable neonates presenting with mucocutaneous bleeding. Early diagnosis and timely intervention are critical to preventing severe hemorrhagic complications and permanent neurological sequelae.

TROMBOCITOPENIA ALOINMUNE NEONATAL A PROPÓSITO DE UN CASO

Resumen

La trombocitopenia aloinmune neonatal (NAIT) representa la principal causa de trombocitopenia severa aislada en recién nacidos a término clínicamente estables. Esta entidad se produce por la transferencia transplacentaria de aloanticuerpos maternos dirigidos contra antígenos plaquetarios humanos (HPA) fetales, heredados del padre. Se considera una verdadera emergencia hematológica pediátrica, dado que el riesgo de hemorragia intracraneal (HIC) es significativamente alto.

Presentamos el caso de un neonato de 23 días que consultó en el servicio de urgencias por un síndrome purpúrico progresivo y petequias generalizadas. La

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evaluación inicial reveló una trombocitopenia severa en un paciente con estado general estable. Ante la sospecha clínica, se inició tratamiento con transfusión de plaquetas e inmunoglobulina intravenosa, complementándose con ecografía transfontanelar; observándose una respuesta clínica favorable. La identificación de aloanticuerpos anti-HPA permitió establecer retrospectivamente el diagnóstico de trombocitopenia aloinmune neonatal.

En los servicios de urgencias, la NAIT suele confundirse con sepsis neonatal tardía, lo que retrasa el tratamiento específico. Este reporte enfatiza la necesidad de un alto índice de sospecha ante un neonato con estado general estable y con hemorragia mucocutánea. El diagnóstico precoz y la intervención oportuna son críticos para prevenir complicaciones hemorrágicas graves y secuelas neurológicas permanentes.

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INTRODUCTION

Neonatal thrombocytopenia, defined as a platelet count below 150,000/mm^3, is a common finding in pediatric clinical practice, particularly among hospitalized newborns, where its prevalence ranges from 25 to 35% according to contemporary studies[1].

Although it is usually a mild and transient condition, when it is severe (< 50,000/mm^3), the clinical picture changes completely because of the risk of intracranial hemorrhage, the leading determinant of morbidity, mortality, and long-term neurological sequelae[2].

Among the causes of isolated severe thrombocytopenia in clinically stable, full-term newborns, neonatal alloimmune thrombocytopenia (NAIT) is the most common etiology[3]. This condition results from the transplacental passage of maternal IgG antibodies directed against fetal platelet antigens inherited from the father, leading to immune-mediated destruction of fetal and neonatal platelets[4].

In pediatric emergency departments, NAIT poses a real challenge. Its clinical manifestations may resemble those of late-onset neonatal sepsis or neonatal thrombocytopenia secondary to maternal immune thrombocytopenia (ITP), conditions that share the finding of thrombocytopenia but differ substantially in their pathophysiology, clinical course, prognosis, and initial management[5]. The most recent guidelines and consensus statements agree that, when NAIT is suspected, the initial priority should not be immediate etiologic confirmation, but rather the early prevention of major bleeding through a structured and timely approach[6,7].

CASE REPORT

A male newborn was delivered at 38+6 weeks' gestation. An emergency cesarean section was performed because of a non-reassuring fetal status (NRFS). The pregnancy had progressed normally, with routine prenatal care and no relevant medical history. Incidental maternal thrombocytopenia (97,000/mm^3) was noted at the time of delivery. The patient weighed 2,685 g at birth, with Apgar scores of 7, 4, and 7 at 1, 5, and 10 minutes, respectively. Because of transient respiratory distress, he was admitted to the Neonatal Intensive Care Unit (NICU), where an initial platelet count of 90,000/mm^3 was documented. Further investigations, including echocardiography, electroencephalography, and serial cranial ultrasounds, were normal. After the platelet count stabilized (120,000/mm^3) and his clinical course was favorable, he was discharged on day 5 of life.

At 23 days of life, the infant was readmitted with a clinical presentation that had begun at 9 days of age with clear rhinorrhea. At 17 days, a progressively enlarging erythematous macule appeared in the left pectoral region. Subsequently, ecchymoses developed on the lower extremities on day 19, followed by petechiae on the face and trunk that rapidly became generalized on day 20.

On admission, the patient was alert, with the following vital signs: axillary temperature 37.1 °C, respiratory rate 47 breaths/min, oxygen saturation 96% on room air, heart rate 157 bpm, blood pressure 65/50 mmHg, and capillary blood glucose 90 mg/dL. Weight: 3,471 g. Physical examination revealed generalized petechiae (Figure 1), wet purpura on the hard palate (Figure 2), and ecchymoses on both lower extremities (Figure 3). No abnormal cardiopulmonary sounds were auscultated, and the neurological examination was normal.



FIGURE 1. Generalized petechiae.



FIGURE 2. Wet purpura on the hard palate.



FIGURE 3. Ecchymoses on both lower limbs.

Admission tests revealed severe thrombocytopenia (17,000/mm³) and leukocytosis (15,100/mm³) with marked lymphocytic predominance (75%). Venous blood gas analysis showed mixed acidosis (pH 7.15; pCO2 65 mmHg; pO2 31.0 mmHg; HCO3 17.9 mEq/L; BE -5.4) associated with hyperlactatemia (65.8 mg/dL) and elevated LDH (443 U/L). The liver profile showed indirect hyperbilirubinemia (total bilirubin 4.6 mg/dL), with transaminase levels within normal ranges. C-reactive protein (< 0.5 mg/dL) and the respiratory viral PCR panel were negative. Coagulation tests could not be processed because the samples clotted spontaneously.

Given the clinical suspicion of neonatal alloimmune thrombocytopenia, treatment was initiated with a transfusion of irradiated platelets, and the patient was transferred to the Pediatric Intensive Care Unit (PICU). Cerebral ultrasonography was performed upon admission, and hemorrhagic complications were ruled out. After the first transfusion, the platelet count rose to 44,000/mm³, followed by a decline to 25,000/mm³, prompting a second transfusion and initiation of intravenous immunoglobulin (IVIG).

The patient showed a satisfactory clinical course, with a platelet count of 208,000 on the third day of hospitalization and a normal follow-up ultrasound, allowing discharge home (Figure 4).

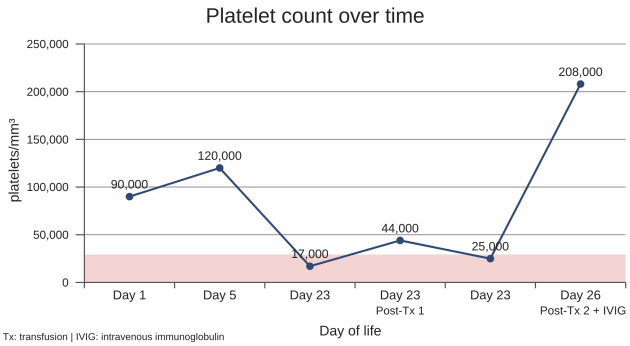


FIGURE 4. Platelet count course during hospitalization.

The definitive diagnosis was confirmed during outpatient follow-up with Hematology-Oncology through the detection of antibodies against human platelet antigens (anti-HPA).

DISCUSSION

Perinatal asphyxia commonly explains early-onset thrombocytopenia (< 72 hours after birth). Therefore, if the platelet count improves and there are no complications, we usually discharge the newborn without further investigations, which can delay diagnoses such as NAIT[8].

NAIT is one of the most important causes of severe thrombocytopenia in neonates who present as clinically stable[3,4,6].

The main factor contributing to the severity of this condition is the risk of intracranial hemorrhage (ICH), a complication that may occur in up to 10–25% of untreated cases and is the leading cause of mortality and permanent neurological sequelae[6,7,10].

In the context of pediatric emergency services, NAIT poses a significant diagnostic challenge. The finding of severe thrombocytopenia in a newborn reasonably warrants ruling out late-onset neonatal sepsis, which remains a frequent cause of thrombocytopenia in this age group. However, unlike sepsis, NAIT usually presents in newborns who are in good general condition, without hemodynamic compromise, with normal acute-phase reactants, and without abnormalities in coagulation tests. This discrepancy between the severity of the thrombocytopenia and the patient's clinical stability is a key diagnostic clue that should be recognized early[10,11,13,14,15].

The differential diagnosis of maternal immune thrombocytopenia (ITP) warrants particular consideration. Although both conditions share an immune mechanism,

thrombocytopenia associated with maternal ITP is usually milder and transient. Recent studies have shown that the maternal platelet count does not reliably predict the severity of neonatal involvement; therefore, the presence of maternal thrombocytopenia does not exclude a diagnosis of NAIT[9].

Current recommendations agree that the initial management of severe neonatal thrombocytopenia should prioritize prevention of ICH over immediate etiologic confirmation. In this regard, they emphasize the need to avoid unnecessary invasive procedures, perform early neuroimaging using transfontanellar ultrasonography, and consider early platelet transfusion with immunoglobulins[6,7,11].

CONCLUSION

Management of the purpuric neonate is based on the infant's clinical status. In a healthy newborn with profound isolated thrombocytopenia, an immune-mediated cause should be suspected. Treatment with platelets and immunoglobulins should be initiated immediately, and a cerebral ultrasound performed, without waiting for laboratory confirmation. The diagnosis of NAIT is confirmed by identifying anti-HPA antibodies and maternal-fetal incompatibility.

Funding

No funding was received for the research, authorship, and/or publication of this article.

Conflict of interest

I declare that there are no commercial or financial conflicts of interest related to this research.

Author Contributions

Carlos Briones Baquero: Data collection

Ethical considerations

Written informed consent was obtained from the parents for publication of this case report and the accompanying images.

Use of AI

I declare that no artificial intelligence tools (such as ChatGPT, Copilot, Gemini, or others) were used in the writing, analysis, or review of this article.

Data availability

The data supporting the findings of this study are available from the corresponding author upon request.

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