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Neonatal Alloimmune Thrombocytopenia

A Concise Review

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ABSTRACT

Background: Neonatal alloimmune thrombocytopenia (NAIT) is defined as an uncommon platelet disorder caused by maternal alloimmunization to human-specific antigens (HPAs) that are paternally inherited, resulting in low fetal/neonatal platelet levels and debilitating effects on the newborn. The incidence of NAIT is 1 in every 1000 live births within the United States; it is the most common cause of severe thrombocytopenia ($<30 \times 10^9$/L) and intracranial hemorrhage in term newborns.

Purpose: The purpose of this article is to discuss the pathophysiology, clinical manifestations, diagnosis, and treatment of NAIT and its implications upon the lifespan of the neonate.

Methods: A literature review was conducted using PubMed, CINAHL, and Google Scholar (2014-2019). Search terms included NAIT, neonatal/fetal alloimmune thrombocytopenia, newborn platelets, and intracranial bleeding and NAIT.

Results: NAIT can affect first pregnancies and often goes undiagnosed until delivery. Universal screening tools with a focus on HPA-1a typing via noninvasive testing have been successfully trialed and have yielded promising results indicating a 75% reduction in risks associated with NAIT; however, none have been incorporated into practice and prophylactic treatment remains unavailable.

Implications for Research: Adopting a universal screening tool and prophylaxis for NAIT would allow for early diagnosis and treatment in utero.

Implications for Practice: Many healthcare providers are not familiar with NAIT often focusing on other causes of thrombocytopenia as a potential diagnosis.

Key Words: fetal/neonatal alloimmune thrombocytopenia, intracranial hemorrhage, NAIT, neonatal alloimmune thrombocytopenia, newborn platelets

Neonatal alloimmune thrombocytopenia (NAIT) is defined as an uncommon platelet disorder caused by maternal alloimmunization to human-specific alloantigens (HPAs) that are paternally inherited, resulting in low fetal/neonatal platelet levels and debilitating effects on the newborn.[1,2] While NAIT is uncommon, it is the primary cause of severe thrombocytopenia ($<30 \times 10^9$/L) and intracranial hemorrhage (ICH) in term newborns.[1,3] The incidence of NAIT is 1 in every 1000 live births within the United States.[1,4,5] Infants with severe thrombocytopenia have a mortality rate of 10%, increasing to 33% with ICH.[3,6,7] Despite the prevalence and negative sequelae associated with NAIT, no universal screening protocol for pregnant women exists.[8-10] The purpose of this article is to discuss the pathophysiology, clinical manifestations, diagnosis, and treatment of NAIT and its implications on the lifespan of the neonate.

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PHYSIOLOGY OF PLATELETS

The physiology of platelets is a complex process that begins soon after conception and continues throughout the lifespan.[6,11] The primary function of platelets involves maintaining hemostasis in the body, a process that is altered when platelet counts are abnormal. Provider understanding of neonatal hematopoiesis is essential to identify and manage hematopoietic pathologies in the neonate.[6,11]

Hematopoiesis is the process of blood cell formation and begins around week 3 of gestation in the yolk sac before transitioning to the liver, and finally the bone marrow.[6] Large progenitor cells, megakaryocytes, identified by week 5 of gestation, form under the stimulus of thrombopoietin to make platelets. Platelet production occurs by 8 to 9 weeks in the developing embryo, following the cytoplasmic division of mature megakaryocytes, a process known as megakaryocytopoiesis.[6,11] Platelet counts are reflective of the quantity and size of megakaryocytes in circulation. Approximately 5 days following megakaryocyte maturation, platelets are released into circulation and are consequential in hemostasis and thrombosis.[6,12]

Platelets, the smallest blood cell in the body, are anucleate disk-shaped cell fragments that are essential in blood coagulation.[6,12] Intrinsic damage within a blood vessel signals platelet migration to the site of injury, resulting in primary hemostasis.[11] Activation of the coagulation cascade causes the formation of a fibrin-platelet plug that stabilizes the clot and completes secondary hemostasis.[11] Glycoproteins located on the cell exterior are crucial in platelet adhesion and aggregation.[13] A significant decrease in platelet production, or an increase in platelet destruction, can result in thrombocytopenia, and have significant effects on hemostasis in the newborn.[6,12]

Once in the bloodstream, platelets have a lifespan of 7 to 10 days.[6] Normal platelet counts vary among preterm and term infants, with term infants being slightly higher and ranging from 150 to 450 $\times$ 10^9/L.[6] Following delivery, platelet counts slowly decline during the first few days of life to a nadir that remains within the normal platelet indices, and begins to increase around 7 days of life.[6]

PATHOPHYSIOLOGY OF NAIT

NAIT occurs when fetal and maternal platelets are not compatible, initiating an immune response, resulting in platelet destruction in the neonate. Platelet types are characterized by antigens, a substance located on the cell surface called human platelet alloantigens (HPA), that can initiate an immune response. Platelet alloimmunization occurs when the fetus inherits HPA from the father that differs from the mother resulting in maternal antibody production against the foreign antigen.[1,6] Maternal immunoglobulin G (IgG) antibodies are the only immunoglobulin transported across the placenta that recognize and bind to foreign antigens.[6] The process of maternal IgG antibody transfer begins as early as 15 weeks' gestation targeting foreign HPA antigens that are paternally inherited, thereby eliciting platelet destruction in the fetus.[1,3,6,8,13] Maternal antibodies remain in the newborn's circulation following delivery and continue to attack foreign HPA platelets until antibodies are cleared from circulation.[11,14]

Human platelet alloantigens are formed by changes in amino acids in platelet membrane glycoproteins that coat the cell surface, resulting in HPA epitopes that can trigger an alloimmunization response.[8] Presently 37 HPAs have been identified on 6 platelet glycoprotein membrane surfaces as early as 14 weeks' gestation.[8] All races are susceptible to NAIT; however, HPA-1a, identified in 80% to 85% of diagnosed NAIT among Caucasians, is seldom identified in other races.[1,6,8,9] The second most commonly identified HPA associated with NAIT is HPA-5b, accounting for 10% to 15% of diagnosed NAIT among the African American population.[8]

CLINICAL MANIFESTATIONS

Hemolytic manifestations of NAIT occur secondary to maternal alloimmunization and destruction of fetal platelets in utero and in the neonatal period.[8,13] Common clinical manifestations include ecchymosis, petechiae, and purpura, which are often identified on the infant's skin and mucous membranes postnatally. A thorough physical examination of the infant's skin following delivery often initiates further investigation and diagnosis of the underlying cause of thrombocytopenia.[11,15] Bleeding can occur in various locations throughout the body including the intracranial space, genitourinary system, gastrointestinal system, lungs, eyes, and spinal cord, and varies based on the severity of thrombocytopenia.[2,11,13] ICH is a serious complication that has been identified in utero as early as 20 weeks' gestation.[3] It is estimated that 10% of infants who suffer from ICH as a result of NAIT will develop long-term neurological deficits and developmental delays.[7]

DIAGNOSIS

The differential diagnosis for NAIT is extensive. There are numerous etiologies for thrombocytopenia in the newborn secondary to a decrease in platelet production or an increase in platelet destruction.[7,11] The most common etiologies for thrombocytopenia in the newborn include perinatal hypoxemia, placental insufficiency, and sepsis.[6,7,11] Refer to Table 1 for a list of differential diagnoses of neonatal thrombocytopenia.

NAIT is often undiagnosed in the prenatal period in first pregnancies due to a lack of universal screening in pregnant women. In subsequent pregnancies, the recurrence of NAIT is almost 100%, often with the severity of thrombocytopenia comparable to or more severe than the first occurrence.[14] Pre- and postnatal diagnosis incorporates testing that is supportive and definitively diagnostic of NAIT. Early diagnosis facilitates treatment and intervention that may minimize and prevent adverse long-term neurological outcomes in many of these infants.[15]

Prenatal Diagnosis

The presence of fetal cells and DNA found in maternal plasma is thought to be linked to fetal trophoblasts.[8] The trophoblast surrounds the developing blastocyst. Following implantation, it differentiates into the syncytiotrophoblast and the cytotrophoblast. The cytotrophoblast then develops into the chorion, the outer portion of the fetal surface of the placenta. Chorionic villi emerge from the chorion allowing maximum contact with maternal blood for the transfer of nutrients, waste products, and IgG transfer during pregnancy.[6,8] This may explain why fetal cells are present in maternal blood by the second trimester. Additionally, 100% of women have

TABLE 1. Differential Diagnoses of Neonatal Thrombocytopenia[a]
Perinatal hypoxemia[7,11]
Placental insufficiency[7,11]
Sepsis[7,11]
Necrotizing enterocolitis[7,11]
TORCH infection[7,11]
Maternal drug subjection[7,11]
Maternal conditions related to pregnancy (PIH)[6]
Autoimmune/alloimmune[6,7,11]
Disseminated intravascular coagulation[7,11]
Congenital heart disease[7]
Inborn errors of metabolism[11]
Genetic disorders[7,11] • Bernard-Soulier • MYH9 macrothrombocytopenia • Thrombocytopenia-absent radii syndrome • Amegakaryocytic thrombocytopenia • Wiskott-Aldrich syndrome • Fanconi anemia
Chromosomal disorders[11] • Trisomy 13 • Trisomy 18 • Trisomy 21
Hemangioma[7,11]
Kasabach-Merritt syndrome

Abbreviations: PIH, pregnancy-induced hypertension; TORCH, toxoplasmosis, other agents, rubella, cytomegalovirus, or herpes simplex.
[a]From Akpan et al,[6] Arnold et al,[7] and Sillers et al.[11]

fetal cells present in their blood by 36 weeks' gestation, despite separate maternal–fetal circulations.[8]

There is currently no universal screening protocol for NAIT. First pregnancies are vulnerable to delayed diagnosis in the postnatal period due to maternal sensitization to foreign HPAs resulting in destruction of fetal platelets in utero.[7,9] A universal screening tool to detect HPA-1a antibodies has been proposed, which could definitively diagnose NAIT prenatally, reducing mortality, morbidity, and healthcare costs related to the disorder.[8] The screening tool focuses on HPA-1a typing via noninvasive screening of maternal plasma for cell-free fetal DNA blood testing and has yielded promising results, indicating a 75% reduction in risks associated with NAIT.[8,9,14]

Fetal HPA genotyping, definitively diagnostic of NAIT, is not typically performed during first pregnancies, as the diagnosis of NAIT is often unknown.[3] Fetal HPA genotyping is required when paternal HPA heterozygosity, discovered after having a child diagnosed with NAIT, is present. The test involves the collection of amniotic fluid via amniocentesis performed after 15 weeks' gestation to determine fetal platelet type.[3] An amniocentesis is an invasive procedure that is not without risks to the mother and fetus including preterm labor, rupture of membranes, infection, bleeding, and miscarriage.[3]

Alloimmunization often results in more severe complications from NAIT in subsequent pregnancies.[13] Prenatal ultrasound indicative of ICH is supportive in the diagnosis of NAIT and is crucial in the management of care of the neonate.[16] Serial ultrasounds are done to monitor fetal growth and assess for ICH beginning around week 20 of gestation.[13] Ultrasounds are helpful in assisting healthcare providers with determining approximately when the hemorrhage occurred in utero.[16]

Fetal platelet counts are also supportive in the diagnosis of NAIT. Currently, a noninvasive technique is not available to confirm fetal platelet counts; fetal blood sampling (FBS) must be performed using cordocentesis, also known as percutaneous umbilical cord blood sampling.[4] Cordocentesis involves inserting a needle under sterile technique and ultrasound guidance, through the abdominal wall, into the umbilical vein, to collect fetal blood for sampling.[4] Complications associated with cordocentesis include fetal bradycardia, maternal/fetal bleeding, rupture of membranes, abruption, infection, alloimmunization, and fetal demise in infants with thrombocytopenia.[4]

Postnatal Diagnosis

NAIT should be suspected following the exclusion of other possible causes of thrombocytopenia in the newborn such as perinatal asphyxia, placental insufficiency, sepsis, congenital infections, autoimmune deficiencies, and maternal drug exposure. NAIT is often diagnosed in term, otherwise healthy, infants who present with severe unexplained thrombocytopenia ($<30 \times 10^9$/L) within 48 hours after delivery.[1,3,7,11] Early recognition and prompt diagnosis can improve the care and negative long-term outcomes for infants with NAIT.[3,11]

When NAIT is suspected, the diagnosis is supported with infant and maternal serum testing.[3] A complete blood count is obtained from the infant, as the first step in diagnosing NAIT, to eliminate pancytopenia, a reduction in red and white blood cells and platelets.[3,11,15] Infants with an initial platelet count of less than 150×10^9/L should have a repeat platelet count collected via a central stick to confirm the low count, as platelet counts obtained from a heel stick may lead to an inaccurately low platelet count due to wound clotting.[11] Often the results indicate severe thrombocytopenia with platelet counts of less than 30×10^9/L.[3] Maternal platelet counts should also be evaluated as they are not affected in NAIT, which is a distinguishing factor between alloimmune and autoimmune thrombocytopenia.[6,11]

Following the evaluation of neonatal and maternal platelet counts, which support the diagnosis, the next step in the definitive diagnosis of NAIT is platelet immunologic testing on maternal and paternal blood to assess for platelet antigen differences.[3,14,15] Several laboratory assays are available for diagnostic testing; however, the monoclonal antibody immobilization of platelet antigen (MAIPA) is most commonly used in diagnosing NAIT.[14] MAIPA is a comprehensive assay that tests for uncommon antigens outside of those commonly reported in NAIT.[14] Platelet testing is highly specialized and only a select few reference laboratories are trained in platelet serology in the United States.[15] The test requires 2 to 3 days to complete and treatment of the infant should not be delayed while awaiting the results.[14]

In conjunction with MAIPA testing, a maternal blood sample should be drawn to identify anti-HPA antibodies to her partner's platelets and is definitively diagnostic of NAIT; however, the antibody level is not indicative of the degree of thrombocytopenia present in the newborn.[3,14,15] Approximately 25% of women may have an initial maternal alloantibody screen that is negative following delivery, yet the suspicion of NAIT remains high in the newborn.[7] Maternal antibody testing should be repeated in these women using surface plasmon resonance, which has been shown to have positive results while other assays were negative.[7] Surface plasmon resonance testing is done in real time and does not require the platelets to undergo a wash procedure prior to being evaluated.[7]

If the result of the antiplatelet antibody testing is positive, blood is drawn from both parents and the newborn for genotyping to identify and definitively diagnose the specific HPA associated with NAIT.[11] HPA genotyping determines the hereditary risks in subsequent pregnancies and is determined by the paternal genotype.[14] Heterozygous fathers have a 50% chance of having a newborn with NAIT, while homozygous fathers have an almost 100% chance of passing the HPA to their child.[6,14] Identification of the HPA antigen involved in NAIT provides a more focused plan for healthcare professionals in the pre- and postnatal management plan.[14] Refer to Table 2 for a summary of postnatal laboratory diagnostic testing of NAIT.

TABLE 2. Postnatal Laboratory Diagnosis of NAIT[a]

Laboratory Test	Results
CBC: *Supportive diagnosis*	
Infant[11]	Platelet count: $<30 \times 10^9$/L[6,11]
Maternal[6,11]	Platelet count: normal ($150\text{-}450 \times 10^9$/L)[6,11]
Platelet testing (MAIPA): *Definitive diagnosis*	
Maternal[3,11,14]	HPA-1a negative; antiplatelet antibodies present[3,11,14]
Paternal[3,11,14]	HPA-1a positive[3,11,14]
Paternal genotype[6,11,14]: *Definitive diagnosis*	100% recurrence rate to homozygous father (HPA-1a/1a)[6,14] 50% recurrence rate to heterozygous father (HPA-1a/1b)[6,14] with HPA-1a negative partner

Abbreviations: CBC, complete blood count; HPA, human platelet antigen; MAIPA, monoclonal antibody immobilization of platelet antigen.

[a]From Bertrand and Kaplan,[3] Akpan et al,[6] Sillers et al,[11] and Zdravic et al.[14]

MANAGEMENT

Management of NAIT can occur during the pre- and postnatal periods. Maternal sensitization to foreign HPA antigens results in production of IgG antibodies that attack fetal platelets in utero affecting first and subsequent pregnancies.[6] Subsequent pregnancies in mothers with a history of NAIT can be managed and followed more closely by healthcare providers to reduce the risk of ICH and long-term implications associated with undiagnosed NAIT.[4,14]

Prenatal Management

Prenatal management of NAIT consists of noninvasive and invasive treatment options aimed at preventing in utero thrombocytopenia. Noninvasive treatment is preferred over invasive options to minimize risks and complications to the fetus and mother.[4,14] Since 1988, intravenous immunoglobulin (IVIG) administration, with or without steroid therapy, has remained the antenatal treatment of choice for NAIT.[3,6,13]

IVIG treatment is recommended to begin around 18 to 20 weeks of gestation, with a dose of 1 to 2 g/kg administered weekly until delivery.[3,7] The mechanism of action of IVIG in the treatment of NAIT is not fully understood; however, it is speculated to work by binding to the Fc-receptors on the placenta, decreasing the transmission of maternal antibodies.[14] Fc-receptors located on the chorionic villus allow the maternal/fetal transfer of IgG antibodies, including HPA antibodies responsible for NAIT, to cross the placenta.[8,14] Winkelhorst et al[5] conducted a systematic review that evaluated the antenatal management of NAIT in 315 pregnancies. The study concluded that IVIG treatment alone was 98.7% effective in preventing ICH associated with NAIT. A reduction in ICH in pregnancies affected by NAIT makes noninvasive maternal IVIG therapy beneficial in the antenatal treatment of NAIT. Adverse effects associated with IVIG therapy are rare but can include headache, rash, hemolytic

anemia, renal failure, aseptic meningitis, and thrombosis in the mother.[5] Despite these risks, no adverse effects from maternal treatment have been noted in the fetus.[3] The estimated cost of IVIG treatment is $75 per gram, with cumulative costs in high-risk pregnancies totaling over $300,000.[5,14]

Corticosteroids—prednisone or dexamethasone—are often administered alongside IVIG when fetal platelet counts via cordocentesis confirm severe thrombocytopenia in the fetus.[6,7,14] Prednisone dosing ranges between 0.5 and 1.0 mg/kg/day starting at 16 to 18 weeks' gestation in subsequent pregnancies with a history of a previous child diagnosed with ICH secondary to NAIT, and 30 to 32 weeks' gestation if there is a history of NAIT in previous children without ICH.[3,14] While there have been no adverse outcomes from treatment reported, a systematic review by Winkelhorst et al[5] reported that further research is needed to support the improvement of severe thrombocytopenia, ICH, and mortality associated with NAIT by combining corticosteroids with IVIG. The benefits of including corticosteroids in the treatment of NAIT are uncertain, but they are thought to decrease platelet destruction and promote primary hemostasis, thereby reducing bleeding in the newborn.[5] Adverse effects from corticosteroids include oligohydramnios, hypertension, and diabetes; however, the benefits are believed to outweigh the risks.[5]

Successful prenatal management of NAIT with IVIG and corticosteroids has greatly reduced the need for highly invasive diagnostic and therapeutic procedures such as FBS and intrauterine platelet transfusions (IUPT).[4,13] Platelets transfused should be HPA compatible, filtered, irradiated, and cytomegalovirus negative.[4] Following the transfusion, a second fetal blood sample is analyzed to assess fetal platelet counts.[4] Complications of IUPT include fetal bradycardia, maternal/fetal bleeding, rupture of membranes, abruption, infection, alloimmunization, fetal stroke, preterm delivery, and fetal demise.[4]

Most healthcare providers recommend delivery via an elective cesarean section at term to minimize or avoid ICH complications in the newborn.[3,14] A planned cesarean section allows for a more controlled situation with the necessary staff and supplies needed to ensure the best outcome for the newborn.[7] Despite the current recommendations for an elective cesarean section, some women strongly desire a vaginal delivery.[4] FBS may be recommended in this situation to ensure that fetal platelet counts are adequate to safely deliver vaginally.[4]

Postnatal Management

Postnatal management of NAIT involves a thorough assessment of the newborn. A detailed history of the pregnancy and delivery, physical examination of the newborn, neonatal and maternal platelet counts, and diagnostic imaging results obtained from a head ultrasound are all important factors in determining the postnatal treatment plan.[11] Treatment regimens for NAIT are determined by the acuteness of thrombocytopenia, mild, moderate, or severe and signs of bleeding or ICH.[3,11]

Mild Thrombocytopenia

A platelet count of 50 to 100 $\times$ 10^9/L is suggestive of mild thrombocytopenia and should be repeated on day of life 2 to 3, when the physiologic nadir is reached, and again on day of life 5 to 6.[3,11] Maternal antiplatelet antibody testing should also be considered prior to discharge if other etiologies for thrombocytopenia are not identified.[11] Infants with decreasing platelet levels during the first week of life should continue to have platelet levels monitored, with treatment based on the severity of findings and platelet levels less than 50 $\times$ 10^9/L.[3,11]

Moderate Thrombocytopenia

A platelet count of 30 to 50 $\times$ 10^9/L is indicative of moderate thrombocytopenia in the newborn.[3] Infants with a platelet count of less than 50 $\times$ 10^9/L should receive a head ultrasound to evaluate for ICH, and NAIT diagnostic testing should be conducted.[3,11] A healthy, full-term infant with no evidence of ICH should continue to have platelet counts monitored the first week of life in the neonatal intensive care unit with no additional treatment, until counts stabilize with no further decline prior to discharge.[3]

Severe Thrombocytopenia

Infants born with active bleeding, ICH or extracranial, or who have severe thrombocytopenia less than 30 $\times$ 10^9/L, are urgently transfused with platelets prior to a diagnostic evaluation for NAIT.[3] Ideally, follow-up platelet counts should be maintained between 30 and 50 $\times$ 10^9/L unless the infant is diagnosed with ICH or is premature, at which point the transfusion threshold increases.[3] In infants diagnosed with ICH, the platelet transfusion threshold recommended for the first week of life is 100 $\times$ 10^9/L or more.[16]

Treatment of the newborn with severe thrombocytopenia should not be delayed while awaiting confirmation of a diagnosis of NAIT.[14] Therefore, the first transfusion the infant receives is usually one of random donor platelets.[14] While this treatment is beneficial to the newborn, it is not the best treatment to sustain platelet levels due to alloantigen incompatibility and the presence of maternal antibodies that remain in the newborn's circulation following delivery.[11,14] Therefore, the treatment of choice in NAIT is donor-matched, HPA-negative platelets. Platelets from HPA-1a- and HPA-5b-negative donors have been shown to be efficient in improving platelet counts in up to 95% of newborns diagnosed with NAIT.[14]

Summary of Recommendations for Practice and Research	
What we know:	• NAIT is a platelet disorder caused by paternally inherited HPAs. • Affects first pregnancies. • Often undiagnosed prenatally due to lack of universal screening. • Can cause devastating effects on the neonate such as ICH from severely low platelet counts.
What needs to be studied:	• A universal screening protocol for all pregnant women using cell-free DNA should be implemented. • HPA-1a prophylax.is
What we can do today:	• Educate healthcare providers about the clinical manifestations and diagnosis of NAIT. • Include NAIT in differential diagnoses for thrombocytopenia, especially in a full-term, otherwise healthy infant. • Early diagnosis and treatment can minimize the severity of thrombocytopenia and deficits resulting from ICH. • With suspected NAIT, the treatment of choice is donor-matched, HPA-negative platelets and IVIG; however, treatment should not be delayed while awaiting a diagnosis and random donor platelets are often used at first.

HPA-negative platelets can be difficult to locate, as many hospitals and blood banks do not have genotyped platelets available for transfusion.[14] Another option, although time consuming, is donation of maternal platelets, which lack the HPA.[11] Platelets donated by the mother must be washed, irradiated, and leukocyte reduced to avoid transferring additional maternal alloantibodies to the newborn during transfusion.[11] IVIG treatment is often given in conjunction with platelet transfusions to decrease the breakdown of transfused platelets from maternal alloantibodies present in the newborn's circulation.[3,14] Several treatments of platelet transfusions and IVIG may be necessary before platelets stabilize and return to normal.[3,11]

Future Directions in the Treatment of NAIT

Promising research led to the development of the PROFNAIT project in 2011 in Europe.[8,9,14] The goal of this project is to develop prophylaxis treatment that can successfully and safely prevent NAIT in pregnancy.[8,9,14] The drug, NAITgam, is developed from plasma donated by women who are HPA-1a-immunized and have given birth to a child with NAIT.[8,9,14] Anti-HPA-1a IgG is collected from the donated plasma and when administered to pregnant women who are positive for HPA-1a antibodies, eliciting an antibody-mediated immune response, thereby preventing NAIT in the newborn.[8,9,14] HPA-1a prophylaxis could be available, pending completion of clinical trials, within the next 5 years.[9]

LIFESPAN IMPLICATIONS

Thrombocytopenia resulting from NAIT resolves as maternal antibodies are eliminated from the newborn's circulation following platelet transfusions with HPA-negative platelets and IVIG.[11] Clearance of maternal antibodies occurs over the first few weeks up to 3 months of life, without further implications on the newborn.[11] Infants diagnosed with ICH secondary to NAIT require medical treatment after thrombocytopenia has resolved, extending well into childhood or is lifelong depending on the severity of ICH.[11,17] Long-term implications from severe ICH include blindness, hydrocephalus, epilepsy, cerebral palsy, cognitive delays, and intellectual disability.[11,17] Developmental milestones should be closely monitored for the first 2 years of life in these children and genetic counseling offered to families.[11]

CONCLUSION

A diagnosis of severe thrombocytopenia in an otherwise healthy, term newborn is most often secondary to NAIT.[1,2,3,7,11] Many healthcare providers are not familiar with this disorder and often focus on other causes of thrombocytopenia as a potential diagnosis.[11,15] It is therefore imperative to educate physicians, nurse practitioners, and nurses about the clinical presentation and risk factors that accompany NAIT. First pregnancies can be affected, as there is currently no screening protocol utilized in practice.[7,9] Early diagnosis and treatment during pregnancy can minimize the severity of thrombocytopenia, which often results in ICH in utero and has devastating effects on the newborn.[4,14]

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