

Platelet Transfusions in the Neonatal Intensive Care Unit



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KEYWORDS

• Platelet transfusions • Neonatal intensive care unit • Thrombocytopenia

KEY POINTS

- Although platelet transfusions are currently administered on the basis of platelet counts or platelet mass, the evidence strongly suggests that factors other than the degree of thrombocytopenia determine the bleeding risk.
- Thus, larger studies are needed to better characterize the platelet function and the hemostatic profile of preterm infants, and their changes over time and in response to illness.
- It will be important to develop and validate tests that can be used in preterm infants and that incorporate both platelet count and function to evaluate hemostasis, rather than individual platelet counts alone.
- Intrauterine growth restriction, pregnancy-induced hypertension or diabetes, perinatal infection, and transplacental passage of maternal allo- or autoantibodies are frequently associated with early onset thrombocytopenia.

INTRODUCTION

Thrombocytopenia, generally defined as a platelet count less than $150 \times 10^9/L$, is (after anemia) the second most common hematologic disorder of infants admitted to neonatal intensive care units (NICUs). It affects 18% to 35% of all patients admitted to NICUs and approximately 70% of extremely low birth weight (ELBW) infants with a birth weight less than 1000 g.^{1–4} The incidence of thrombocytopenia is inversely proportional to the gestational age, and it represents a risk factor for poor neonatal outcomes.⁵

Disclosures: None.

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Recently, Wiedmeier and colleagues published the largest study on neonatal platelet counts conducted to date, which included approximately 47,000 infants delivered between 22 and 42 weeks gestation.⁶ This study showed that platelet counts at birth increased with advancing gestational age (Fig. 1). Linear regression analysis showed that, for each week increase in gestational age, there was a corresponding increase in mean platelet count of approximately $2 \times 10^9/L$. Importantly, while the mean platelet count was $\geq 200 \times 10^9/L$ even in the most preterm infants, the fifth percentile in this large epidemiologic study was $104 \times 10^9/L$ for those no more than 32 weeks gestation and $123 \times 10^9/L$ for late-preterm and term neonates (see Fig. 1).⁶ These findings indicate that different definitions of thrombocytopenia should be applied to preterm infants.

The etiologies of thrombocytopenia are highly diverse, as is the natural history. Clinically, a distinction is frequently made between early onset (≤ 3 days of life) and late-onset (≥ 4 days of life) neonatal thrombocytopenia. Intrauterine growth restriction, pregnancy-induced hypertension or diabetes, perinatal infection, and transplacental passage of maternal allo- or autoantibodies are frequently associated with early onset thrombocytopenia. Late-onset neonatal thrombocytopenia is most commonly caused by bacterial infection or necrotizing enterocolitis.

PLATELET TRANSFUSION PRACTICES

Platelet transfusion remains the primary treatment modality for neonatal thrombocytopenia, but there is lack of agreement regarding the platelet count below which a newborn infant should be transfused. Nevertheless, it has been widely accepted that neonates should be transfused at higher platelet counts than older children and adults, and thus platelet transfusions are a frequent intervention in the NICU. In an earlier study of a single NICU in the United States with liberal transfusion practices, 9% of infants admitted received at least 1 platelet transfusion during their NICU stay.⁷ Extrapolating data from a single institution to the number of North American

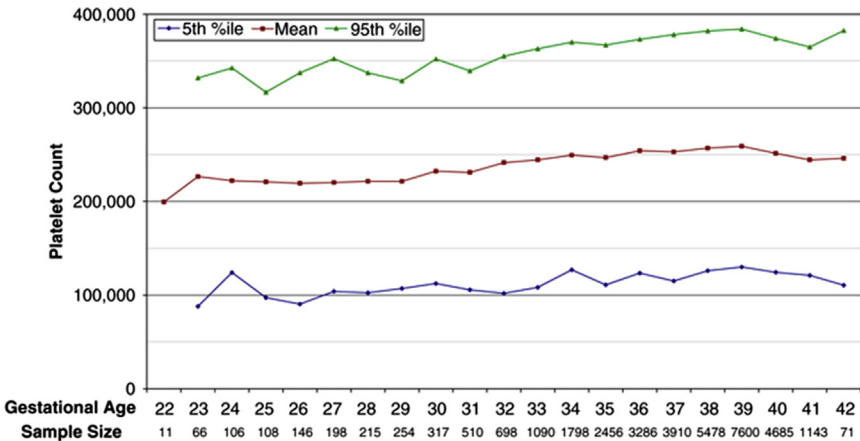


Fig. 1. First recorded platelet counts, obtained in the first 3 days after birth, in neonates born at 22 to 42 weeks gestation. Mean values are indicated by the red line, and the 5th and 95th percentiles are shown in the blue and green lines, respectively. (From Wiedmeier SE, Henry E, Sola-Visner MC, et al. Platelet reference ranges for neonates, defined using data from over 47,000 patients in a multihospital healthcare system. *J Perinatol* 2009;29:132; with permission.)

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