

Erythrocyte index and serum ferritin in newborns

Índices hematimétricos e ferritina sérica em recém-nascidos

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The main consequence of iron deficiency is anemia, but this does not occur during the neonatal period.^(1,2) Thus, identifying newborns at risk for iron deficiency is very important as perinatal iron deficiency can lead to severe consequences in neurodevelopment and in iron deficiency during infancy (usually after 6 months of age).⁽²⁾ The requirement for iron is greater during periods of rapid growth and differentiation such as in the late fetal and neonatal periods.⁽³⁾

The progressive drop in hemoglobin values during the first months of life in term and premature infants has been named physiologic anemia of infancy and anemia of prematurity, respectively. In premature infants, the decline occurs more rapidly with the lowest values at 4 to 8 weeks as opposed to 10 to 12 weeks in term infants. The recovery stage of physiologic anemia depends on iron stores, but iron administration to infants does not affect the physiological drop in hemoglobin.⁽¹⁾

Iron passes into the fetus via the placenta mainly in the third trimester of pregnancy. There is risk of developing brain iron deficiency as storage iron pools become depleted in certain gestational conditions. The serum ferritin concentration has been used as a standard measurement of iron stores in infants, children and adults, but we have few data about cord serum ferritin in term and premature newborns.⁽⁴⁾ Premature infants have limited iron stores and are at risk to develop iron deficiency due to inadequate intake, frequent phlebotomy, increased erythropoiesis, rapid postnatal growth, delayed iron supplementation and low levels of iron supplementation.^(4,5)

Maternal conditions such as iron deficiency, diabetes mellitus, hypertension and smoking, and preterm birth are common causes of perinatal iron deficiency. Studies have shown that preterm newborns have lower cord serum ferritin than term babies, but levels remain within the normal range.^(4,6) A maternal ferritin concentration <12 µg/l appears to be the threshold below which fetal iron accretion is affected; 14% of full-term infants born to iron-deficient mothers have a serum ferritin concentration <30 µg/l at birth.⁽²⁾

As in other age groups, iron deficiency is more common than iron excess.⁽²⁾ As preterm infants who are submitted to multiple red blood cell (RBC) transfusions, intravenous iron therapy and aggressive enteral iron therapy have very high ferritin concentrations, it may be prudent to use appropriate iron supplementation for these patients in order to avoid iron overload. However, serum ferritin is increased in inflammatory conditions (as intrauterine growth retardation) and in neonatal hemochromatosis.^(2,4)

The article "Erythrocyte Indices and serum Ferritin in Newborns"⁽⁷⁾ published in this issue describes the hematological profile of umbilical cord blood and iron reserve in three distinct groups of newborns: term adequate for gestational age (AGA), term small for gestational age (SGA) and preterm AGA. The term SGA newborns presented the highest mean values for hemoglobin, RBC, hematocrit and ferritin, while the preterm AGA newborns exhibited the lowest mean values. In this study, mean values of Red cell distribution width (RDW) were similar in different groups of newborns. The results regarding RBC parameters are similar to those reported in some studies and lower than those observed in others, and are lower than the reference standards usually used in neonatology. Serum ferritin in term AGA newborns was closer to the concentrations reported by some authors but higher than those obtained by others. These differences can be explained by the small sample size of some groups of newborns, especially the preterm AGA group, or due to possible maternal characteristics as discussed above.

Following the example of Nunes et al.,⁽⁷⁾ further studies in Brazil to determine hematological parameters and iron burden in neonates must be made to better understand newborn babies at risk of developing iron deficiency. As hepcidin regulates iron homeostasis, future studies of hepcidin expression and regulation in the neonate may also be interesting.

Regardless of the need for more studies, we should avoid iron deficiency during pregnancy to avoid iron deficiency in newborns. All pregnant women should be screened for iron deficiency. During pregnancy, daily iron supplementation can prevent maternal iron deficiency.⁽²⁾ Finally, the Brazilian Ministry of Health, in order to reduce the prevalence of iron deficiency anemia, recommends iron supplementation for infants and food fortification for older children.

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