Weighing the risks and benefits of iron administration in children

The ability of iron ions to transfer electrons has been harnessed by a number of essential iron-dependent proteins. Iron deficiency results in lack of hemoglobin, impaired protein synthesis and metabolism, which ultimately affects tissue regeneration and growth. But the potential for iron to participate in electron transfer can also be a detriment: the reactive oxygen species generated through this process may cause molecular and cellular damage.

Children are especially sensitive to the balance between not enough and too much iron. In addition to monitoring the efficacy of strategies to counter iron deficiency, timing and safety are prime areas of concern. Klaus Schümann and Noel Solomons address these key aspects of iron administration in children. The first section of their article covers the nutritional aspects of meeting iron requirements across the different age groups. In the latter section of the article, they review the safety concerns associated with excess iron intake.

“The motivation for supplementation can be either therapeutic or prophylactic,” reveal Schümann and Solomons. They start off by outlining the nutritional strategies for countering iron deficiency according to the different techniques for supplying extra iron to children of different ages. Beginning with parenteral administration, the authors move on to discuss enteral supplements. An important means of prophylaxis is public supplementation programs, including food fortification.

Nevertheless, the success of highly bioavailable iron compounds has been tempered by the potential toxicity when iron thresholds are exceeded. The extent of these adverse effects is modulated by the body’s iron status and anti-oxidant buffering capacity. Schümann and Solomons take a practical standpoint when describing these adverse effects, by exploring the consequences of excess iron exposure in relevant organs including the gut, vasculature, central nervous system and endocrine system.

“Iron is truly a two-edged sword,” state the authors. “A full understanding of the issues that make iron administration efficacious and effective, while at the same time safe in the short and long term, is essential for the well-being of patients and the population at large.”

References