Abstract


Manganese in parenteral nutrition: who, when, and why should we supplement?

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BACKGROUND: Micronutrient requirements are not fully understood. Parenteral nutrition (PN) usually contains the trace element (TE) manganese (Mn) from fixed-concentration TE supplements. Multiple TE formulations may not be optimal in pediatric and home PN. Moreover, most PN products contain Mn as a ubiquitous contaminant. Excessive Mn can lead to Parkinson-like symptoms resulting from hypermanganesemia.

FINDINGS: A survey of 40 Australasian hospitals that contributed data on 108 patients to the annual home PN register and a systematic review of the literature were conducted to establish the scope of the potential problem of Mn toxicity in PN patients. Exposure to Mn doses 5-6 times current daily requirements, together with the TE contamination that is reported in PN products, can lead to neurotoxicity. Whole-blood levels are more accurate for monitoring and correlate well with signal intensity of magnetic resonance imaging. Current TE formulations restrict prescribing options. The regulatory mechanisms of Mn homeostasis are bypassed via the parenteral route so elimination via the hepatobiliary system is impaired, resulting in tissue or brain accumulation.

CONCLUSIONS: Published dosage recommendations may be excessive and official guidelines require revision. Variability in clinical practices necessitates that individual TE additives are more widely available and multiple TE products reformulated. More frequent monitoring for any brain accumulation is recommended. The scarcity of PN-associated Mn deficiency, plus the growing evidence for Mn toxicity, leads to the conclusion that it is unnecessary for Mn to be prescribed routinely for pediatric or long-term PN patients.

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