Readers' Forum

Parenteral Iron Therapy: Indications and Safety

Q. *What are the usual indications of parenteral iron therapy in children? Which injectable iron preparation(s) can be used safely in pediatric practice?*

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A. Parenteral iron therapy is infrequently indicated. It should be used only in very specific situations. Indiscriminate use must be avoided. Contrary to popular belief, parenteral therapy offers no advantage in the rate of response. The increase in reticulocyte counts and the increment in hemoglobin levels are similar with parenteral or oral iron therapy(l,2). Iron stores are, however, created more rapidly when parenteral iron is adminsitered. The potential side-effects of parenteral therapy are a deterrant. The decision to administer iron by the intramuscular or intravenous route must be made judiciously, weighing the relative risks and benefits. Parenteral iron therapy would usually be indicated in the following situations(2,3): *(a)* inability to tolerate oral iron inspite of administering it in three divided doses, about 30-45 minutes after meals; *(b)* poor patient compliance despite repeated instructions; (c) gastrointestinal disorders such as malabsorptive states, chronic diarrheas or ulcerative colitis; and *(d)* loss of iron at a rate too rapid for oral iron to compensate, as would be encountered in some rare bleeding disorders of the gut, *e.g.,* hemorrhagic telangectasias.

Failure to respond to oral iron therapy is a relative indication for parenteral iron. The main causes for an inadequate response to oral therapy are: (i) incorrect diagnosis; *(ii)* complicating illness; (iii) poor compliance; *(iv)* insufficient dose; *(v)* continuing loss of iron; or *(vi)* malabsorption(2,4). Severe anemia, by itself, must not dictate preference for parenteral therapy since there is little evidence to support its superiority over oral iron therapy.

The various parenteral iron preparations that are commercially available are summarized in *Table I.* Essentially, parenteral iron is in two forms: iron dextran or iron sorbitol citrate complex. The former can be administered by the intramuscular or intravenous route(5) whilst the latter can be given intransmuscularly only. Injections have to be given deep intramuscularly, on the lateral aspect of the thigh, by Z-tracking to avoid skin discoloration. Abscess formation is common, if aseptic precautions are not adhered to. Long continued discomfort and concern about malignant change(6) at the site of injection make intravenous route the preferred choice.

The total amount of parenteral iron required to raise hemoglobin to normal and replenish stores is calculated as follows:

$$\frac{\text{Normal Hb - Initial Hb} \times \text{Weight in Kg} \times 80 \times 3.4 \times 1.5}{100}$$

where 80 represents the blood volume in ml/kg, 3.4 the amount of iron in mg/g of Hb and 1.5 the factor to provide extra iron to replace depleted iron stores.

Parenteral iron may be given as a daily dose or as a total dose infusion(l,3). The maximal daily dose is 2.0 ml of the undilut-

TABLE I–*Commercially Available Parenteral Iron Preparations.*

Preparation	Composition	Availability
Imferon	Iron dextran 50 mg; Vitamin B_{12} 500 mcg; Folic acid 2.5 mg	2 ml and 10 ml ampoules
Imferon-B_{12}	Iron dextran 50 mg; Vitamin B_{12} 12,500 mcg;	2 ml ampoule
Imferon-F_{12}	Iron dextran 50 mg; Vitamin B_{12} 12,500 mcg; Folic acid 2.5 mg	2 ml ampoule
Jectofer	Iron sorbitol citrate 50 mg	1.5 ml ampoule
Jectofer Plus	Iron sorbitol citrate 50 mg; folic acid 50 mcg; Vitamin B_{12} 50 mcg.	1.5 ml ampoule

ed preparation given intramuscularly or intravenously (at the rate of 1 ml/minute). A 0.5 ml test dose is recommended about an hour before the first daily dose.

For the total dose infusion, the iron dextran solution (Imferon) is diluted in a ratio of 1 ml in 20 ml saline. The infusion is started at a rate of 20 drops/minute and increased gradually to 40-60 drops /minute. The side-effects include headache, malaise, fever, generalized lymphadenopathy, arthralgias and urticaria. Phlebitis is a frequent occurrence. Anaphylaxis, though uncommon, has been reported to result in fatalities despite appropriate therapy and is a major deterant to the parenteral use of iron.

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