

### Which is the Ideal Iron Preparation for Treating Anemia?

Iron deficiency anemia is highly prevalent in children. Presently, the market is flooded with different iron salt preparations. Every manufacturer claims superiority for its preparation over others. It would be a great help if the experts enlighten us by presenting a brief comparative profile regarding efficacy, side effects and dosage schedule and rise in hemoglobin for the different iron preparation available presently.

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### REPLY

#### Iron Therapy in Children

Oral iron is recommended for treatment of iron deficiency anemia (IDA). The choice of iron salt to be used for replacement therapy is based on bioavailability, side effects and cost effectiveness of various iron salts. A review article has been published in Indian Pediatrics in 2004(1). However, relevant information on the subject is presented below.

Since all iron has to be reduced to ferrous form for absorption, ferrous salts are preferred for treatment of IDA(2-4), and specifically ferrous sulfate. Ferrous sulfate in liquid form is not stable, hence other ferrous salts are used in these formulations(1). Side effects of ferrous sulfate, particularly gastrointestinal (GI) intolerance and is the likely cause for promotion of other compounds which are said to be better tolerated. GI side effects are more common in adults and adolescents and are reported to occur in 15-20 % patients(4). To overcome this side effect various measures suggested include administration after meals and at bed time. Decreased intestinal motility during sleep may improve absorption(3).

Of the ferric salts, ferric ammonium citrate is used in various formulations. However, bioavailability of iron from these salts is considered 3-4 times less than ferrous compounds(1). Iron amino acid chelates are other group of iron preparations available. Better bioavailability is claimed with these salts as absorption is not interfered with by dietary phytates(1). In clinical studies in young children and infants equal rise in Hb is reported with these salts compared to ferrous sulfate. Side effects with iron-amino acid chelates are less frequent(5).

Two more types of iron preparations deserve mention- iron polymaltose complex (I-PMC) and carbonyl iron. I-PMC has been demonstrated to have bioavailability similar to ferrous sulfate(6). A recent meta-analysis on I-PMC use in adults concluded that in patients with IDA, ferrous sulfate and I-PMC in equivalent doses had similar efficacy(7). However, in an Indian study, IPC given to patients with IDA for 4-52 weeks failed to show adequate response(8).

Carbonyl iron has been used in food fortification industry. The main advantage with this form of iron is its small particle size which contributes to increased bioavailability. Another advantage is that considerably higher doses of iron can be administered. In an Indian study, a modified release form of carbonyl iron has been found to have 147 % bioavailability compared to ferrous fumarate(9). In another Indian series, Hb rise with carbonyl iron and ferrous sulfate is reported to be similar(10).

Conventionally, the dose of medicinal iron recommended for treatment of IDA in children is 4-6 mg/kg/day of elemental iron(2). However, smaller doses have been found to be equally effective and better tolerated. Hence a dose of 3 mg/kg/ day is currently recommended(11,12). Absorptive capacity of iron in duodenum is saturated by 25 mg of elemental iron, hence higher doses will not increase the absorption(3).

Response to oral iron therapy is usually excellent. Within 1-2 days a sense of well being

ensues with decrease in irritability and improvement in appetite. A positive hematological response has been defined as rise of Hb 0.1 g/dL daily. Approximately 2 months treatment is required for Hb to come to normal level. Two more months therapy is required to replenish the stores(12).

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