Are ferric compounds useful in treatment of iron deficiency anemia?

Ahmet Arvas, Emel Gür

Social Pediatrics Unit, Department of Pediatrics, İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul, Turkey

SUMMARY: Arvas A, Gür E. Are ferric compounds useful in treatment of iron deficiency anemia? Turk J Pediatr 2000; 42: 352-353.

The effect of ferric compounds in therapy of iron deficiency anemia is doubtful; however, the absorption of iron is not affected negatively by food or drugs. In our Well Baby Clinic, ferric polymaltose (6 mg/kg/d) was given to 59 infants (Group 1) and ferrous sulphate (same doses) was given to 64 infants (Gorup 2) (74 ± 9 d, 70 ± 7 d, respectively). These infants had iron deficiency anemia, and their therapy was continuous. Ferric polymaltose was not as effective as ferrous sulphate, although it increased hemoglobin and serum iron. Mean corpuscular volume and serum ferritin were not significantly changed after therapy. For this reason, we prefer to use only ferrous salts in therapy.

Key words: ferric polymaltose, ferrous sulphate, iron deficiency anemia.

Iron deficiency anemia (IDA) is a common problem in infancy, especially in developing countries[1]. Iron compounds are given perorally for ease, low price and low adverse reactions. ferrous compounds are usually preferred because they are more bioavailable. Also the therapeutic value of ferric compounds are disputable. In our study, we wanted to compare ferric polymaltose with ferrous sulphate in the therapy of IDA. Ferric polymaltose (6 mg/kg/d elementary Fe+3, p.o., b.i.d.) was given to 59 anemic infants (27 girls, 32 boys) (Group 1) and ferrous sulphate (same doses elementary Fe+2) was given to 64 anemic infants (33 girls, 31 boys) (Group 2). These infants were followed between April 1997-January 1999 at the Children's Hospital's Well Babay Clinic, and their therapy was continuous. Babies were separated into groups according to a record book. They were born at term and had no infection during therapy. All the infants in each group were fed the same complementary foods following the same time schedule after four months (vegetable purees, yoghurt, fruit, cereal, meat, eggs, respectively). Hemoglobin (Hb), hematocrit (Hct), mean corpuscular volume (MCV), serum ferritin (SF), serum iron (SI) and total iron binding capacity (TIBC) were measured for the diagnosis of IDA. Hb: 11 g/dl, MCV: 70 fl and ferritin: 12 ng/ml were accepted as a cut-off level[2]. Hemogram was made by cell counter analysis method (Counter Micro Diff 18, Miami, US). SI and TIBC were measured by colorimetric method (Iron/TIBC reagent set-pointer Scientific Inc.). SF was measured by radioimmunoassay method (Active TM Ferritin, Diagnostic Systems Laboratories 3000, Inc. US). Student's-t test was used for statistical analysis in the program of SPSS for 5.0 Windows. The age of infants in Group 1 was 235 ± 82 days, the period of therapy was 74 ± 9 days, birth weights were 3297.5 ± 401.5 g, weights before therapy were 8210 ± 1245 g and exclusive breast-feeding period was 87 ± 28 days. In Group 2, these values were 252 ± 90 days, 70 ± 7 days, 3269.8 ± 403.6 g, 8503 ± 1531 g, and 72 ± 35 days, respectively. Only breast-feeding time in Group 1 was higher than in Group 2 ($p < 0.001$); there was no significant difference between birth weight and therapeutic periods between the two groups ($p > 0.05$). Hematological values of groups before and after therapy shown in Table I. In Group 2, Hb, MCV SI and SF values after therapy compared to before therapy and to Group 1 values were significantly increased ($p < 0.001$). TIBC was not different before and after therapy in the two groups ($p > 0.05$). In Group 1, only Hb and SI values were increased after therapy ($p < 0.01$). It has been known that ferrous salts are most useful in the therapy of IDA, but the therapeutic importance of ferric compounds is doubtful. There is no recent literature on this subject. Geisser[3] reported that ferric polymaltose has a

Table I. Hematological Findings

	Ferric polymaltose (Gorup 1, n = 59)	Ferrous sulphate (Gorup 2, n = 64)	p values
Hb (g/dl)			
b.t.*	9.7 ± 0.7***	10.0 ± 0.6	0.021
a.t.**	10.5 ± 1.0	11.3 ± 0.6	0.0001
p	0.0001	0.0001	
MCV (fl)			
b.t.	69.9 ± 5.6	70.4 ± 5.4	0.116
a.t.	70.9 ± 6.4	75.7 ± 5.0	0.0001
p	0.130	0.0001	
SF (ng/ml)			
b.t.	11.4 ± 9.5	11.7 ± 7.7	0.460
a.t.	14.5 ± 9.8	29.1 ± 19.0	0.0001
p	0.090	0.0001	
SI (µg/dl)			
b.t.	35.1 ± 18.7	38.8 ± 16.2	0.239
a.t.	45.2 ± 23.2	63.2 ± 25.9	0.0001
p	0.002	0.0001	
TIBC (µg/dl)			
b.t.	354.2 ± 48.6	360.3 ± 55.8	0.523
a.t.	349.4 ± 69.6	329.0 ± 53.4	0.070
p	0.563	0.0001	

* before therapy.
** after therapy.
*** Mean ± SD.

Hb : hemoglobin.
MCV: mean corpuscular volume.
SF : serum ferritin.
SI : serum iron.
TIBC: total iron binding capacity.

different absorption mechanism and that its elementary Fe+3 was not affected by intestinal pH, food or drugs. Sas et al.[4] stated that ferrous and ferric compounds have comparable effects in IDA[4]. Also, Jacobs[5] found that ferrous sulphate and ferric polymaltose have the same iron absorption and the same therapeutic effects[5]. In IDA, two to four months are usually sufficient for treatment. In our study, we found that ferric polymaltose is not effective in therapy of IDA when compared to ferrous sulphate, even though it increased Hb and SI values. Nielsen[6] and Özsoylu et al.[7] also found comparable results[6,7]. In conclusion, it can be shown that ferric compounds are not as effective as ferrous sulphate in the therapy of IDA, which is in accordance with the opinion available in literature.

REFERENCES

1. Dallman PR, Siimes MA, Stekel A. Iron deficiency in infancy and childhood. Am J Clin Nutr 1980; 33: 86-118.
2. Lanzkowsky P. Manual of Pediatric Hematology and Oncology (2nd ed). New York: Churchill Livingstone; 1995: 630-631.
3. Geisser P. In vitro studies on interactions of iron salts and complexes with food-stuffs and medicaments. Arzneim ittel forschung 1990; 40: 754-760.
4. Sas G, Nemesanszky E, Brauer H, Scheffer K. On the therapeutic effects of trivalent and divalent iron in iron deficiency anaemia. Arzneim Forsch Drug Res 1984; 34: 1575-1579.
5. Jacobs P, Johnson G, Wood L. Oral iron therapy in human subjects, comparative absorption between ferrous salts and iron polymaltose. J Med 1985; 15: 367-377.
6. Nielsen P, Gabbe EF, Fischer R, Heinrich HC. Bioavailability of iron from oral ferric polymaltose in humans. Arzneim ittelforschung 1994; 44: 743-748.
7. Özsoylu S, Özbek N. Bioavailability of iron. Exp Hematol 1991; 19: 1065.