

Ginger supplementary therapy for iron absorption in iron deficiency anemia

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The study was aimed to establish ginger as a supplement in treatment of anemia along with iron supplements. Sixty two patients aged between 18-55 yrs, suffering from anemia participated in the study. Blood sample was analyzed for hematological and iron related parameters before and after treatment. Hematological parameters and iron related parameters – plasma iron and plasma ferritin show increased and TIBC decreased by treatment in all the group patients. Per cent rise in hematological and iron related parameters, was calculated which indicates that the ginger and iron supplementation was found to be effective in correcting anemia and iron deficiency. It was concluded that ginger assist in iron absorption and found to be beneficial as a supplement in therapy of anemia.

Keywords: Ginger, Supplementation, Iron deficiency anemia, Iron absorption

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Iron is an important element in human metabolism. Abnormalities in its metabolism have widespread effects. It has a central role in erythropoiesis. It is also involved in many other intracellular processes. Iron deficiency (ID) is the most widespread nutritional problem, and affects over two billion people¹. It is a particularly common disorder among infants, pre-school aged children, young women and older people, but it can occur at all ages and in any region. In India also, depending on age and sex, prevalence of iron deficiency anemia (IDA) has been reported to range from 38-72 %, majority of them being women and children. High prevalence of iron deficiency anemia amongst apparently healthy Indians has been reported².

Zingiber officinale (Ginger) is the most popular of hundreds of members of the Zingiberaceae family. Ginger has been widely used as a common household remedy for various illnesses from ancient times³. There are many iron containing allopathic formulations available in the market for treatment of iron deficiency anemia⁴, though the need of a better preparation has always been felt. However, carbohydrates, inorganic salts, amino acids, ascorbic

acid and surface acting agents are used to increase absorption of iron. An alternative approach of therapy is to enhance the absorption of dietary iron, rather than increase iron in the diet. The present study is one such step in this direction and we are using ginger as a supplement in treatment of anemia along with iron supplements.

Materials and methods

Sixty two patients (12 male and 50 female) aged between 18-55 yrs, suffering from anemia visiting to Medicine OPD in Shri Aurobindo Institute of Medical sciences, hospital for apparent clinical conditions participated in the study. On the entry, whose hemoglobin (Hb) less than <13 gm/dL for Men and HB <12 gm/dL for non-pregnant women was included. Patients who had Tuberculosis, Arthritis, AIDS, Renal failure, Diabetes mellitus, Pregnancy, immunological or autoimmune diseases and blood donors were excluded from the study. Consent to participate in the study was obtained from each individual and the study protocol was approved by the Institutional and Human Ethical committees, Shri Aurobindo Institute of Medical sciences, Indore.

The 62 patients divided into two groups, first group of 30 patients taking iron and ginger supplementation,

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and 32 patients taking only iron supplementation. Two hundred fifty mg of Ginger extract (equivalent to 1.5 gm of pure ginger powder) was given to patients in powder form orally twice daily after meals for 30 days. The patients purchased the prescribed iron supplements from the local market and took them in prescribed dose.

Fasting blood samples (5 ml) was collected from antecubital venipuncture in a plain tube, and was left to clot and then centrifuged at 5000 rpm for 10 min. The serum was then aliquoted and stored until used for assay of parameters. Blood samples were collected from all controls and from the patients at baseline, i.e. before starting treatment and after one month of treatment.

Haemogram was estimated by automated cell counter (Sysmex KX-21). Serum Fe and total Fe-binding capacity (TIBC) were estimated on an autoanalyser from Rosh diagnostics using commercial test kits from Randox Laboratories, UK. Ferritin was estimated by direct immunoenzymatic determination by using test kits from Diametra, Italy.

Paired t-test was used for statistical assessments with SPSS Version 10 to determine values of pre-treatment and after treatment in study group. Values were expressed as Mean \pm SD and $p \leq 0.05$ was significant.

Result and discussion

This study consisted of two groups of 30 patients who received treatment for 30 days by with ginger and iron supplementation and one group of 32 patients as control which was given only iron supplements. As shown in Table 1, the patients were suffering from moderate to severe anemia and their mean Hb level prior to treatment was comparable. From Table 2, it is clear that all the hematological parameters and iron related parameters – plasma iron,

per cent saturation and plasma ferritin increased show increased by treatment in all the group patients. As happens on treatment of anemia, TIBC decreased. Taking PCV as the criteria, the response of group I was more than allopathic drug.

In order to assess comparative efficacy of various drugs, per cent rise in hematological and iron related parameters, was calculated. This is presented in Table 3. It is clear from Table 3 that the ginger and iron supplementation was found to be effective in correcting anemia and iron deficiency. Sharma *et al.* (2007)⁵ observed that when ginger was used as vehicle along with Ayurvedic iron supplements, assist for significant increased in the hematological parameters, iron and ferritin and decreases TIBC levels.

Ginger is widely used as spice and flavoring agent. The properties and uses of ginger in Ayurvedic medicine are available from authentic ancient treatises like *Charaka Samhitha* and *Susrutha Samhitha*, which are the basics for this system. In ancient India, ginger was not significant as a spice, but it was *Mahabheshaj*, *Mahaoushadhi*, literally meaning the great cure, the great medicine⁶. Nutritional data for 100 gm dry ginger shows that ginger contains⁷ water, 9.4 ml; protein, 9.1 gm; fat, 6.0 gm; total carbohydrate, 70.8 gm; food energy, 374 kcal; fiber, 5.9 gm; ash, 4.8 gm; iron, 12 mg; magnesium, 184mg; phosphorous, 148 mg; potassium, 1342mg; sodium, 32 mg; zinc, 5 mg, and niacin, 5 mg.

Farrell. (1985)⁷ and Haq *et al.* (1986)⁸ reported that along with other nutritional element in ginger, the high content of vitamin C and iron should be noted. Allopathic system uses iron polymaltose complex, ferrous gluconate and ferrous glycine sulfate is widely used as iron salt. Ascorbic acid seems to be promising in treatment. As these substances like ascorbic acid, sugars, amino acids, organic acids, which cause better

Table 1—Hematological and Iron parameters before the treatment

Parameters	Group I	Group II	p value
	Pre-treatment	Pre-treatment	
Hb(g%)	9.11 \pm 1.19	9.30 \pm 1.39	p>0.05
RBC (106/cumm)	4.1 \pm 0.56	4.1 \pm 0.56	p>0.05
PCV (%)	28.9 \pm 2.83	29.3 \pm 3.29	p>0.05
MCH (Pg)	22.3 \pm 3.99	22.7 \pm 4.07	p>0.05
MCV (fl)	70.4 \pm 6.47	71.7 \pm 9.74	p>0.05
MCHC (g%)	31.6 \pm 4.07	31.9 \pm 5.03	p>0.05
IRON (μ mol/l)	8.66 \pm 1.82	7.75 \pm 1.84	p>0.05
TIBC (μ g/dl)	408.20 \pm 8.68	401.84 \pm 48.67	p>0.05
Ferritin (ng/mL)	34.73 \pm 8.95	36.93 \pm 8.37	p>0.05

Table 2—Response of Hematological and Iron parameters after treatment

Parameters	Group I			Group II		
	Pre-treatment	Post-treatment	p value	Pre-treatment	Post-treatment	p value
Hb(g%)	9.11 ± 1.19	9.86 ± 1.11	P<0.001	9.30 ± 1.39	9.52 ± 1.39	p<0.05
RBC(106/cumm)	4.1 ± 0.56	4.5 ± 0.62	P<0.02	4.1 ± 0.56	4.3 ± 0.49	P<0.02
PCV(%)	28.9 ± 2.83	32.4 ± 2.64	P<0.001	29.3 ± 3.29	31.2 ± 2.41	P<0.02
MCH(Pg)	22.3 ± 3.99	22.1 ± 3.61	p>0.05	22.7 ± 4.07	21.7 ± 2.26	p>0.05
MCV(fl)	70.4 ± 6.47	72.4 ± 7.77	p>0.05	71.7 ± 9.74	71.8 ± 7.77	p>0.05
MCHC(g%)	31.6 ± 4.07	30.5 ± 3.89	p>0.05	31.9 ± 5.03	30.6 ± 4.66	p>0.05
IRON(μmol/l)	8.66 ± 1.82	10.36 ± 1.75	P<0.001	7.75 ± 1.84	8.18 ± 1.74	P<0.02
TIBC(μg/dl)	408.20 ± 8.68	378.30 ± 43.61	P<0.001	401.84 ± 48.67	382.78 ± 46.69	P<0.05
Ferritin (ng/mL)	34.73 ± 8.95	50.04 ± 10.57	P<0.001	36.93 ± 8.37	49.53 ± 11.75	p<0.001

Table 3—Percentage change in Hematological and Iron parameters after treatment

Groups	Parameters			
	Hb	Iron	TIBC	Ferritin
Anemic Patients with iron and ginger supplements	8.23%	19.63%	7.23%	45.11%
Anemic Patients with iron supplements	2.3%	5.54%	4.47%	34.11%

absorption of non-heme iron. These compounds form a complex with iron and helps in iron absorption⁹. Since, ginger possesses ascorbic acid, reducing sugars, amino acids it might aids in absorption of iron. Patrick-Iwuanyanwu, *et al.* (2007)¹⁰ reported that ginger might possess constituents that would trigger the erythropoietic system to produce red cells.

Iron supplements have various side effects like heart burn, nausea, upper gastric discomfort, constipation and diarrhea¹¹. Recently, it has been shown to generate damaging free radicals in the intestine¹². Ginger has emerged as an alternative therapy and digestive aid for nausea, gastric discomfort and constipation, so it may overcome the problem related to the side effects^{13,14}. Also ginger as an antioxidant agent helps to reduce oxidative stress caused by allopathic iron supplements¹⁵. It was concluded that ginger assist in iron absorption and found to be beneficial as a supplement in therapy of anemia.

Recommendations

Pregnant women and gallstone patients take ginger supplement with physician advice.

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