No Malabsorption of Inorganic Ferrous Iron in Patients with Achylia gastrica

Celada et al. [1] recently described in this journal a considerable malabsorption of $^{59}\text{Fe}^{2+}$ for subjects with achylia gastrica. The authors have used the same test dose of 0.56 mg $^{59}\text{Fe}^{2+}$ and the technique of whole body counting of absorbed $^{58}\text{Fe}$ as proposed by us [7] but their results are in contradiction with published work from our [3-6] and another laboratory [8]. Neither normal gastric juice nor an intrinsic factor is required for the intestinal absorption of $^{59}\text{Fe}^{2+}$ or hemoglobin-$^{39}\text{Fe}$ in humans [3-6]. Subjects with histamine-re-fractive achylia gastrica and absolute intrinsic factor deficiency (pernicious anemia in remission) absorbed 27 ± 15% [3, 5, 6] and subjects with a partial gastrectomy (Billroth I and II) 32 ± 15% [6], which was identical with the absorption of 31 ± 12% as observed for the 10 µmol (= 0.56 mg) $^{59}\text{Fe}^{2+}$ test dose in normal subjects [2-6]. Magnusson did confirm our results since he found no indications for iron malabsorption from the 0.56 mg $^{59}\text{Fe}^{2+}$-dose in patients with Billroth I-partial gastrectomy or antrectomy and gastroduodenostomy with or without vagotomy [8]. $^{59}\text{Fe}^{2+}$ malabsorption (5.1 ± 3.3%) was observed only in patients with a total gastrectomy [6]. Hemoglobin $^{59}\text{Fe}$ was even better absorbed (2-fold) by subjects with achylia gastrica and absolute intrinsic factor deficiency (15 ± 5.6% from a 5 mg hemoglobin-Fe dose versus 7.5 ± 2.4% in normal subjects) [3, 5], since the acidity of normal gastric juice does reduce the bioavailability of hemoglobin-iron probably by heme-polymerization and precipitation [4]. A 3-fold reduction of intrinsically $^{59}\text{Fe}$-labeled meat- (and liver-) iron bioavailability was, however, demonstrated for subjects with gastric mucosa atrophy or Billroth II partial gastrectomy [4] and confirmed with an extrinsically $^{59}\text{Fe}$-labeled test meal for subjects after antrectomy or partial gastrectomy [8]. This reduced bioavailability is however caused by, e.g., meat iron mal-digestion and not by malabsorption since it can be corrected by an in vitro peptic pre-digestion of the $^{59}\text{Fe}$-labeled pork [4]. The normal absorption of ferrous iron, the doubled hemoglobin-iron absorption and the considerable reduction of meat- and liver-iron favour the assumption that dietary iron maldigestion rather than malabsorption causes the development of iron deficiency in patients with achylia gastrica or partial gastrectomy [4]. Patients with achylia gastrica No Malabsorption of Inorganic Ferrous Iron in Patients with Achylia gastrica 57 and iron deficiency anemia do absorb iron from therapeutic oral ferrous sulphate iron preparations like normal subjects and are not resistant to oral iron therapy and do not require parenteral iron.

References


This letter was presented to Dr. Celada, who offered the following reply.

Absorption of inorganic iron in elemental form or combined with food is impaired in patients with achylia gastrica [1-3]. Hydrochloric acid plays a part in iron absorption, since it has been shown to increase the absorption of Cl$_3$Fe by achlorhydric subjects [1]. Gastric juice has also been found to have a potentiating effect on the absorption of nonheme food iron [2, 3]. On the other hand, in patients with antrectomies Magnusson [4] has shown a significant positive correlation between gastric acid secretion (measured as the peak acid output) and absorption of a test dose of inorganic iron. The effect of gastric juice on inorganic iron absorption may be a function of hydrochloric acid [5] or other constituents [6]. Studies on the role of gastric juice in hemoglobin iron absorption are controversial. Intrinsic factor, however, does play a major role in complexing hemoglobin iron and serving as an intestinal transport factor for heme [7].

The difference between our results and those of Dr. Heinrich in the inorganic iron absorption studies in subjects with achylia gastrica, could be due to differences in the patient groups studied. Finally, Gross et al. [8] describe malabsorption of iron in 7 children with iron deficiency.

Following intramuscular iron ad-

ministration, all 7 children had a significant rise in hemoglobin concentration, similar to the patient we described.

References


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