



PIC QUESTION OF THE WEEK: 7/04/06

Q: To what extent do proton pump inhibitors (PPIs) affect the absorption of iron salts?

A: Iron absorption is closely regulated and affected by several factors including the form in which it is administered, dosage, gastric pH, the rate of erythropoiesis, and diet. The major factor influencing absorption appears to be the patient's level of iron stores. *Ferrous* iron is the most efficiently absorbed form and dietary heme iron (the porphyrin iron chelate that is in the ferrous form and found in animal blood and muscle) is considered the optimal source. The absorption of oral iron salts, including polysaccharide iron complex, is dependent on low gastric pH. This acidic environment not only maintains administered iron in the ferrous state, but may also contribute to enhanced absorption in the upper duodenum. PPIs and histamine H₂-antagonists increase gastric pH and potentially could decrease iron absorption. The product information of each PPI contains a precautionary statement indicating that absorption of drugs dependent on low gastric pH (e.g. ketoconazole, iron salts, etc.) may be decreased by concomitant administration of PPIs. Considering the widespread use of PPIs, documentation of iron treatment failure due to simultaneous administration is quite limited. An early study in patients with reflux esophagitis indicated no change in iron, ferritin, B₁₂, or folic acid levels after continuous omeprazole treatment for up to four years. These patients were not iron deficient and received no supplements. In 2004, Sharma described two patients with iron deficiency who failed to respond to adequate iron replacement while receiving omeprazole. After several months of treatment with ferrous sulfate, hemoglobin (Hg) and mean corpuscular volume (MCV) values did not improve. Discontinuation of the PPI resulted in steady increases in Hg and MCV in both cases. Neither patient had endoscopic evidence of gastrointestinal blood loss. Although there may have been other contributory factors, it was concluded that simultaneous use of omeprazole reduced iron absorption. Patients at greatest risk of this interaction appear to be those with severe iron deficiency, limited dietary iron intake, and prolonged therapy with PPIs. In some cases, it may be necessary to administer parenteral iron supplements for these types of patients.

References:

- Koop H, Bachem MG. Serum iron, ferritin, and vitamin B₁₂ during prolonged omeprazole therapy. *J Clin Gastroenterol* 1992;14:288-92.
- Sharma VR, Brannon MA, Carlross EA. Effect of omeprazole on oral iron replacement in patients with iron deficiency anemia. *South Med J* 2004;97:887-9.
- Nand S, Tanvetyanon T. Proton pump inhibitors and iron deficiency: is the connection real? *South Med J* 2004;97:799.

John G. Lech, Pharm.D.

The PIC Question of the Week is a publication of the Pharmaceutical Information Center, Mylan School of Pharmacy, Duquesne University, Pittsburgh, PA 15282

