A Review of Treatment Recommendations for Iron Deficiency Anemia in Inflammatory Bowel Disease

Assessment Questions

1. Which one of the following statements is TRUE regarding inflammatory bowel disease (IBD):
   A. Inactive disease is a common patient characteristic for those with IBD and anemia
   B. Decreased iron absorption is a risk factor for developing iron deficiency anemia (IDA) for patients with IBD***
   C. B12 deficiency is the most common form of anemia for patients with IBD
   D. IBD is most common in developing countries in South American and Australia

Correct Answer: B

IBD occurs most commonly in developed countries in the Northern Hemisphere. Hospitalized IBD patients with active disease have anemia, including IDA, more often than outpatients with inactive disease. While B12 deficiency can cause anemia, iron deficiency is the leading cause of anemia in patients with IBD. Decreased absorption of iron in addition to decreased uptake, increased iron turnover, and blood loss are all risk factors for iron deficiency anemia in patients with IBD.

2. Which oral iron regimen would deliver the low-dose supplementation of 50 to 120 mg of elemental iron per day?
   A. Ferrous fumarate 325 mg by mouth (PO) twice daily
   B. Ferrous sulfate 325 mg; take 2 tabs PO twice daily
   C. Ferrous gluconate 325 mg; take 2 tabs PO 4 times daily
   D. Ferrous gluconate 325 mg PO twice daily***

Correct Answer: D

Ferrous fumarate contains 33% elemental iron, ferrous sulfate contains 20%, and ferrous gluconate contains 12%. Ferrous gluconate 325 mg by mouth twice daily supplies 76 mg of elemental iron per day.

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<tr>
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<td>260 mg/day</td>
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<td>Ferrous gluconate 325 mg PO twice daily</td>
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3. What dose of oral iron would you recommend for a patient with IDA when oral therapy is indicated?
   A. Ferrous fumarate 325 mg PO once daily***
   B. Ferrous fumarate 150 mg; 2 tabs PO twice daily
   C. Ferrous sulfate 325 mg; 2 tabs PO twice daily
   D. Ferrous gluconate 325 mg; 2 tabs PO twice daily

Correct Answer: A
Ferrous fumarate 325 mg PO once daily can deliver a low dose of elemental iron, approximately 100 mg, each day. The duodenum can absorb at most 10 to 20 mg of elemental iron each day; so, 100 mg day is sufficient. Also, gastrointestinal (GI) side effects increase with each increase in dose because unabsorbed iron increases the risk of side effects, intolerance, and possible GI toxicity.

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4. Which one of the following beverages is most appropriate to take with oral iron supplements:  
A. Orange juice***  
B. Milk  
C. Tea  
D. Coffee  

Correct Answer: A  
Dairy, dietary fiber, tea, or coffee can decrease the absorption of oral iron. Alternatively, increased acidity and vitamin C can increase the absorption of oral iron. Therefore, orange juice is the best of the four options. Additionally, drugs to avoid giving at the same time as oral iron include proton pump inhibitors, antacids, tetracyclines, or cholestyramine as they too can decrease oral iron absorption.

5. Which IV iron formulation requires the most infusions to complete the total cumulative dose?  
A. Ferric carboxymaltose  
B. Ferumoxytol  
C. Iron sucrose  
D. Ferric gluconate***  

Correct Answer: D  
A total cumulative dose of 1000 mg ferric gluconate is given over 8 infusions. While iron sucrose still requires a number of infusions (5), ferric carboxymaltose and ferumoxytol are newer agents that deliver more iron in each infusion, which will cause a substantial decrease in the number of infusions. Moreover, the newer agents are equally as effective as the older agents, but come at a much higher direct cost versus the older agents. Therefore, pharmacoeconomics weighing the benefits, risks, and the direct and indirect costs must be considered when choosing which intravenous (IV) iron to recommend.
6. Which IV iron formulation requires a test dose prior to the full dose?
A. Ferric carboxymaltose  
B. Ferumoxytol  
C. Iron sucrose  
D. Low molecular weight (LMW) iron dextran**

Correct Answer: D  
LMW iron dextran is the only agent that requires a test dose be given to assess for possible anaphylaxis or hypersensitivity. Patients must be observed for an hour after the test dose before the full dose can be administered. Moreover, patients are still at risk for severe anaphylaxis or hypersensitivity from either the full dose or the test dose itself, even when the test dose was well-tolerated.

7. A woman, 28 years of age, with active Crohn’s Disease is admitted to the hospital and is diagnosed with IDA. The team has started appropriate induction therapy for the flare-up of disease, but the doctor would like you to recommend an iron replacement regimen. The patient weighs 60 kg, has a hemoglobin of 9.1 g/dL, a ferritin of 20 μg/L, and a transferrin saturation of 15%.

A. Ferrous fumarate 325 mg PO once daily  
B. Ferrous sulfate 325 mg PO twice daily  
C. Iron sucrose 200 mg IV as 5 different infusions over a 14 day period***  
D. Ferric carboxymaltose 1000 mg IV daily for 5 days

Correct Answer: C  
IV iron is indicated for this patient based on their hemoglobin, ferritin, and transferrin saturation. While ferric carboxymaltose could be an appropriate choice, the regimen is incorrect. Therefore, iron sucrose is the correct choice based on the route of administration and number of infusions to deliver the total cumulative iron dose.

8. A patient with IBD is started on oral iron replacement for mild IDA. Which one of the following lab values would indicate an appropriate response:
A. Hemoglobin increase by > 2 g/dL 1 week after therapy is initiated  
B. Hemoglobin value of 14 g/dL after 4 weeks of therapy  
C. Hemoglobin increase by ≥ 2 g/dL and transferrin saturation > 30%, 4 weeks of therapy***  
D. Hemoglobin increase by ≥ 1 g/dL and transferrin saturation of 25%, 6 weeks of therapy

Correct Answer: C  
Oral iron supplementation can take 4 to 6 weeks to see a correction in the laboratory results. The treatment goal is to normalize hemoglobin, have hemoglobin increase by ≥ 2 g/dL, and transferrin
saturation reach > 30%. Furthermore, transferrin saturations > 50% and ferritin concentrations > 800 μg/L are toxic and would require discontinuation of therapy.

9. Which of the following would be an appropriate use of erythropoietin for the treatment of patients with IDA:
A. Add erythropoietin to oral iron supplementation to enhance the response
B. Use erythropoietin in combination with IV iron as initial therapy upon the first diagnosis of IDA
C. Use erythropoietin as monotherapy for the treatment of IDA
D. Add erythropoietin to IV iron after nonresponse to IV iron monotherapy***

Correct Answer: D
Patients with IBD who are receiving IV iron for IDA respond 70% to 80% of the time. Erythropoietin therapy can be considered in conjunction with IV iron if the patient does not respond to IV iron, has low erythropoietin levels, or has not responded to aggressive IBD treatment. Oral iron is not the administration route recommended to be given in conjunction with erythropoietin therapy.

10. What is the cumulative total iron dose for a man with an ideal body weight (IBW) of 69 kg, hemoglobin = 10.2 g/dL, and a target hemoglobin of 13 g/dL? (rounded to the nearest 100 mg)
A. 750 mg
B. 1000 mg***
C. 1500 mg
D. 2000 mg

Correct Answer: B
Using the Ganzoni formula, the cumulative total dose (mg) = [IBW (kg) X (target Hb – actual Hb) X 2.4] + 500. The target hemoglobin is 13 g/dL for men; so cumulative total dose = [(69)(13 – 10.2)(2.4)] + 500 = 964 mg (rounding to the nearest 100 mg would give you 1000 mg). If the patient will receive ferric carboxymaltose or iron isomaltoside, the alternative dosing strategy can be used. The patient’s IBW is < 70 kg, and his hemoglobin is ≥ 10 g/dL, estimating his cumulative total dose to be 1000 mg.