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

EDUCATIONAL OBJECTIVES

Upon completion of this program, participants should be better able to:

1. Identify the prevalence and risk factors of iron deficiency anemia for patients with inflammatory bowel disease (IBD);
2. Review current recommendations for the use of iron supplementation for patients with IBD;
3. Discuss therapeutic selection and the safe and effective dosage of intravenous iron formulations for patients with IBD;
4. Analyze steps for balancing hemoglobin levels and minimizing safety risks for patients with IBD and anemia; and
5. Discuss institutional and patient-related barriers to the optimal use of iron for patients with IBD and identify the pharmacist’s role in decision making and the delivery of care.

Post-Test/Rationale

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

Correct answer: B
Rationale: IBD occurs most commonly in developed countries in the Northern Hemisphere. Hospitalized IBD patients with active disease have anemia, including iron deficiency anemia, more often than outpatients with inactive disease. While vitamin 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 iron 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; 1 tablet by mouth twice daily
   B. Ferrous sulfate 325 mg; 2 tablets by mouth twice daily
   C. Ferrous gluconate 325 mg; 2 tablets by mouth 4 times daily
   D. Ferrous gluconate 325 mg; 1 tablet by mouth twice daily***
Correct answer: D
Rationale: Ferrous fumarate contains 33% elemental iron, ferrous sulfate contains 20%, and ferrous gluconate contains 12%. Ferrous gluconate 325 mg by mouth twice daily provides 76 mg of elemental iron per day. Answer A provides 200 mg/day of elemental iron, Answer B provides 260 mg/day, and Answer C provides 304 mg/day.

3. Which oral iron regimen would you recommend for a patient with iron deficiency anemia when oral therapy is indicated?
A. Ferrous fumarate 325 mg; 1 tablet by mouth once daily***
B. Ferrous fumarate 150 mg; 2 tablets by mouth twice daily
C. Ferrous sulfate 325 mg; 2 tablets by mouth twice daily
D. Ferrous gluconate 325 mg; 2 tablets by mouth twice daily
Correct answer: A
Rationale: Ferrous fumarate 325 mg by mouth 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, a dose of 100 mg day is sufficient for correcting iron deficiency. Also, gastrointestinal (GI) side effects increase with each dose increase because unabsorbed iron increases the risk of side effects, intolerance, and possible GI toxicity. Answer B provides 200 mg/day of elemental iron, Answer C provides 260 mg/day, and Answer D provides 152 mg/day.

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
Rationale: Dairy, dietary fiber, tea, and 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 4 options.

5. Which intravenous iron formulation requires the most infusions to complete a total cumulative dose of 1000 mg?
A. Ferric carboxymaltose
B. Ferumoxytol
C. Iron sucrose
D. Ferric gluconate***
Correct answer: D
Rationale: A total cumulative dose of 1000 mg ferric gluconate is given over 8 infusions. Iron sucrose requires 5 infusions. Ferric carboxymaltose and ferumoxytol are newer agents that deliver more iron in each infusion, which allows for substantially fewer infusions (i.e., 2).

6. Which intravenous iron formulation requires a test dose prior to the full dose?
A. Ferric carboxymaltose
B. Ferumoxytol
C. Iron sucrose
D. Low molecular weight iron dextran***

Correct answer: D
Rationale: Low molecular weight 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 1 hour after the test dose before the full dose can be administered. Patients are still at risk for severe anaphylaxis or hypersensitivity from either the full dose or the test dose itself, even if the test dose is well-tolerated.

7. JP is a 28-year-old woman with active Crohn’s disease. She is admitted to the hospital and is diagnosed with iron deficiency anemia. JP weighs 60 kg, has a hemoglobin of 9.1 g/dL, a ferritin of 20 μg/L, and a transferrin saturation of 15%. The team has started appropriate induction therapy for the flare-up of disease, but the doctor would like the pharmacist to recommend an iron replacement regimen. What is the most appropriate recommendation?
A. Ferrous fumarate 325 mg once daily
B. Ferrous sulfate 325 mg twice daily
C. Iron sucrose 200 mg IV; administer 5 doses over a 14-day period***
D. Ferric carboxymaltose 1000 mg IV daily for 5 days

Correct answer: C
Rationale: Intravenous iron is indicated for this patient based on her hemoglobin, ferritin, and transferrin saturation. Ferric carboxymaltose could be an appropriate choice, but 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 inflammatory bowel disease is started on oral iron replacement for mild iron deficiency anemia. Which one of the following lab values would indicate an appropriate response?
A. Hemoglobin increase by more than 2 g/dL after 1 week of therapy
B. Hemoglobin value of 14 g/dL after 4 weeks of therapy
C. Hemoglobin increase by at least 2 g/dL and transferrin saturation greater than 30% after 4 weeks of therapy***
D. Hemoglobin increase by at least 1 g/dL and transferrin saturation of 25% after 6 weeks of therapy

Correct answer: C
Rationale: Oral iron supplementation can take 4 to 6 weeks to achieve a correction in the laboratory indices. The treatment goal is to normalize hemoglobin, have hemoglobin increase by at least 2 g/dL, and have transferrin saturation be greater than 30%.

9. Which of the following would be an appropriate use of erythropoietin for the treatment of patients with iron deficiency anemia (IDA)?
A. Add erythropoietin to oral iron supplementation to enhance the response
B. Use erythropoietin in combination with intravenous (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
Rationale: Patients with inflammatory bowel disease (IBD) who are receiving IV iron for IDA have a response rate of 70% to 80%. 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 treatment for IBD. Oral is not the recommended route of administration for iron given in conjunction with erythropoietin therapy.

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

Correct answer: B
Rationale: Using the Ganzoni formula, the cumulative total dose (mg) = [actual body weight (kg) × (target hemoglobin – actual hemoglobin) × 2.4] + 500. The target hemoglobin is 13 g/dL for men. Therefore, the cumulative total dose = [(69) × (13 – 10.2) × (2.4)] + 500 = 964 mg. Rounding to the nearest 100 mg yields a dose of 1000 mg. The simplified dosing strategy could also be used: it was originally used with ferric carboxymaltose, and it was later used clinically.
with the other intravenous iron formulations. The patient’s body weight is less than 70 kg and his hemoglobin is greater than 10 g/dL, so his estimated cumulative total dose is 1000 mg.