EVALUATION AND MANAGEMENT OF THE PATIENT WITH CHRONIC ANEMIA

Rajeev Jain, MD, AGAF

Texas Digestive Disease Consultants
Dallas, TX
72-year-old woman was referred for evaluation of anemia
- Initially seen by PCP for recent onset of fatigue
- No digestive symptoms.
- Aspirin 81 mg QD. No NSAIDs.
- Physical exam unremarkable
- Labs:
  - Hgb 10.8
  - MCV 77
  - ferritin 16
Colonoscopy – ascending colon cancer
ANEMIA

Definition – decreased number of circulating red blood cells

- Men: HGB <13 g/dL
- Women: HGB <12 g/dL
ANEMIA - SYMPTOMS

- Decrease in hemoglobin
- Diminished $O_2$ carrying capacity
- End organ hypoxia
- Signs and symptoms
ANEMIA - SYMPTOMS

• Neurologic
  – Fatigue, headaches, sleep disturbances
• Cardiac
  – Chest pain, tachycardia, palpitations, heart failure
• Pulmonary
  – Shortness of breath
• Vascular
  – Pallor
CAUSES OF ANEMIA

• Kinetic approach
  – Differential diagnosis based on causes of declining Hgb

• Morphologic approach
  – Differential diagnosis based on categorizing anemia by RBC size (MCV)
ANEMIA – KINETIC APPROACH

Blood Loss

Decreased RBC production

Increased RBC destruction

Increased RBC destruction

Decreased RBC production

Blood Loss
ANEMIA – KINETIC APPROACH

Decreased RBC Production

• Lack of nutrients
  – Fe, Folate, B12
• Bone marrow disorders
  – Myelodysplasia, aplastic anemia
• Bone marrow suppression
  – Medications, chemotherapy
• Low level of trophic hormones
  – Erythropoietin, hypothyroidism, hypogonadism
• Chronic diseases
ANEMIA — KINETIC APPROACH
Increased RBC Destruction

• Hemolytic anemias
  – Inherited
    • Sickle cell disease
    • Thalassemia
    • Spherocytosis
  – Acquired
    • Autoimmune, Coombs +
    • Thrombotic thrombocytopenic purpura (TTP)
    • Hemolytic-uremic syndrome (HUS)
**Anemia — Kinetic Approach**

**Blood Loss**

- Overt
  - Gastrointestinal (GI)
  - Menstrual
  - Epistaxis
- Occult GI Loss
- Induced
  - Repeated lab draws, hemodialysis losses, donation
- Other
  - Postoperative
  - Retroperitoneal
ANEMIA – MORPHOLOGIC APPROACH

- Differential diagnosis based on categorizing anemia by RBC size (MCV)
  - Macrocytic: MCV > 100 fL
    - Folate or B12 deficiency, medications, myelodysplastic syndrome, liver disease, alcohol abuse
  - Normocytic: MCV 80-100 fL
  - Microcytic: MCV < 80 fL
    - Iron deficiency, thalassemia, anemia of chronic inflammation
INITIAL ASSESSMENT OF ANEMIA

- History – duration of anemia, bleeding, symptoms of anemia, medications (ASA/NSAIDs)
- Vital signs – volume depletion
- Physical exam – pallor
- Laboratory studies
  - CBC
  - Depending on MCV: ferritin, B12, folate
  - Hemolysis: LDH and haptoglobin
IRON HOMEOSTASIS

- 1-2 mg of iron enters and leaves the body each day
- Dietary iron is absorbed by duodenal enterocytes
- Iron circulates in plasma bound to transferrin

IRON DEFICIENCY ANEMIA

• Prevalence
  – 2-5% of adult men and postmenopausal women (age > 65) in the developed world \(^1,2\)

• Definition
  – Low Hgb
  – Low ferritin (best laboratory marker)
  – Low iron saturation (< 15%)
  – Absent iron stores on bone marrow biopsy

IRON DEFICIENCY ANEMIA
DIAGNOSIS

• Gold standard – bone marrow biopsy

• Labs
  – Ferritin
    • < 15 ug/L  Rules in IDA
    • 16-99 ug/L  Intermediate
    • > 100 ug/L  Rules out IDA
  – Fe/TIBC/saturation
    • Low Fe,
    • High TIBC or transferrin,
    • Low saturation

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IRON DEFICIENCY ANEMIA

- Symptoms of anemia
  - Fatigue, exercise intolerance, headaches
- Pica
  - Pagophagia (ice)
  - Geophagia (dirt or clay)
  - Amylophagia (starch)
- Glossitis
- Alopecia
- Physical Exam
  - Pallor
  - Koilonychia (spoon nails)
IRON DEFICIENCY ANEMIA
DIFFERENTIAL DIAGNOSIS

• Occult loss
  – ASA/NSAID use
  – Cancer (colon, stomach)
  – Peptic ulcer disease
  – Angiodysplasia
  – Cameron’s ulcers

• Malabsorption
  – Celiac disease
  – Gastrectomy

• Non-GI blood loss
  – Menstruation, blood donation, hematuria, epistaxis
IRON DEFICIENCY ANEMIA

EVALUATION

• Colonoscopy and endoscopy
  – 61/100 patients had positive findings\(^1\)
    • Endoscopy – 36 lesions with 11 ulcers
    • Colonoscopy – 25 lesions with 11 cancers

• Capsule endoscopy
  – 91/138 patients had positive findings\(^2\)
    • 51 pts with angiodysplasias
    • 12 pts with jejunal and/or ileal micro-ulcerations in
    • 9 pts with tumors/polyps
    • 5 pts with Crohn's disease

IRON DEFICIENCY ANEMIA

MANAGEMENT

• Treat findings found on endoscopic evaluation

• Oral iron
  – Multiple preparations
    • Ferrous sulfate 325 mg provides 65 mg of elemental iron
    • Ferrous gluconate 325 mg provides 38 mg of elemental iron
  – Consider adding vitamin C
  – Decreased absorption with:
    • foods rich in tannates (e.g., tea) or phytates (e.g., bran, cereal)
    • medications that raise the gastric pH (e.g., antacids, H2RAs & PPIs)
  – Hgb typically increases by 1 g per dL should occur every 2-3 weeks

• Intravenous iron if:
  – Oral iron not tolerated
  – Anemia not responsive to oral iron
  – Preparations: iron dextran (Dexferrum), ferric gluconate (Ferrlecit), iron sucrose (Venofer)
REFRACTORY IRON DEFICIENCY ANEMIA

• Consider repeating endoscopic evaluation
  – Colonoscopy
  – EGD
  – Capsule endoscopy

• Hematologic evaluation
  – Consider bone marrow disorders
  – Other nonGI disorders
CASE PRESENTATION - 1

• 82-year-old woman referred for anemia
  – No symptoms. No aspirin or NSAIDs. Prior colonoscopy 5-10 years ago was normal.
  – Exam unremarkable.
  – Hgb 9.2, MCV 92, ferritin 7, Fe saturation 6%
  – Treated with Fe and Hgb 11.7, MCV 96
CASE PRESENTATION - 1

• Colonoscopy – cecal mass
Case Presentation - 2

- 60-year-old woman referred for evaluation of anemia
  - History: fatigue and diarrhea
  - Physical exam: pallor
  - Labs: Hgb 9.9, MCV 83, ferritin 6, Fe 18, TIBC 528, Fe saturation 3%

- Evaluation
  - Colonoscopy: normal to the terminal ileum
  - EGD: normal including duodenal biopsies

- Treatment
  - Oral iron: poor response
  - Intravenous iron: transient response
CASE PRESENTATION - 2
ANEMIA SUMMARY

• Anemia is a common abnormality
• Use kinetic and morphologic approach to establish differential diagnosis
• If iron deficiency anemia is present, endoscopic evaluation in men and post-menopausal women is indicated to exclude a gastrointestinal cancer.