Extreme anemia (hemoglobin 1.8 g/dL) secondary to colon cancer

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We present the case of a 34-year-old man who presented to the emergency department with complaints of generalized fatigue and palpitations, with a heart rate of approximately 100 beats per minute and an orthostatic blood pressure of 80/30 mm Hg upon standing. A hemoglobin of 1.8 g/dL was discovered. A positive fecal occult blood test led to the diagnosis of colon cancer. Once the cancer was resected, the patient's anemia resolved.

Emergency department management of lower gastrointestinal bleeding, anemia, fatigue, and orthostasis are common (1–5). We report the lowest hemoglobin of which we are aware, at 1.8 g/dL, in a patient with lower gastrointestinal bleeding.

CASE REPORT

A 34-year-old previously healthy black man presented to the emergency department with a complaint of generalized fatigue and palpitations that had progressively increased over the last 6 months. The patient's heart rate was 100 to 105 beats/minute, and his blood pressure was 110/74 mm Hg when supine but 80/30 mm Hg upon standing. He was found to have marked conjunctival pallor with moist mucous membranes. He had generalized abdominal tenderness and a briskly positive fecal occult blood test absent of melena or overt blood. Electrocardiogram analysis showed Q waves in V1 to V3 with inverted T waves in V4 and lead III.

The patient had had anemia as a child. He had no history of sickle cell or other hematopoietic disorders. He denied melanic or bloody stools. He indicated that he had been intermittently homeless over the prior 6 months. He denied a history of hepatitis, intravenous drug use, prosthetic valves, or hemoptysis.

Initial laboratory evaluation was complicated by standard laboratory protocols rejecting the patient's complete blood count due to machine error, citing a "dilute" specimen. A call by the emergency physician requesting the release of the results after two rejected attempts showed on the third specimen severe anemia with a hemoglobin of 1.8 g/dL (*Tables 1 and 2*).

He was transfused with a total of 5 units of blood over 2 days, reaching a hemoglobin level of 7.6 g/dL, and provided

Table 1. Complete iron studies

Hematopoietic studies	Value	Reference range
Hemoglobin (g/dL)	1.8	14–18
Hematocrit (%)	7.7	42–52
Mean corpuscular volume (fL)	51	80–94
Mean corpuscular hemoglobin (pg)	11.9	27–34.5
Mean corpuscular hemoglobin concentration (g/dL)	23.4	32–36.5
Iron (µg/dL)	21	39–150
Total iron binding capacity (µg/dL)	454	241–421
Transferrin saturation (%)	5%	20%–50%
Transferrin (mg/dL)	289	200–360
Haptoglobin (mg/dL)	182	62–197
Reticulocyte count (%)	0	0.5–2.2
Vitamin D 25 hydroxy (ng/mL)	16	30–80
Vitamin D 1,25 hydroxy (ng/mL)	35	15–75
Vitamin B1 (nmol/L)	47	70–180
Vitamin B6 (nmol/L)	20	20–120
Vitamin B12 (nmol/L)	447	180–914

with intravenous and oral iron and cholecalciferol supplementation. He underwent esophagogastroduodenoscopy as well as colonoscopy with biopsies showing extensive carcinoma of the colon. This was followed by a right hemi- and transverse colectomy with an ileostomy placement. Ultimately, the surgical specimen revealed a 13 × 11 × 4 cm 100% encircling high-grade, poorly differentiated adenocarcinoma. The patient, now 36 years old, had complete resolution of his anemia, with the most recent hemoglobin level being 14.0 g/dL just under 2 years after his colectomy.

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Table 2. Hemoglobin electrophoresis

Hemoglobin electrophoresis	Value	Reference range
Hemoglobin A	98.6%	96.0%–98.5%
Hemoglobin A2	1.4%	1.5%–3.5%
Hemoglobin F	0%	0%–2.0%
Hemoglobin S	0%	0%
Hemoglobin Other	0%	0%

DISCUSSION

Our patient had the lowest hemoglobin of which we are aware in an ambulatory patient with lower gastrointestinal bleeding. Severe anemia at a level <4 g/dL is uncommonly seen in the hospital setting. In the ambulatory setting, it has been reported in other case reports (6, 7). Only one other case has been reported of an ambulatory patient with a hemoglobin value of 1.8 g/dL, and this was due to chronic urinary bleeding (7). The most common source of blood loss that leads to such severe anemia is from the gastrointestinal tract (8, 9). This case adds to other case reports of patient survival with a hemoglobin level of <2 g/dL (6, 7, 10).

1. Janz TG, Johnson RL, Rubenstein SD. Anemia in the emergency department: evaluation and treatment. *Emerg Med Pract* 2013;15(11):1–15.
2. Vieth JT, Lane DR. Anemia. *Emerg Med Clin North Am* 2014;32(3):613–628.
3. Bhalla MC, Wilber ST, Stiffler KA, Ondrejka JE, Gerson LW. Weakness and fatigue in older ED patients in the United States. *Am J Emerg Med* 2014;32(11):1395–1398.
4. Kim BS, Li BT, Engel A, Samra JS, Clarke S, Norton ID, Li AE. Diagnosis of gastrointestinal bleeding: a practical guide for clinicians. *World J Gastrointest Pathophysiol* 2014;5(4):467–478.
5. Cohen E, Grossman E, Sapoznikov B, Sulkes J, Kagan I, Garty M. Assessment of orthostatic hypotension in the emergency room. *Blood Press* 2006;15(5):263–267.
6. Padmakumar R, Pai M, Farish S, Rajeev J, Sanjeev T, Sreevalsan TV, Sheetal B, Sooraj YS, Rowther SS. Successful bowel surgery at hemoglobin 2 g/dL without blood transfusion. *World J Gastrointest Surg* 2013;5(8):252–255.
7. Imaizumi T, Yagi E, Ushijima K, Suzuki K, Terasaki H. A patient with a preoperative hemoglobin concentration of 1.8 g/dl: how was the life-threatening anemia tolerated without any intensive care? *J Anesth* 1999;13(2):125–126.
8. Navuluri R, Kang L, Patel J, Ha TV. Acute lower gastrointestinal bleeding. *Semin Intervent Radiol* 2012;29(3):178–186.
9. Strate LL. Lower GI bleeding: epidemiology and diagnosis. *Gastroenterol Clin North Am* 2005;34(4):643–664.
10. Zollinger A, Hager P, Singer T, Friedl HP, Pasch T, Spahn DR. Extreme hemodilution due to massive blood loss in tumor surgery. *Anesthesiology* 1997;87(4):985–987.