

## Case Report

# Small Bowel Anastomotic Ulcers: A Source of Iron Deficiency Anemia in Adults Detected by Capsule Endoscopy

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### Abstract

Anemia affects roughly a third of the world's population with half of these cases being attributed to iron deficiency anemia. Gastrointestinal bleeding is the most common cause of iron deficiency anemia in patients without an obvious source of bleeding. Anastomotic or marginal ulcers are a known complication following small bowel resection and a source of chronic blood loss and anemia. However, small bowel anastomotic ulcers have only been described in the pediatric population and they have not been well defined as a source of adult obscure gastrointestinal bleeding leading to iron deficiency anemia. Here the authors report six cases of iron deficiency anemia secondary to small bowel anastomotic ulcers in adults that highlight a previously poorly described source of occult bleeding and emphasize the diagnostic benefit of video capsule endoscopy.

**Keywords:** Anastomosis; Capsule endoscopy; Small intestine

### Abbreviations

VCE: Video Capsule Endoscopy

OGIB: Obscure Gastrointestinal Bleeding

NSAID: Nonsteroidal Anti-Inflammatory Drugs

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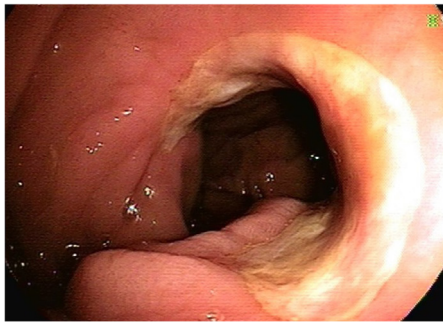
### Introduction

Anemia affects roughly a third of the world's population with half of these cases being attributed to Iron Deficiency Anemia (IDA) [1,2]. In the USA approximately 5-12% of women and 1-5% of men have IDA. Gastrointestinal (GI) bleeding is the most common cause of IDA in patients without an obvious source of bleeding [3,4]. A thorough examination of the gastrointestinal tract via colonoscopy and upper endoscopy is considered standard of care in the evaluation of IDA. In patients with obscure GI bleeding with negative upper and lower endoscopies, the recommendation is to proceed with an examination of the small bowel with Video Capsule Endoscopy (VCE) [5]. Up to three-quarter of patients with obscure GI bleeding have a lesion in the small intestine, defined as bleeding that occurs between the ligament of Treitz and the ileocecal valve [6]. The most common lesions responsible for small bowel bleeding are vascular (including arteriovenous malformations), with other causes being benign tumors, inflammatory lesions and lesions secondary to non-steroidal anti-inflammatory medications [7].

Anastomotic or marginal ulcers are a known complication following gastric bypass surgeries and a source of chronic blood loss and anemia [8]. However, small bowel anastomotic ulcers have only been described in the pediatric population and they have not been well defined as a source of adult obscure GI bleeding leading to IDA [9-12]. Here we present six patients with iron deficiency anemia secondary to small bowel anastomotic ulcers. In each case, other sources of anemia including abnormal uterine bleeding or nutritional deficiencies were ruled out.

### Case Reports

**Patient 1:** A 29-year-old caucasian female with a past medical history significant for lupus anticoagulant syndrome complicated by deep vein thrombosis and pulmonary embolism on anticoagulation who was evaluated by gastroenterology for iron deficiency anemia and melena. She had a history of congenital intestinal obstruction and was status post partial small bowel resection in infancy, 26 years prior to her presentation with IDA. She denied Non Steroidal Anti-Inflammatory Drug (NSAID) use. Hemoglobin on presentation was 9.5 g/dL with an MCV of 73.6  $\mu\text{m}^3$  and a ferritin of 6  $\text{ng/mL}$ . Initial work up included normal upper endoscopy and colonoscopy. Small bowel follow-through was negative for mass or stricture. Capsule endoscopy showed two areas of ulceration at the mid and distal small bowel at prior anastomotic sites. Subsequent double balloon enteroscopy confirmed anastomotic ischemic ulcerations in the distal jejunum and proximal ileum (Figure 1). She did not respond appropriately to oral iron supplementation and continued to have melena. Thus she was referred to surgery and underwent a segmental jejunal resection. Histopathology showed chronic mucosal ulceration and granulation tissue. 6-month follow up laboratory results were significant for hemoglobin of 14.0 g/dL, MCV 90.6  $\mu\text{m}^3$  and ferritin 70  $\text{ng/mL}$ .

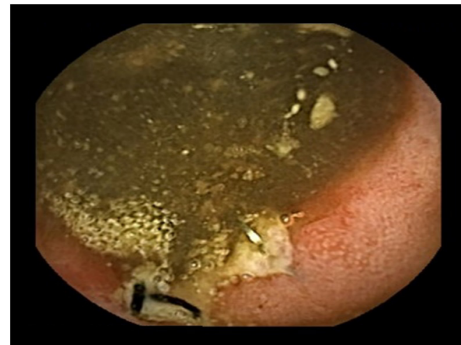


**Figure 1:** Anastomotic ischemic ulcerations in the distal jejunum and proximal ileum in Patient 1.

**Patient 2:** A 78-year-old caucasian female with a past medical history significant for type 2 diabetes mellitus and essential hypertension was evaluated by gastroenterology for iron deficiency anemia. She had a history of refractory bleeding ileal ulcers and had undergone an ileal resection 7 years prior. She reported recent NSAID use. Hemoglobin on presentation was 6.8 g/dL with an MCV of 66.2  $\mu\text{m}^3$  and a ferritin of 8 ng/mL. Initial work up included unremarkable upper endoscopy, colonoscopy and computed tomography enterography. Capsule endoscopy showed erosions at the small bowel anastomosis in the distal ileum. She was treated with oral iron. Laboratory results on 6-month follow up were significant for hemoglobin of 13.5 g/dL, MCV 84.4  $\mu\text{m}^3$  and ferritin 91 ng/mL.

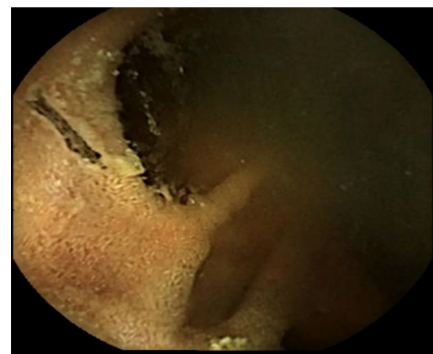
**Patient 3:** A 37-year-old hispanic male with a past medical history significant for HIV (CD4 351, viral load undetectable) complicated by CMV colitis, disseminated mycobacterium bovis and central nervous system toxoplasmosis was evaluated by gastroenterology for iron deficiency anemia. He had a history of a massive gastrointestinal hemorrhage refractory to endoscopic intervention and was status post right hemicolectomy with resection of 75 cm of the ileum and end ileostomy formation. Pathology demonstrated ulcers with CMV inclusions and granulomas containing acid-fast bacilli. He later underwent take down of the end ileostomy with ileocolonic anastomosis two years prior to his presentation with IDA. His NSAID use is unknown. Hemoglobin on presentation was 8.5 g/dL with an MCV of 63.7  $\mu\text{m}^3$  and a ferritin of 4 ng/mL. Initial work up included unremarkable upper endoscopy and colonoscopy. Capsule endoscopy showed suture material in the distal ileum with surrounding ulceration at the anastomotic site (Figure 2). He was intolerant to oral iron and therefore was treated with intravenous iron. Laboratory results on 6-month follow up were significant for hemoglobin of 14.1 g/dL, MCV 85.1  $\mu\text{m}^3$  and ferritin 13 ng/mL.

**Patient 4:** A 82-year-old caucasian male with a past medical history significant for essential hypertension, hyperlipidemia, type 2 diabetes mellitus and hypothyroidism was evaluated by gastroenterology for iron deficiency anemia. He had a history of colon cancer and had undergone colectomy with partial ileal resection. He was referred from an outside gastroenterologist and therefore much of his history is unknown. It is unknown whether he was taking NSAIDs or how long after his colectomy he developed iron deficiency anemia. Hemoglobin on presentation was 11.5 g/dL with an MCV of 98.3  $\mu\text{m}^3$  and a ferritin of 19 ng/mL. Initial work up included unremarkable upper endoscopy and colonoscopy. Capsule endoscopy showed ulceration at the small bowel anastomosis. He was lost to follow up after his capsule was completed.



**Figure 2:** Suture material within the distal ileum with surrounding ulceration at the anastomotic site in Patient 3.

**Patient 5:** A 73 year old caucasian female with a past medical history significant for essential hypertension, hyperlipidemia and type 2 diabetes mellitus was evaluated by gastroenterology for iron deficiency anemia. She had a history of incarcerated hernia and was status post small bowel resection. It is unknown how long after her small bowel resection she developed iron deficiency anemia. She reported recent NSAID use. Hemoglobin on presentation was 6.0 g/dL. Her MCV and ferritin are unknown. Initial work up included unremarkable upper endoscopy and colonoscopy. Capsule endoscopy showed ulceration at the small bowel anastomotic site (Figure 3). She was treated with oral iron and instructed to stop NSAID use. Laboratory results on 6-month follow up were significant for hemoglobin of 12.1 g/dL, MCV 89.7  $\mu\text{m}^3$  and ferritin 47 ng/mL.



**Figure 3:** Ulceration in the ileum at the site of the small bowel anastomosis with suture material in Patient 5.

**Patient 6:** A 28 year old middle eastern male with a past medical history significant for idiopathic thrombocytopenic purpura status post splenectomy was evaluated by gastroenterology for iron deficiency anemia. He had a history of small bowel obstruction due to adhesions and had undergone an ileal resection one year prior to presentation with IDA. He reported chronic NSAID use. Hemoglobin on presentation was 7.2 g/dL with an MCV of 67  $\mu\text{m}^3$  and a ferritin of 4 ng/mL. Initial work up included normal upper endoscopy, colonoscopy, capsule endoscopy and single balloon enteroscopy. Repeat capsule endoscopy showed a clean-based ulcer at the small bowel anastomotic site. He was treated with intravenous iron due to poor oral iron absorption. Laboratory results on 6 month follow up were significant for hemoglobin of 10.4 g/dL with MCV 82.4  $\mu\text{m}^3$ . Ferritin was not rechecked. Summary of the case reports is given in table 1.

Patient	Age (yrs)	Sex (M/F)	AC Use	NSAID Use	Indication for Resection	Type of Resection	Presenting Symptoms	Time from resection to IDA (yrs)	Presenting Hgb (g/dL), MCV (um3), Ferritin (ng/mL)	Investigative Modalities Used	Capsule Endoscopy Findings	Treatment	6 Month Follow Up Hgb, MCV, ferritin
Patient 1	29	F	Yes	No	Congenital intestinal obstruction	Partial small bowel resection, unknown anatomy	Anemia, Melena	26	Hgb 9.5, MCV 73.6, ferritin 6	EGD, colonoscopy, push enteroscopy, small bowel follow through	Two areas of ulceration at the mid and distal small bowel at prior anastomotic sites	Jejunal Resection	Hgb 14, MCV 90.6, ferritin 70
Patient 2	78	F	No	Yes	Bleeding ileal ulcers	Ileal resection	Anemia	7	Hgb 6.8, MCV 66.2, Ferritin 8	EGD, push enteroscopy, colonoscopy, CTE	Erosions at the small bowel anastomosis in distal ileum	Oral iron	Hgb 13.5, MCV 84.4, Ferritin 91
Patient 3	37	M	No	Unknown	Gastrointestinal hemorrhage	Right hemicolectomy with resection of 75cm of ileum, end ileostomy. Then take down with ileocolonic anastomosis	Anemia	2	Hgb 8.5, MCV 63.7, Ferritin 4	EGD, colonoscopy	Suture material in distal ileum with surrounding ulceration at the anastomotic site	Intravenous iron	Hgb 14.1, MCV 85.1, ferritin 13
Patient 4	82	M	No	Unknown	Colon Cancer	Colectomy with partial ileal resection	Anemia	Unknown	Hgb 11.5, MCV 98.3, Ferritin 19	Upper endoscopy, colonoscopy	Small patchy areas of possible anastomosis with ulcerated suture material seen in mid to distal ileum	Lost to follow up	Lost to follow up
Patient 5	73	F	No	Yes	Incarcerated Hernia	Small bowel resection	Anemia	Unknown	Hgb 6. No other data available	EGD, colonoscopy	Ulceration seen at small bowel anastomosis	Oral iron, discontinue NSAIDs	Hgb 12.1, MCV 89.7, Ferritin 47
Patient 6	28	M	No	Yes	Small bowel obstruction due to adhesions	Ileal resection	Anemia	1	Hgb 7.2, MCV 67, Ferritin 4	EGD, colonoscopy, SBE, VCE	Clean based ulcer at small bowel anastomosis distal to pylorus	Intravenous Iron, discontinue NSAIDs	Hgb 10.4, MCV 82.4, no repeat ferritin

**Table 1:** Summary of patient characteristics, capsule endoscopy findings and follow up.

\*AC: Anticoagulation; NSAID: Nonsteroidal Anti-Inflammatory Drugs; EGD: Esophagogastroduodenoscopy; Hgb: Hemoglobin; MCV: Mean Corpuscular Volume; VCE: Video Capsule Endoscopy; SBE: Single Balloon Enteroscopy; CTE: Computed Tomography Enterography;; IDA: Iron Deficiency Anemia

## Discussion

The American College of Gastroenterology (ACG) guidelines recommend a thorough upper endoscopy and colonoscopy evaluation for patients with iron deficiency anemia. If no source of bleeding is found, examination of the small bowel with VCE is recommended as long as there are no concerns for possible small bowel obstruction which could lead to capsule retention. Capsule endoscopy is currently the initial test of choice if repeat endoscopy is not warranted. If capsule endoscopy shows a bleeding source, subsequent investigation with push or deep/balloon assisted enteroscopy may be needed depending on the finding [13].

End-to-end small bowel anastomotic ulcers identified via capsule endoscopy have not been well described in the literature as a source of IDA in adults. Although previous literature has demonstrated the existence of several cases of chronic iron deficiency anemia in adults with history of side-to-side small bowel anastomoses, these sources of bleeding were identified during exploratory laparotomy or colonoscopy [12,14]. The pathophysiology behind anastomotic ulcers involves ischemia due to sutures, the tension of the anastomosis, or an inflammatory response to the materials used during anastomosis [15].

This small case series highlights an unusual source of occult bleeding that has yet to be well described and emphasizes the diagnostic benefit small bowel capsule endoscopy in the evaluation of iron deficiency anemia. These techniques are especially important in the evaluation of anastomotic sites outside the reach of traditional upper endoscopy and colonoscopy since anastomotic ulcers many times cannot be visualized on other modalities such as CT or MR enterog-

raphy. By finding the bleeding source in these patients with VCE, further studies including repeat upper endoscopy, colonoscopy or enterography can be avoided which also has significant impact on cost.

Of note, despite the history of small bowel surgery in these patients, there were no complications of capsule endoscopy, including no reports of capsule retention. If there is concern about small bowel patency, a radiological study such as CT versus MR enterography can be performed prior to capsule endoscopy. In patients with iron deficiency anemia and a history of small bowel surgery, capsule endoscopy is useful in determining whether a small bowel source is causing blood loss and contributing to anemia. In addition, anastomotic ulcers should be considered as a source of bleeding in patients who present with iron deficiency anemia and a history of bowel resection.

## Conflict of Interest

The authors whose names are listed immediately below certify that they have no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

## Author Contributions

**Megan E Reinders:** Study concept and design, analysis and interpretation of data, drafting of the manuscript, critical revision of the manuscript, approved final submission.

**Albert Ding:** Drafting of the manuscript, critical revision of the manuscript, approved final submission.

**Denise Kalmaz:** Study concept and design, analysis and interpretation of data, drafting of the manuscript, critical revision of the manuscript, study supervision, approved final submission. Guarantor of the article.

All authors approved the final version of this article.

## Informed Consent

Informed consent was obtained for case publication.

## References

1. Gasche C, Lomer MC, Cavill I, Weiss G (2004) Iron, anaemia, and inflammatory bowel diseases. *Gut* 53: 1190-1197.
2. Lopez A, Cacoub P, Maccougall LC, Peyrin-Biroulet L (2016) Iron deficiency anaemia. *Lancet* 387: 907-916.
3. Rockey DC, Cello JP (1993) Evaluation of the gastrointestinal tract in patients with iron-deficiency anemia. *N Engl J Med* 329: 1691-1695.
4. Bosch X, Montori E, Guerra-García M, Costa-Rodríguez J, Quintanilla MH, et al. (2017) A comprehensive evaluation of the gastrointestinal tract in iron-deficiency anemia with predefined hemoglobin below 9 mg/dL: A prospective cohort study. *Dig Liver Dis* 49: 417-426.
5. Enns RA, Hookey L, Armstrong D, Bernstein CN, Heitman SJ, et al. (2017) Clinical Practice Guidelines for the Use of Video Capsule Endoscopy. *Gastroenterology* 152: 497-514.
6. Pasha SF, Leighton JA, Das A, Harrison ME, Decker GA, et al. (2008) Double-balloon enteroscopy and capsule endoscopy have comparable diagnostic yield in small-bowel disease: A meta-analysis. *Clin Gastroenterol Hepatol* 6: 671-676.
7. Gunjan D, Sharma V, Rana SS, Bhasin DK (2014) Small bowel bleeding: A comprehensive review. *Gastroenterol Rep (Oxf)* 2: 262-275.
8. Csendes A, Burgos AM, Altuve J, Bonacic S (2009) Incidence of marginal ulcer 1 month and 1 to 2 years after gastric bypass: a prospective consecutive endoscopic evaluation of 442 patients with morbid obesity. *Obes Surg* 19: 135-138.
9. Bass LM, Zimont J, Prozialeck J, Superina R, Cohran V (2015) Intestinal Anastomotic Ulcers in Children With Short Bowel Syndrome and Anemia Detected by Capsule Endoscopy. *J Pediatr Gastroenterol Nutr* 61: 215-219.
10. Goldszmidt D, Duche M, Gauthier F (1994) [Small intestine ulcers 12 years after ileosigmoid anastomosis for neonatal necrotizing enterocolitis]. *Arch Pediatr* 1: 1011-1013.
11. Sondheimer JM, Sokol RJ, Narkewicz MR, Tyson RW (1995) Anastomotic ulceration: a late complication of ileocolonic anastomosis. *J Pediatr* 127: 225-230.
12. Chari ST, Keate RF (2000) Ileocolonic anastomotic ulcers: a case series and review of the literature. *Am J Gastroenterol* 95: 1239-1243.
13. Gerson LB, Fidler JL, Cave DR, Leighton JA (2015) ACG Clinical Guideline: Diagnosis and Management of Small Bowel Bleeding. *Am J Gastroenterol* 110: 1265-1287.
14. Alekseev GI, Veretnik GI, Archvadze VG, Baranovich VIu (1989) [Intestinal side-to-side anastomosis as a cause of iron deficiency anemia]. *Khirurgiia (Mosk)* 101-103.
15. Wilson JA, Romagnuolo J, Byrne TK, Morgan K, Wilson FA (2006) Predictors of endoscopic findings after Roux-en-Y gastric bypass. *Am J Gastroenterol* 101: 2194-2199.