

## AUDIT

# Iron deficiency anaemia: are the British Society of Gastroenterology guidelines being adhered to?

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**Background:** The British Society of Gastroenterology (BSG) issued guidelines on the investigation of iron deficiency anaemia (IDA) ensuring standardised and comprehensive gastrointestinal investigation in all patients. It was apparent that not all patients in the authors' hospital were investigated according to these guidelines.

**Objective:** To determine whether patients who were referred for upper gastrointestinal endoscopy for investigation of IDA were confirmed to be iron deficient, and whether the BSG guidelines were being fully implemented.

**Methods:** All patients referred for upper gastrointestinal endoscopy over an 18 month period on a computer database (Endoscribe) were reviewed. Haematology, biochemistry, and radiology results were obtained and the frequency of the various diagnoses recorded.

**Results:** A total of 320 patients (133 male; mean age 71.5 years) were initially referred for upper gastrointestinal endoscopy for investigation of IDA, of whom 95 were iron deficient. Of these, 44 (46%) had duodenal biopsies performed, three (7%) of whom were diagnosed with coeliac disease. Five patients were diagnosed with upper gastrointestinal carcinoma (one oesophageal, four gastric). Of the remaining 87 patients, 65 (75%) underwent lower gastrointestinal investigations with four having colorectal carcinoma, four colonic polyps, and one angiodysplasia.

**Conclusions:** Duodenal biopsies were performed in less than half of the patients. In those not diagnosed with coeliac disease or upper gastrointestinal carcinoma, only three quarters underwent lower gastrointestinal assessment. Approximately 10% were diagnosed with gastrointestinal malignancy as a cause for their anaemia and in 66% of patients no gastrointestinal cause was found. All physicians need to be made fully aware of the BSG guidelines for investigation of IDA.

Iron deficiency anaemia (IDA) is a common problem both in primary and secondary care. Estimates of the prevalence of IDA in adults vary widely depending on the population screened, although it is believed to affect between 2%–5% of adults.<sup>1,2</sup> Gastrointestinal blood loss has been found to account for anaemia in 27%–95% of cases and is the commonest cause of IDA in men and postmenopausal women.<sup>1,3–6</sup> Despite adequate investigation, no clear cause for anaemia is identified in 10%–43% of patients.<sup>7,8</sup> One previous study has highlighted that there is substantial under investigation of IDA, with serious treatable conditions being undetected.<sup>9</sup> Subsequently, the British Society of Gastroenterology (BSG) produced guidelines for the investigation of IDA in 2000.<sup>10</sup> It was proposed that all adult male patients and postmenopausal female patients, without overt blood loss or any other obvious cause of IDA, should undergo upper gastrointestinal endoscopy, including duodenal biopsy, and colonoscopy or barium enema, with or without flexible sigmoidoscopy.

The aim of this study was to determine if patients initially referred for upper gastrointestinal endoscopy for evaluation of anaemia did in fact have documented iron deficiency, and to determine whether appropriate upper and lower gastrointestinal investigations were performed, in accordance with the BSG guidelines for the investigation of IDA.

## METHODS

All patients undergoing upper gastrointestinal endoscopy for the investigation of anaemia, between September 2000 and February 2002, were identified from a computerised endoscopy database (Endoscribe). Haematology results were reviewed to determine if IDA was present. Anaemia was

defined as haemoglobin concentration <11.5 g/dl in women and haemoglobin concentration <12.5 g/dl in men (representing the lower limits of our hospital reference laboratory). Definite iron deficiency was defined as serum ferritin <12 µg/dl. Probable iron deficiency was defined as mean corpuscular volume <76 fl (lower range of hospital reference laboratory), in association with appropriate changes in serum iron, total iron binding capacity, and percentage iron saturation, when the serum ferritin was >12 µg/dl. Patients were excluded if they did not fulfil the definition for definite IDA or probable iron deficiency. Patients with a history of previous oesophageal varices or symptoms of haematemesis or melaena to suggest overt gastrointestinal blood loss were also excluded.

The medical records of patients with definite and probable iron deficiency were assessed to determine if they had a duodenal biopsy performed at the time of upper gastrointestinal endoscopy. In accordance with the BSG guidelines, if patients did not have upper gastrointestinal malignancy or coeliac disease diagnosed at the time of upper gastrointestinal endoscopy, patients' records were assessed to determine whether a colonoscopy, flexible sigmoidoscopy or barium enema was performed. The following were considered as aetiological diagnoses: coeliac disease, upper and lower gastrointestinal carcinoma, erosive gastritis, erosive oesophagitis (grade III and IV), peptic ulcer, colonic polyps, and angiodysplasia. The frequency of the various diagnoses were recorded.

**Abbreviations:** BSG, British Society of Gastroenterology; IDA, iron deficiency anaemia

**Table 1** Results of lower gastrointestinal investigations: a comparison of barium enema and colonoscopy

Diagnosis	Barium enema (n=50)	Colonoscopy (n=15)	p Value
Diverticular disease	24	4	0.24
Colonic polyps	1	3	0.05
Colonic carcinoma	3	1	0.6
Normal investigations	12	5	0.89
Angiodysplasia	0	1	NA
Did not attend	7	0	NA
Inflammatory stricture	1	0	NA
Technically difficult	1	1	0.4
Results unobtainable	1	0	NA
Total	50	15	

NA, not appropriate.

## RESULTS

Three hundred and twenty patients (133 male; mean age 71.5 years) underwent upper gastrointestinal endoscopy during the study period for evaluation of iron deficiency anaemia. Of these, 40 patients (22 male; mean age 65 years) had symptoms of haematemesis or melaena, 112 (49 male; mean age 74.8 years) had no evidence of iron deficiency, 63 (23 male; mean 70.3 years) had no serum ferritin recorded, and 10 (one male; mean age 49.7 years) did not fit the definition for anaemia, leaving 95 patients (37 male; mean age 68.5 years) in the study group. This group included 19 patients (nine male; mean 69.5 years) who met the definition for probable iron deficiency. The mean haemoglobin concentration was 8.6 g/dl (range 5.1–12.4) in the male patients and 8.7 g/dl in the female patients (range 4.3–11.4).

Forty four patients (16 male; mean age 66.2 years) had a duodenal biopsy performed at the time of upper gastrointestinal endoscopy, representing 46% of the study group. In three cases (7%) duodenal biopsy demonstrated either total or subtotal villous atrophy in keeping with coeliac disease. Five (5%) patients were diagnosed with upper gastrointestinal carcinoma, one of whom (male aged 59 years) had oesophageal carcinoma and four (all male; mean age 62 years) had gastric carcinoma. In addition, four patients had erosive oesophagitis (at least grade III), one had erosive gastritis, seven had a gastric ulcer (one of whom had coeliac disease), and two had a duodenal ulcer. In total, 21 of 95 patients (22%) undergoing upper gastrointestinal endoscopy had an aetiology identified to explain their IDA.

Of the 87 patients (32 male; mean age 69.1 years) who were not diagnosed with coeliac disease or upper gastrointestinal cancer at upper gastrointestinal endoscopy, 65 underwent lower gastrointestinal investigations, representing 75% of the study group. Of these, 15 (six male; mean age 67.6 years) (17%) had colonoscopy, 50 (18 male; mean age 70 years) (57%) had a barium enema arranged, and one patient had both flexible sigmoidoscopy and barium enema. The main aetiologies identified after lower gastrointestinal investigations were colonic polyps (n=4), colorectal carcinoma (n=4), and angiodysplasia (n=1) (table 1). Of those patients (n=15) who underwent colonoscopy, six (40%) had a potential attributable cause for the anaemia found compared with only three (6%) of those who underwent barium enema (n=50) (p<0.01). Regarding the individual diagnoses, the detection rates did not differ significantly between colonoscopy and barium enema (table 1). Table 2 lists the final diagnoses made after completed gastrointestinal investigations for IDA.

## DISCUSSION

Of the 320 patients initially identified, only 95 met our inclusion criteria for definite or probable iron deficiency. We

**Table 2** Final diagnoses made after upper with or without lower gastrointestinal investigations

Diagnosis	No of patients
Oesophagitis (at least grade III)	4
Oesophageal carcinoma	1
Gastritis (erosive)	1
Gastric ulcer	7*
Gastric carcinoma	4
Duodenal ulcer	2
Coeliac disease	3*
Colonic polyps	4
Colonic carcinoma	4
Angiodysplasia	1
No cause found	63
Others	2†

\*One patient had coeliac disease and a gastric ulcer.

†Others: "Creon" induced inflammatory stricture; stricture at splenic flexure diagnosed on computed tomography. No lower gastrointestinal investigation.

excluded 185 patients who were referred for investigation of anaemia who were not confirmed to be iron deficient. Given that the BSG guidelines are specifically for the investigation of patients with IDA, the importance of measuring haematinics to correctly characterise the type of anaemia on all patients before undertaking further investigations is a fundamental first step. This information should be included in the referral for upper gastrointestinal endoscopy. As a result unnecessary investigations may be avoided. In addition, patients were only included in this audit if the referring physician had decided that it was appropriate to investigate IDA in their patient. Clearly there will be patients with IDA in whom it is not deemed appropriate to embark on investigations of IDA—for example, due to confounding factors such as age or extensive comorbidity. From our laboratory system it is not possible to obtain an estimate of the number of patients with IDA who were not referred for gastrointestinal investigations.

In our study only 46% of patients undergoing upper gastrointestinal endoscopy for the investigation of IDA had duodenal biopsies performed. Since the prevalence of coeliac disease in Northern Ireland is 1:122 in the general population,<sup>11</sup> this finding is disappointing. Of those patients who had duodenal biopsy performed, 7% had histological features of coeliac disease, reinforcing the importance of routine biopsies in all patients referred for investigation of IDA, in accordance with the BSG guidelines.

In total 21 (22%) patients had a cause identified for their anaemia at upper gastrointestinal endoscopy, of whom eight had either neoplasia or coeliac disease. Only 75% of the remaining patients proceeded to lower gastrointestinal investigations. In nine patients (14%) a cause was found for the anaemia. Colonoscopy as a diagnostic tool for investigation of iron deficiency yielded a higher proportion of positive diagnoses than barium enema. This predominantly relates to the superior detection of colonic polyps and angiodysplasia by colonoscopy.

If a cause for IDA is not found at the time of upper gastrointestinal endoscopy, we would advise the referring physician to proceed with lower gastrointestinal investigations. The reason why one quarter of our patients did not proceed to lower gastrointestinal investigations is not clear. Their age did not differ significantly from those who underwent lower gastrointestinal investigations; however, comorbidity or ignorance of the BSG guidelines for the adequate investigation of anaemia are possible explanations.

In 63 (66%) of the 95 patients no cause was found for the IDA, after upper and lower gastrointestinal investigations. The

BSG guidelines state that such patients should be monitored three monthly for one year with additional iron replacement being given if the haemoglobin or mean cell volume falls below normal, with consideration of further investigations only if the haemoglobin concentration cannot be maintained. Reassuringly, follow up studies in patients with negative gastrointestinal investigations confirm that iron deficiency does not return and has a benign course in most patients.<sup>12 13</sup>

In summary, a large proportion of patients referred for investigation of anaemia were not confirmed to be iron deficient. Even in those patients in whom investigations were considered appropriate, the BSG guidelines are not being fully implemented with only three quarters of patients proceeding to lower gastrointestinal investigations. Colonoscopy as a diagnostic tool for investigation of iron deficiency yielded a higher proportion of diagnoses which could be contributing to the IDA than barium enema. Approximately 10% of our patients had a diagnosis of gastrointestinal malignancy as a cause of their IDA.

In conclusion, all physicians need to be fully aware of the BSG guidelines for investigation of IDA, both in terms of appropriate referral and the necessary investigation pathway. Clearly this would need to be the subject of a further audit after a period of re-education and implementation of the BSG guidelines.

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