Audit of the investigation and outcome of iron-deficiency anaemia in one health district

ABSTRACT—The investigation of iron-deficiency anaemia (IDA) is a clinical problem which arises in virtually all branches of medicine. To audit the investigation of IDA, a computer-based laboratory record system was used to identify all women over 50 years of age and all men (n = 200) presenting to a single district laboratory with probable IDA in a six-month period. In 21 of 130 incident cases anaemia was clearly attributable to non-gastrointestinal disease. Of the remaining 109, 19% had investigation of both upper and lower gastrointestinal tract, 21% the upper gastrointestinal tract only, and 7% the lower gastrointestinal tract only. In 55 cases either no investigation was performed or only faecal occult blood tests. Eighteen months after presentation nine colorectal cancers, five gastric cancers and 11 peptic ulcers had been diagnosed; 21 patients had died, including two from colorectal cancers not detected when the IDA presented. This audit has revealed substantial underinvestigation of probable IDA, with serious but treatable conditions remaining undetected. Our findings, which we have no reason to believe are unrepresentative, indicate that policies are needed to ensure adequate investigation of IDA.

Iron deficiency is the most common cause of hypochromic microcytic anaemia. It is an axiom of good practice that a cause of iron deficiency should be established and, when necessary, investigation performed to exclude serious but treatable causes. Several recent studies have examined the outcome of such investigation in patients with iron-deficiency anaemia (IDA) referred to gastroenterologists [1–4]. Most patients, however, are not referred for specialist investigation. We have therefore reviewed the investigation and outcome of all patients presenting within one health district with a probable IDA.

Methods

A laboratory database (which records all full blood counts (FBCs) analysed in the district, population 290,000) was used to identify women aged over 50 years and all men found to have a probable IDA (haemoglobin (Hb) < 11 g/dl in women and < 12 g/dl in men, and mean cell volume less than 83 fl) in the six months from October 1991 to March 1992. Hospital and general practice records were used to collect data on investigation, treatment, outcome and comorbidity. Patients were categorised as being incident cases if the date of the first abnormal FBC fell either within or three months prior to the six-month study period and there had been no other episode of anaemia within the previous two years. All other cases were categorised as prevalent cases. The hypochromic microcytic anaemia was presumed to be due to iron deficiency unless proven otherwise through appropriate investigation.

Results

Approximately 60,000 FBCs were analysed and 200 cases of presumed IDA identified according to the study criteria; 130 were deemed to be incident, 55 prevalent, and in 15 cases no further records could be traced. In 21 incident cases, anaemia was clearly attributable to non-gastrointestinal disease, most commonly to urinary tract bleeding, but also to uterine, respiratory and surgical blood loss and, in one case, sideroblastic anaemia. In 109 incident cases there was a presumed gastrointestinal cause.

The following gastrointestinal investigations had been performed: 46 patients had faecal occult blood (FOB) tests, 41 upper endoscopy with small bowel biopsies in nine, 10 had barium meals, 28 barium enemas, 6 had colonoscopy and 11 sigmoidoscopy/proctoscopy. In 21 patients there were investigations of both the upper and the lower gastrointestinal tract (Table 1) (by endoscopy and/or barium meal and by barium enema and/or colonoscopy or, in two cases, rigid sigmoidoscopy). In 23, only the upper gastrointestinal tract was investigated and in 10, only the lower.

FOB tests alone were done in 15 patients, and 40 had no gastrointestinal investigation—yet 30 of these 55 patients presented with Hb levels < 9.0 g/dl, 13 were under 65 years and in 15 only a single FBC had been performed. In all, 95% (104/109) of the patients were treated for their anaemia, but in 30 there was no record of an FBC after treatment.

By December 1992 diagnoses had been made in 54 of the 109 incident cases (Table 1). In October 1993 further follow-up was considered for the 55 patients who had either had no investigation or FOB tests alone. In 22 patients no further investigation was attempted because of age, comorbidity or non-

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Table 1. Extent of investigation by age and diagnosis in December 1992

	n	Hb < 9 g/dl	Upper and lower GI investigation	Upper GI investigation only	Lower GI investigation only	FOB tests only	No GI investigation
Age (years)							
< 65	29	21	8	5	3	3	10
65–79	51	37	10	11	4	7	19
> 80	29	21	3	7	3	5	11
All ages	*109*	*79*	*21*	*23*	*10*	*15*	*40*
Diagnosis							
Oesophagitis/ hiatus hernia	12	11	4	5	0	0	3
Peptic ulceration	8	8	2	6	0	0	0
Gastric cancer	5	4	0	5	0	0	0
Colorectal conditions (cancer)	14 (7)	13 (6)	3 (0)	1 (0)	6 (4)	0 (0)	4 (3)**
Malnutrition/ malabsorption*	8	4	1*	1*	0	2	4
NSAID-induced	7	5	0	4	1	0	2
Diagnosis recorded as 'not known'	15	12	7	0	1	2	5
No diagnosis recorded	40	22	4	1	2	11	22

* 2 malabsorption (1 coeliac disease, 1 gastric surgery)
** 1 diagnosed at laparotomy, 1 at autopsy and 1 recurrence of previous cancer
FOB = faecal occult blood
GI = gastrointestinal
NSAID = non-steroidal anti-inflammatory drug

response. Of the remainder, 13 had a normal blood count and serum ferritin, 3 had large benign gastric ulcers and 4 remained anaemic (2 had previous IDA and 2 refused further tests). The remaining 13 had died, including 2 from colorectal cancer not detected when the IDA presented. These were both women (of 70 and 75 years with a presenting Hb 6.6 g/dl and 7.2 g/dl) who had been treated with oral iron without investigation (one had been taking a non-steroidal anti-inflammatory drug). They re-presented with recurrent anaemia and inoperable caecal carcinomas 21 and 18 months later. The causes of death in the other 11 were colorectal cancer (3—shown in Table 1), cardiorespiratory failure (4), lung cancer (1) and cerebrovascular disease (3). Of the 109 incident cases a total of 9 colorectal cancers, 5 gastric cancers and 11 peptic ulcers have been diagnosed and 21 patients have died within 2 years of presentation.

Discussion

As a minimum, the management of IDA requires assessment of the response to treatment and investigations for a cause of iron-deficiency. Investigations should reasonably exclude the presence of causes such as colorectal cancer. By these standards, our audit has revealed substantial underinvestigation, leaving serious but treatable conditions undetected. It would be interesting to know how far these findings represent management of IDA elsewhere in Britain.

Iron deficiency was presumed to be present in our patients until proved otherwise. It is debatable whether a serum ferritin measurement is necessary before giving iron therapy and arranging investigation. Thalassaemia is generally uncommon in the UK, and a policy of measuring serum ferritin only in those not responding to iron is likely to be a more cost-effective use of resources in our population. Nevertheless, serum ferritin was measured in 47 patients and Hb electrophoresis in 4; no patients with thalassaemia were identified.

Inappropriate reliance on FOB tests appears to have contributed to underinvestigation. FOB tests are well-known to be insensitive for detecting bleeding from the upper gastrointestinal tract [5]. Their sensitivity for detecting colorectal cancer is also not good, ranging from 50–75% depending on the absence or presence of bowel symptoms—presumably because many cancers do not bleed sufficiently [5,6]. FOB tests may even be negative in cases of colorectal cancers where bleeding is sufficiently severe to produce anaemia [2].

Table 2. Comparison with other recent series

	This study (Mansfield)	Cook *et al* [1] (Sydney)	Rockey & Cello [2] (San Francisco)	McIntyre & Long [3] (Nottingham)	Till & Grundman [4] (Chesterfield)
Duration (months)	6	17	30	17	21
n	109	100*	100	111	89***
Colon cancer	9	14	11**	5	12
Gastric cancer	5	5	1	8	5
Peptic ulcer	11	8	16	23	5
Mean age (years)	70	70	60	63	61
Mean Hb (g/dl)	8.0	8.4	7.8	8.6	–

* all patients were inpatients
** including 2 patients with negative FOB tests
*** including only patients with positive FOB tests
FOB = faecal occult blood

Analysis of the outcome and cause of the anaemia is limited by the large number of patients who had either no investigation or FOB tests only. Nevertheless, most serious causes are likely to have revealed themselves within the 18 months' follow-up period. Almost one in 10 patients was eventually found to have a colorectal cancer. As shown in Table 2, this figure is similar to those of recent series in which patients have been referred for specialist investigation by gastroenterologists. Until recently, the *Oxford textbook of medicine* listed the most frequent gastrointestinal causes of IDA as haemorrhoids (10%) and salicylate ingestion (8%), with neoplasia in only 2%. However, this statement is not present in the 3rd edition [7].

There has been much debate about the extent and order of any gastrointestinal investigations necessary, particularly on the need for large bowel investigation when an upper endoscopy has revealed a cause for IDA [1–3,8]. Our findings suggest that in unselected patients in the UK with probable IDA, colorectal cancer is prevalent enough for dual pathology not to be unusual. None the less, Sahay and Scott have shown that if a barium enema and an upper endoscopy with duodenal biopsy fail to demonstrate a cause for the anaemia, there is little likelihood of a serious cause remaining undetected [9]. To promote such a practice locally, our response has been to publicise the audit widely and to add management guidelines to the FBC report form for new IDA cases, emphasising the importance of excluding colorectal disease and checking the response to iron therapy. We will use the laboratory database to monitor whether these measures have been sufficient.

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