Audit on the use of the barium enema

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SUMMARY All 1358 referrals for barium enemas at Bristol Royal Infirmary in 1981 were studied. The overall diagnostic yield for colonic or distal ileal pathology was 33% with 75 (5.5%) cancers detected. General practitioner requested enemas constituted 25.8% of the total undertaken and their diagnostic yield was equal to hospital outpatient requested enemas. Medical and surgical diagnostic yields were similar for both inpatient and outpatients though the indications varied. Women predominated by 3:2 in all age groups. In the under 40's the yield was low (19.8%) except for inflammatory bowel disease. When related to symptoms the lowest yield was obtained for the investigation of abdominal pain (25%), particularly in women, except in those admitted as inpatients. The clinicians were wrong in diagnosing abdominal or pelvic masses as being of colonic origin in over 50% of cases. It is suggested that yield could be improved by being more selective in patients under 40, more use being made of suitable faecal occult blood testing, and ultrasonic scanning of abdominal masses before barium enema.

The barium enema is one of the most commonly requested radiological investigations by clinicians in many specialities as well as being available to general practitioners in many areas of the United Kingdom.

This study was undertaken to assess the overall diagnostic yield from barium enemas done in one radiology department with particular reference to age, sex, and presenting symptoms as well as detecting any differences related to the referring specialities or general practitioners. Attempts were made to highlight particular groups where diagnostic yield could be improved.

Methods

PATIENTS

All referrals for barium enema at Bristol Royal Infirmary during the year 1981 were studied. The radiology department serves a population of 286 300 and provides an inpatient service covering most acute specialities as well as neighbouring geriatric, orthopaedic, and psychiatric hospitals. Gynaecology, neurosurgery, and thoracic inpatients are served at separate hospitals though there is a gynaecology outpatient clinic at the Bristol Royal Infirmary. A direct access barium enema service is

available for general practitioners. A standardised bowel preparation consisted of five days low residue diet, laxatives and a pre-examination colonic lavage. For hospital inpatients the preparation varied according to the presenting symptoms. Double contrast enemas were carried out on the vast majority using a standard technique¹ except where clinically contraindicated.

Results

There were 1358 requests for a barium enema and 1353 were carried out. One patient refused the examination and in four it was abandoned as not being technically possible. There was a female predominance of 3:2 (821 women and 537 men) and this applied to all age groups. The requests consisted of 351 from 97 general practitioners, 745 from hospital outpatient departments (274 medical and 471 surgical), and 262 for hospital inpatients (92 medical and 170 surgical). The overall diagnostic yield for each referring group is shown in Table 1. Polyps less than 0.5 cm diameter were not considered as being symptomatically significant and were therefore recorded as incidental findings. Patients with only one or two diverticula were likewise not considered as having diverticular disease though it was appreciated that these could occasionally cause symptoms. The miscellaneous diagnoses consisted of conditions such as ischaemic

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Received for publication 28 May 1985

Table 1 *Diagnostic yield in each referral group*

	General practitioner N=351	Outpatients		Inpatients		Total percentage yield of yield
		Medical N=274	Surgical N=471	Medical N=92	Surgical N=170	
Cancers	21	12	20	5	17	75
Polyps (>0.5 cm)	4	6	18	1	5	34
Inflammatory bowel disease	7	31	16	11	1	66
Diverticular disease	69	32	81	21	48	251
Miscellaneous	—	—	12	3	5	20
Total positive	101	81	147	41	76	446
Percentage positive in each group	28.8%	29.5%	31%	44.6%	44.7%	33%

or radiation colitis, vesicocolic and other fistulae of unknown cause, extrinsic colonic infiltration, and anastomatic leakage.

Table 2 shows the diagnostic yield in those aged under 40 years. There were a total 272 with an overall positive yield of 19.8%. Only one cancer of the sigmoid colon was detected in a 39 year old man. This group consisted of 102 (37.5%) men and 170 (62.5%) women. The positive yield in women was 16.5%, and for men 25.5%, the difference being in the diagnosis of inflammatory bowel disease including the terminal ileum. In those with normal barium enema, pain was the commonest symptom.

Table 3 shows the numbers referred in respect to the main presenting symptom or sign with the positive yield in per cent. Patients referred for rectal bleeding had an overall positive finding in 39% of the 295 investigated. It was not possible to distinguish between the various types of rectal bleeding. Some additional patients who were anaemic also had rectal bleeding or positive faecal occult bloods. Many patients had several symptoms but the predominate symptom was recorded in the order listed in Table 3 with anaemia first. Abdominal masses included pelvic masses on rectal examination and only 45% proved to be of colonic origin. Miscellaneous symptoms included distension, weight loss, excessive flatus as well as screening indications.

Where the symptoms were not stated a diagnosis only had been suggested without reference to the symptoms. This included polyps, cancers or colitis seen on sigmoidoscopy and hence had the highest diagnostic yield of 56%. The lowest yield was obtained in those investigated for abdominal pain except in those admitted as inpatients under the surgeons where 25% of all those investigated with an enema had severe diverticular disease.

Only 38 patients were investigated for positive faecal occult blood tests, three by general practitioners, and the yield was only 18.4% with four neoplasms. The type of test used was not specified but it is known that there is no standardisation of tests in the local area. Only 37 enemas were requested for screening purposes. These consisted of a rectal cancer on sigmoidoscopy in five so looking for a synchronous cancer or polyps, strong family history of polyposis coli in four, past history of polyps in six and previous colonic cancer in 22 in whom three recurrences were detected. Twenty three colostomy enemas were done, usually to check anastomoses before closure of colostomy in surgical patients.

Extracolonic or incidental findings were noted in an additional 71 (5%) patients consisting of gall stones (16), extracolonic mass (20), small polyps less than 0.5 cm diameter (33), malrotation (one) and

Table 2 *Diagnostic yield in those under 40 years*

	General practitioner N=65	Outpatients		Inpatients	
		Medical N=99	Surgical N=84	Medical N=11	Surgical N=13
Cancers	—	1	—	—	—
Polyps (>0.5 cm)	1	3	4	—	1
Inflammatory bowel disease	5	18	9	7	1
Diverticular disease	1	2	1	—	—
Total	7	24	14	7	2
Percentage	10.6%	24%	16%	64%	15%

Table 3 Main symptom resulting in barium enema with percentage yield in parentheses

	General practitioner N=351	Outpatients		Inpatients		Overall positive yield
		Medical N=274	Surgical N=471	Medical N=92	Surgical N=170	
Anaemia	9 (11%)	19 (26%)	5 (60%)	19 (63%)	5 (80%)	43%
Rectal bleeding	64 (41%)	54 (30%)	120 (35%)	18 (67%)	39 (49%)	39%
Abdominal mass	2 (50%)	3 (67%)	25 (32%)	10 (60%)	20 (50%)	45%
Abdominal pain	135 (28%)	82 (18%)	134 (20%)	8 (12%)	60 (43%)	25%
Altered bowel habit	111 (28%)	75 (31%)	72 (22%)	25 (32%)	20 (50%)	29%
Miscellaneous	13 (23%)	11 (0%)	76 (42%)	10 (40%)	19 (53%)	38%
Not stated	17 (38%)	30 (67%)	39 (56%)	2 (50%)	7 (57%)	56%

fractured vertebra (one). The total of all polyps was therefore 67 found in 5% of all barium enemas performed. The diagnosis of Crohn's disease in the small bowel by reflux of barium into the terminal ileum occurred in eight patients and these were included under inflammatory bowel disease rather than extracolonic lesions.

There were 75 cancers overall and 41 of these occurred in the rectum or sigmoid colon. Most left sided colonic cancers were found in surgical referred patients and in medical referrals the cancers were more likely to be on the right side.

Emergency barium enemas within 24 hours of admission were only carried out on 10 patients, usually to exclude or define the level of an obstruction or for profuse rectal bleeding. The yield in this group was over 50% with the inclusion of one case with an extracolonic obstruction.

Discussion

Though not strictly comparable the overall diagnostic yield of 33% obtained in this group of barium enemas compares favourably with the yield from flexible sigmoidoscopy of 30% when perianal conditions are not included.² With screening techniques, in particular faecal occult blood testing, and the investigation of patients solely from gastroenterology clinics the barium enema yield can be increased to over 50%.³ In particular it was noted that the diagnostic yield from general practitioner requests was equal to that from hospital outpatient departments and that the symptoms investigated were similar.

Open access barium enema facilities are not universally available because of lack of facilities or hospital clinicians concern that general practitioners might misinterpret radiological reports. Indeed, radiologists themselves make reporting errors of 6.7–16.7% of all enemas reported depending on whether the consultant or junior staff are doing the reporting.⁴ Most of these errors, however, are

minor, usually related to small polyps but general practitioners should be prepared to ask for consultant advice or a repeat barium or endoscopic examination if symptoms persist, particularly in the case of rectal bleeding in the presence of diverticular disease, a situation where neoplasms may also be present.^{5 6}

The faecal occult blood tests currently being used in the Bristol Royal Infirmary and by the general practitioners are clearly too sensitive for any clinical value with only 18.4% detection of significant lesions. With guaiac impregnated tests such as Haemoccult it should be possible to have a significant detection rate of neoplasm of about 50%.⁷

On average at the Bristol Royal Infirmary 2.6 cancers present each year in patients aged 40 years or less but rarely have these patients had a barium enema.⁸ As the largest yield is for inflammatory bowel disease it would seem appropriate to investigate those under 40 with a flexible sigmoidoscope before proceeding to a barium enema if warranted.

Assuming the number of cancers presenting in the past few years has remained constant then 108 cancers can be expected at the Bristol Royal Infirmary each year with 21 diagnosed at emergency surgery. This leaves 87 presenting for elective treatment which means that the 75 detected in 1981 represents 86% of the total for elective treatment.⁹

Clinicians interpretation of an abdominal or pelvic mass being of colonic origin was wrong in 55% cases. With ultrasound now able to distinguish colonic lesions from non-colonic^{10 11} it would seem appropriate that ultrasonic examination should be done before barium enema for the investigation of a mass. There were few barium enemas done for the follow up of colonic polyps as clinicians now prefer to re-examine these patients with colonoscopy when polypectomy or biopsies can be carried out at the same time.¹²

We believe the yield could be improved by being more selective in patients aged less than 40, restricting the type of faecal occult blood tests available and

using less sensitive tests more frequently, and using ultrasonic scans of abdominal masses before a barium enema. There is no evidence from this study that direct access for general practitioners to request barium enemas should be restricted.

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