

# Diagnostic yield from barium enemas: a study among patients referred by general practitioners and hospital outpatient departments

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**SUMMARY.** Although the double contrast barium enema is the standard radiological examination of the colon, it is not universally available to patients referred by their general practitioners. A retrospective survey of all double contrast barium enemas carried out over a two year period in one health district was undertaken to determine the diagnostic yield of pathological findings for patients referred by general practitioners and hospital outpatient departments and for patients who had rigid sigmoidoscopy prior to the enema and those who did not. A total of 530 patients were studied. The diagnostic yield for the hospital outpatients was 41.6% and in the general practitioner group 35.6%. In the patients who had rigid sigmoidoscopy the yield was 42.7% compared with 32.6% in those who had no prior sigmoidoscopy.

It is concluded that the withdrawal of direct access for barium enemas to general practitioner patients in this district because of a low diagnostic yield cannot be justified. The lower diagnostic yield in the patients who did not have sigmoidoscopy supports the policy of requiring this examination prior to all barium enemas.

**Keywords:** barium compounds; radiography; sigmoidoscopy; open access services.

## Introduction

IT is generally accepted that a rectal examination and sigmoidoscopy should be carried out before a double contrast barium enema is done so as to ensure safe rectal intubation and also to exclude any pathology that may make the examination unnecessary. Because some general practitioners do not have access to sigmoidoscopy and because of increasing workloads some radiology departments restrict access to the double contrast barium enema to patients of hospital consultants only.

In 1986 under a rationalization scheme the Greenwich district health authority closed St Nicholas Hospital (a community hospital) where many outpatient investigations were being done, and restricted referral for some radiological examinations including barium enemas to patients of hospital consultants only. Consequently a general practitioner patient who requires this examination has to be first referred to the outpatient department which inevitably leads to some delay (up to three weeks).

We could find no published study comparing the diagnostic yield of pathological findings from barium enemas of patients who had had sigmoidoscopy prior to the enema and those who had not. A previous report<sup>1</sup> showed that the diagnostic yield from general practitioner requests was equal to that from hospital outpatient departments and that the indications for barium enema were similar.

It was therefore decided to review the results of double contrast barium enemas over a two year period to see if there was any significant difference in the diagnostic yield for general practitioner and hospital outpatient referrals to justify the policy of restricting open access. In addition, the yield from patients who had sigmoidoscopy was compared with the diagnostic yield from those who had not.

## Method

The records of all general practitioner and hospital outpatient referrals for double contrast barium enema between January 1983 and December 1984 at St Nicholas Hospital were reviewed. The diagnostic yield of pathological findings was compared for general practitioner patients and hospital outpatients, and for patients who had sigmoidoscopy prior to barium enema and those who had not. The outpatients were referred from the Brook General Hospital and St Nicholas Hospital.

During the period under study all general practitioners in the district had open access for barium enema and sigmoidoscopy for their patients. The sigmoidoscopy for general practitioner patients was carried out by two consultant surgeons or their experienced registrars using a rigid instrument at least seven days before the barium enema. The sigmoidoscopy for hospital outpatients was carried out by the referring surgeons, physicians or their registrars also using rigid instruments.

Bowel preparation for the double contrast barium enema was with magnesium citrate and sodium picosulphate powder<sup>2</sup> for patients under 65 years of age, and with senna liquid with lavage<sup>3</sup> for those aged 65 years and over as this preparation is better tolerated by elderly patients. No preparation was undertaken in patients with active inflammatory bowel disease or suspected intestinal obstruction. All the double contrast barium enemas were done by one consultant radiologist using a standard technique.<sup>4</sup> The radiologist was aware of the sigmoidoscopy findings in most cases.

The radiological and sigmoidoscopy reports, any operative findings and the final diagnoses were analysed for all the patients. Patients whose records could not be traced or were incomplete were excluded from the study. The pathological findings considered clinically significant were carcinoma, inflammatory bowel disease, diverticular disease with at least three diverticula and polyps greater than 5 mm in diameter. Patients who had minor bowel malrotations were not considered to have a significant pathological finding.

In the analysis presented here, it has been assumed that the group of patients who had sigmoidoscopy prior to barium enema was comparable with the group of patients who did not, and that the groups contained no bias. The results were analysed using the chi square test for two independent samples, with a confidence level of 5%.

## Results

Of the 591 patients who had a double contrast barium enema over the study period, 55 had missing or incomplete records and were excluded from the study. Six patients who had unsuccessful examinations were also excluded from the analysis.

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Among the remaining 530 patients who had successful examinations 339 were hospital outpatients and 191 general practitioner patients. The overall male to female ratio was approximately 2:3 (214 male patients and 316 female); among the hospital outpatients 144 were male and 195 female and among the general practitioner patients 70 were male and 121 female. The age range was 11–87 years (mean 57.8 years) for outpatients and 14–86 years (mean 55.5 years) for general practitioner patients.

The diagnostic yield of pathological findings from the double contrast barium enemas in the 530 patients is shown in Table 1. Abnormal findings were present in 141 (41.6%) of the outpatients and 68 (35.6%) of the general practitioner patients. Twenty seven patients had carcinomas of whom 22 were outpatient and five general practitioner referrals. There was little difference in the yield for diverticular disease, inflammatory bowel disease and polyps between the two groups.

A total of 358 patients had had rigid sigmoidoscopy before barium enema and 172 had not. Thirteen of the general practitioner patients did not have sigmoidoscopy owing to administrative errors. At the time of the study there was no policy insisting on sigmoidoscopy before barium enema for referrals from hospital outpatient departments. Therefore, 159 outpatients were examined without having had sigmoidoscopy. The mean age of the 180 outpatients who had sigmoidoscopy (76 males and 104 females) was 58.2 years (range 22–86 years) and 56.6 years (range 11–87 years) for the 159 outpatients who did not (68 males and 91 females). The mean age of the 178 general practitioner patients who had sigmoidoscopy (65 males and 113 females) was 55.9 years (range 14–86 years) and 54.1 years (range 31–60 years) for the 13 patients who did not (five males and eight females). The diagnostic yield of pathological findings in the groups who had and had not had sigmoidoscopy is shown in Table 2. In patients who had prior sigmoidoscopy the yield was 42.7% compared with 32.6% in those who had not had sigmoidoscopy (chi square = 4.62, 1 df,  $P < 0.05$ ).

## Discussion

The double contrast barium enema is the standard radiological examination of the colon. It is not a pleasant examination for the patient and should only be done when clearly indicated. Most radiology departments offer an open access service for barium enemas to general practitioner patients but some restrict it to patients referred by hospital doctors because of lack of diagnostic facilities or increased costs, because the general practitioners may not have facilities for sigmoidoscopy or occasionally for historical reasons. There may also be concern that the general practitioner might misinterpret the radiological report.<sup>1</sup> However, with the implementation of the white paper *Working for patients*<sup>5</sup> and the introduction of general practitioner fund-

**Table 1.** Diagnostic yield of pathological findings from the barium enemas for hospital outpatients and general practitioner patients.

	No. (%) of patients referred by:	
	Hospital outpatient department (n = 339)	General practitioner (n = 191)
Carcinoma	22 (6.5)	5 (2.6)
Diverticular disease	101 (29.8)	48 (25.1)
Inflammatory bowel disease	10 (2.9)	6 (3.1)
Polyps	8 (2.4)	9 (4.7)
Total	141 (41.6)	68 (35.6)

n = total number of patients.

**Table 2.** Diagnostic yield of pathological findings from the barium enemas for patients who had rigid sigmoidoscopy and those who did not.

	No. (%) of patients who had:	
	Sigmoidoscopy and barium enema (n = 358)	Barium enema without sigmoidoscopy (n = 172)
Carcinoma	20 (5.6)	7 (4.1)
Diverticular disease	106 (29.6)	37 (21.5)
Inflammatory bowel disease	18 (5.0)	9 (5.2)
Polyps	9 (2.5)	3 (1.7)
Total	153 (42.7)	56 (32.6)

n = total number of patients.

holding and medical audit it will become much more difficult to restrict open access to any general radiological investigation on cost grounds alone, since the general practitioner will be in a position to decide whether or not to bear those costs.

The overall diagnostic yield of pathological findings in the general practitioner patients studied here was 36% compared with 42% in the hospital outpatients. These yields were higher than those reported by Vellacott and Virjee<sup>1</sup> who found 29% for general practitioner referrals and 31% for surgical outpatients. They did not state whether all their patients had had sigmoidoscopy but concluded that there was no evidence to suggest that direct access for general practitioners to request barium enema should be restricted. The high diagnostic yield of pathological findings for the general practitioner patients studied here was probably due to the prior sigmoidoscopy as patients with perianal conditions only, such as haemorrhoids, did not go on to have a barium enema examination. The results of this study indicate that withdrawal of open access to general practitioner requests on grounds of efficacy cannot be justified.

The low diagnostic yield of 2.6% for carcinoma in the general practitioner group compared with 6.5% in the hospital outpatients may be due to urgent referral being made to hospital consultants once colonic carcinoma is suspected by the general practitioner. The diagnostic yield could be improved by being more selective in patients aged under 40 years and investigating them first with flexible sigmoidoscopy thus reducing the number of patients requiring a barium enema.<sup>1,6-8</sup>

Although many radiologists insist that sigmoidoscopy is carried out before a barium enema, we could find no studies comparing the diagnostic yield for patients who have had prior rigid sigmoidoscopy and those who have not. In this study the diagnostic yield of the barium enema for patients who had had rigid sigmoidoscopy was 43% compared with 33% in those examined without prior sigmoidoscopy. These two groups were similar in terms of age and sex distribution and it was assumed that they were randomly referred by clinicians who either had no ready access to sigmoidoscopy or were not aware of the need for it prior to a barium enema. The higher yield in the sigmoidoscopy group was probably due to the exclusion of patients with perianal conditions and may also have been due to knowledge of the sigmoidoscopy findings by the radiologist who might have ensured that the known or suspected abnormality was demonstrated. However, the diagnostic yield of rigid sigmoidoscopy is only 11.5–13.0%,<sup>8,9</sup> since the mean distance passed is only  $16.0 \pm 4.2$  cm<sup>7</sup> and therefore most of the colon is not examined by this method. Despite the limited reach of the rigid sigmoidoscopy, the presence of proximal pathology can be indicated by observing signs such as bleeding or excessive

mucus. Ideally, however, open access flexible sigmoidoscopy should be available but where this is not possible then rigid sigmoidoscopy prior to barium enema should be offered to general practitioners.

In this study of the double contrast barium enema, the need for sigmoidoscopy before barium enema has been demonstrated. We have also shown that there is no justification for restricting open access for general practitioner requests for barium enema.

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