Reduction in late diagnosis of colorectal cancer following introduction of a specialist colorectal surgery service

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ABSTRACT

INTRODUCTION An audit of patients presenting with colorectal cancer to our district general hospital during a 2-year period from November 1994 found that 12.1% of cases were diagnosed later than 6 months after initial presentation to a physician. This audit was repeated for a 2-year period from December 2001, to determine whether the introduction of a specialist coloproctology surgery service had led to a reduction in late diagnosis of colorectal cancer.

PATIENTS AND METHODS Case notes were reviewed of all patients presenting with colorectal cancer between December 2001 and November 2003. Late diagnosis was defined as diagnosis of colorectal cancer more than 6 months after their first attendance to either their general practitioner or district general hospital. The results were compared with those of the previous study.

RESULTS Of a total of 218 patients presenting with colorectal cancer during the study period, 14 (6.4%; 10 men and 4 women) satisfied the criteria for late diagnosis, with the longest delay being 12.5 months. Reasons for late diagnosis were false-negative reporting of barium studies ($n = 3$), inaccurate tumour biopsy ($n = 2$), concurrent pathology causing anaemia ($n = 4$), inappropriate delay in definitive investigation ($n = 3$), and refusal of investigation by patients ($n = 2$).

CONCLUSIONS There has been a reduction of nearly 50% (12.1% to 6.4%) in the proportion of patients with a late diagnosis of colorectal cancer compared with our previous audit. It is suggested that an important factor in this improvement in diagnosis has been the introduction of a specialist coloproctology surgery service.

KEYWORDS

Colorectal neoplasia – Diagnosis – Cancer care facilities

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Colorectal cancer is a common condition, with an incidence in the UK of 58/100,000 per year.¹ This translates to nearly 35,000 new cases and 17,000 deaths per year from the disease. The most important prognostic indicator influencing survival is the Dukes' stage of a colorectal cancer at the time of treatment;² although the majority of colorectal cancers are believed to be slow-growing, there is evidence to support the intuition that early diagnosis leads to improved results from surgery.^{3,4} Early diagnosis is thus the key to improving outcomes in the treatment of colorectal cancer, a fact recognised by the increasing implementation of screening programmes in industrialised countries.⁵

In the last decade, there have been a number of changes in the provision of colorectal services in the UK. The avail-

ability of colonoscopy has increased, screening for colorectal cancer amongst high-risk populations has been introduced, and many hospitals now have a sub-specialist coloproctology surgery department for the management of colorectal disease.

A previous audit at our hospital during a 2-year period from November 1994 to October 1996 found that over 12% of 141 colorectal cancers treated were diagnosed later than 6 months after initial presentation to a physician.⁶ We repeated this audit for the 2-year period December 2001 to November 2003, with an emphasis on establishing the reasons for delayed diagnosis. The results of this audit were then compared with those of the audit in 1996 to determine whether the changes in practice had led to any reduction in late diagnosis of colorectal cancer.

Table 1 Reason for delay in diagnosis of 14 patients

Cause for delay	Number of patients (%)	
	1994–1996	2001–2003
Missed diagnosis on barium enema	5 (3.6%)	3 (1.4%)
Missed diagnosis on colonoscopy	5 (3.6%)	2 (0.9%)
Concurrent pathology	2 (1.4%)	4 (1.8%)
Delay in diagnostic tests	4 (2.8%)	3 (1.4%)
Patient refusal to undergo investigation	1 (0.7%)	2 (0.9%)
Total	17 (12.1%)	14 (6.4%)

Patients and Methods

The data for this retrospective study were obtained from the notes of all patients who had a colorectal cancer diagnosed by a department of surgical coloproctology unit in a district general hospital between December 2001 and November 2005. Those considered to be diagnosed late were patients who had cancers diagnosed 6 months or more after their first attendance at either their general practitioner or the district general hospital. Information collected included age and sex, presenting symptoms, and the time taken from first presentation to diagnosis. Investigations performed, site and Dukes' stage of the cancer were also recorded.

Results were then compared with those from a previous audit in the same hospital, covering the period November 1994 to October 1996, prior to the implementation of a specialist colorectal surgery department.⁶

Results

Of a total of 218 patients seen with colorectal cancer over the study period of 2 years, 14 (6.4%) satisfied our criteria for late diagnosis. Ten women and four men were identified, with a mean age of 74 years (median, 80 years; range, 59–87 years). This compares favourably with the study from the same institution 7 years previously, in which 17 of 141 cases of colorectal cancer (12.1%; (10 men and 7 women) were diagnosed later than 6 months after initial presentation. The ratio of emergency to elective cases in the initial audit was 33:141 (23.4% emergency), compared with 57:218 (26.1% emergency) in the period 2001–2005.

The longest delay between first visiting a physician and diagnosis in these 14 patients identified was 12.5 months. The median delay was 7 months; in the previous audit, the corresponding median delay was 15 months.

Most patients complained of more than one symptom at initial presentation. The most common presenting complaint in the cases identified was a change in bowel habit

(8 patients; 57%). Next most common were iron-deficiency anaemia and rectal bleeding (each 6 patients; 43%). Abdominal pain and weight loss were least commonly identified (each 3 patients; 21%). The relative frequency of symptoms in our study was similar to that in the previous audit, the only exception being a higher incidence of change in bowel habit amongst the patients in this study.

There were many reasons for late diagnosis (Table 1). Three patients had double contrast barium enemas that were incorrectly reported; two patients with worrying symptoms whose initial biopsies at colonoscopy were benign were found at repeat colonoscopy to have invasive cancer. The cause of delay in these 5 patients can be considered as missed diagnosis. There were 3 patients in whom the diagnosis of colorectal disease was delayed due to the presence of concurrent pathology thought to be responsible for their symptoms (1 with bladder cancer, 1 with ovarian cancer, and one with a duodenal ulcer). In one patient, a mass in the right iliac fossa was initially diagnosed and treated as an appendix mass, and only on histological examination found to be an invasive colorectal cancer. Two patients were delayed by their refusal to attend for investigations, while in three patients the delay was attributable to a delay in arranging diagnostic tests.

The most common site for late diagnosed colorectal cancers was the right colon, with 8 of 14 (57%) (caecum [$n = 5$], ascending colon [$n = 3$]). The remaining sites were sigmoid colon ($n = 3$), rectum ($n = 2$) and descending colon ($n = 1$).

Clinicopathological classification of the late diagnosed cancers is shown in Table 2.

Discussion

In the UK, there is a life-time risk of more than 1 in 20 of developing colorectal cancer, and almost half of patients die from their disease. There has been a gradual improvement in survival of colorectal cancer in the past 30 years, as a result of advances in diagnostic techniques, improvements

Table 2 Clinicopathological stage of 14 late-diagnosed tumours

Dukes' classification of late-diagnosed tumours	Number of patients	
	1994–1996	2001–2003
Dukes' A	1	1
Dukes' B	7	5
Dukes' C	2	3
'Dukes' D' (metastatic spread)	4	5
Unknown	3	–
Total	17	14

in surgery and intensive care, progress in the efficacy of chemotherapy, and the development of effective treatments for liver metastases.⁷ However, there were still more than 16,000 deaths from colorectal cancer in the UK in 2002, and it remains the second commonest cause of cancer death in this country.

An audit of diagnosis of colorectal cancer was performed at our institution between November 1994 and October 1996; this found that in over 12% of cases, there was a delay of more than 6 months from initial presentation to a general practitioner or district general hospital to diagnosis of colorectal cancer.⁶ We repeated this audit for the period December 2001 to November 2003, and found that the incidence of delayed diagnosis of colorectal cancer had almost halved, to 6.4%, despite a 50% increase in the number of cases treated.

The most influential prognostic factor in colorectal cancer is the clinicopathological stage of the disease, measured using Dukes' classification² or the TNM system.⁸ Patients with a Dukes' stage A tumour have a 5-year survival of 90%, whereas for those with a Dukes' stage C tumour it is less than 40%. Early diagnosis is thus recognised as essential for the successful treatment of colorectal cancer.⁵

A number of factors contribute to delay in diagnosis. Patients must notice the symptoms of illness and present themselves to medical attention; widely publicised patient awareness programmes address this issue. General practitioners need to recognise the symptoms of their patients and have access to urgent hospital out-patient clinics; it is hoped that these factors might be assisted by GP education schemes and the implementation of reduced out-patient appointment waiting times, although the impact of the latter is not universally accepted.⁹ In a study detailing delays in diagnosis of 100 consecutive cases of colorectal cancer in Nottingham in 1979, the mean time between first symptom and presentation to the family doctor in that study was 14 weeks, and the mean time between presentation to the family doctor and referral to hospital was 13 weeks.¹⁰

Unfortunately, there is no evidence from UK studies to suggest that there has been any significant improvement in this situation in the intervening 35 years.

The study reported here addresses the delay between initial presentation to a GP or district general hospital and definitive diagnosis of colorectal cancer. The results show that nearly 94% of patients presenting to a physician with symptoms of colorectal cancer were diagnosed within 6 months. Comparison of the results of this audit with those of a similar audit 7 years ago suggests that the proportion of patients with an unacceptable delay in diagnosis has almost halved.

In 1997, the Department of Health Clinical Outcomes Group published the document *Guidance on commissioning cancer services: improving outcomes in colorectal cancer – the manual*,¹¹ much of which was based on the guidelines published the previous year by The Royal College of Surgeons of England and the Association of Coloproctology.¹² These documents give detailed guidance for the setting up and running of a colorectal cancer service, from the implementation of multidisciplinary teams to the provision of chemotherapy and radiotherapy. The aim of the documents is: 'to assist those commissioning, planning, and developing cancer services by focusing on those aspects of colorectal cancer which are most likely to have a significant impact on health outcomes'.¹¹

The provision of treatment for colorectal cancer at St Richard's Hospital, Chichester, has changed radically in the last 5 years in response to this guidance. A second specialist colorectal surgeon was employed, and the post of specialist colorectal nurse was created. Regular multidisciplinary team meetings were instigated, attended by surgeons, radiologists, pathologists, oncologists and specialist nurses. Implementation of the 2-week rule enabled rapid referral of patients to hospital out-patient appointments, and rapid access clinics with flexible sigmoidoscopy were set up, allowing one-stop diagnosis of colorectal cancer. It is our belief that these changes to the service provided by our hospital have led to the reduction in number of patients with delayed diagnosis of colorectal cancer, in the face of an almost 50% increase in the number of cases overall.

In accordance with the literature,¹³ and the previous audit at our institution,⁶ our study showed that right-sided colorectal cancers comprise a disproportionate number of cases of delayed diagnosis – 8 of 14 cases (57%) were in the caecum or ascending colon. This contrasts markedly with the known distribution of colorectal tumours – only 25% of colorectal tumours are found at or proximal to the hepatic flexure.¹⁴ This disparity is likely to be due to two factors. First, this is the most proximal part of the colon, and is thus the most difficult to image either endoscopically or radiologically. This issue is addressed in the updated *Guidance on commissioning cancer services* document,¹⁵ which lays down guidelines for the provision of training for endoscopists such

that a successful caecal intubation rate of over 90% is routinely achieved. Second, the insidious symptoms of right-sided tumours are less likely to come to the attention of a patient, and may not lead to sufficiently prompt investigation.

Less easy to address is the proportion of patients whose delayed diagnosis of colorectal cancer is attributable to the diagnosis of a concurrent condition following appropriate investigation of symptoms. Of the four patients in our study, two were diagnosed with cancerous conditions causing iron-deficiency anaemia (ovarian cancer and bladder cancer). The simultaneous presence of a further distant primary tumour in these patients is very unfortunate, and could not be predicted; indeed, it is creditable that appropriate follow-up of these patients revealed a persistent iron-deficiency anaemia, leading to further investigation and diagnosis of the second primary tumour. A further patient whose iron-deficiency anaemia was attributed to a duodenal ulcer was treated accordingly. Failure of the anaemia to resolve led to colonoscopy and the discovery of a right-sided tumour; again, this sequence of events cannot be faulted. We can only recommend that patients presenting with an iron-deficiency anaemia are appropriately followed up after diagnosis and treatment of the apparent cause.

The delayed diagnosis in three of our 14 patients (21%) was attributable to incorrect reporting of a double-contrast barium enema. Overall, this contributed to delayed diagnosis in 1.4% of our 218 patients, compared to 3.5% of patients (5 of 141) in the previous audit. We suspect that this improvement is a result of an increasing reliance on colonoscopy in the investigation of the symptoms of colorectal cancer, since there is no evidence of improving skill in performing and reading barium enema examinations. It is an unfortunate fact that every investigation has an incidence of false negatives and false positives; McDonald *et al.*¹⁶ retrospectively assessed the results of 313 patients with histologically proven colorectal cancer who had undergone barium enema examination, and found that in 21 patients (6.7%) a carcinoma had been missed, most commonly due to technical failure. They concluded that strict quality control was imperative for the performance of barium enemas, and that it is important to understand the limitations of the investigations we use. The recent development of computed tomographic colonography may lead to a reducing requirement for barium enema investigations, which will surely be welcomed by radiologists and patients alike.¹⁷

This increased reliance on colonoscopic visualisation and biopsy of suspicious lesions may have contributed to late diagnosis in two patients. Symptoms suggestive of colorectal cancer were investigated with colonoscopy, which demonstrated likely tumours; however, biopsy was benign or inconclusive. Further colonoscopic biopsy subsequently provided histological diagnosis of colonic cancer, several weeks or months after the original examination. Increased training and practice in colonoscopy

might reduce such diagnostic delays to a minimum, but again it must be remembered that no test is fully sensitive or specific.

Conclusions

We have demonstrated that the incidence of delayed diagnosis of colorectal cancer in our institution has almost halved in the last 7 years, despite a 50% increase in the workload. We suggest that this is mainly attributable to the implementation of recommendations from the government and The Royal College of Surgeons of England, including the setting up of a specialist coloproctology service with the requisite staff.

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