

Stage Migration in Curative Colorectal Cancer Resections

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ABSTRACT

AIM: The NHS Bowel Cancer Screening Programme (BCSP) introduced in 2006 aimed at detecting pre-malignant colorectal disease in patients aged >60 years. We assessed the impact of screening on Dukes Stage presentation in patients undergoing curative colorectal resections.

METHOD: All patients undergoing curative resection between January 2008 and January 2012 were assessed. Demographics, age of diagnosis and histological Duke's Stage were analysed.

RESULTS: 467 patients were identified. Median age was 69, male to female preponderance of 1.67:1. The total number of curative resections ranged from 111-123 (mean 117). A significant decrease in Dukes A cancers from 32.2% in 2008 to 15.5% in 2012. ($p=0.0024$ chi-square) was observed. Dukes B cancers increased from 26.3% to 38% ($p=0.05$ Chi-square). An increase in Dukes C cancers by 4.9% was demonstrated, however this did not attain statistical significance ($p=0.516$ chi-square).

DISCUSSION: Dukes A disease has decreased but with a steady rise in Dukes B and C cancers in our cohort. The total number of annual curative resections remains unchanged. Stage migration to more advanced disease in curative resections may be attributable to more aggressive endoscopic treatment of premalignant adenomatous disease. Evaluation in larger cohorts is needed, which may necessitate screening in younger patients.

INTRODUCTION

Colorectal cancer (CRC) is the third most common cancer and the second most common cause of cancer death in the UK. Fifty five percent of all CRC patients present with lymph node metastases at the time of diagnosis^[1]. Stage migration is defined as a change in the distribution of stage in a particular cancer population, induced either by a change in the staging system itself or improved detection technologies. Earlier detection, before the development of symptoms, is an effective method of down staging disease with a consequent reduction in mortality and is the strategy of choice adopted by screening programmes.

The NHS Bowel Cancer Screening Programme (BCSP) was introduced in 2006 and is now fully established across the U.K. The programme aims to detect premalignant colorectal disease in patients aged 60 years and above, ultimately with a view to reducing CRC mortality by 16% in those offered screening^[1]. BCSP invites those aged 60-69 years to undertake a biennial guaiac based faecal occult blood test with subsequent offer of colonoscopy to the patient should an abnormal FOBt be found. Those patients aged >70 years may request a FOBt kit.

Two year data from the first English centre to start bowel cancer screening demonstrated significant downstaging of CRC, consistent with the preceding randomised controlled trials^[2]. Furthermore, the first full round of screening in England also demonstrated the expected improvement in cancer stage at diagnosis. Early cancer (Dukes A or B) was found in 70% of those with cancer^[3]. Pande et al determined that screening offer a significant survival benefit over

non-screened patients in the pilot programme across in all stages and indeed when compared stage for stage^[4]. Improved survival was also found in BCSP interval cancers between 2000 and 2007 in Scotland^[5]. Based on these early results, the BCSP should in theory achieve its intended goal of reducing mortality^[6], however this has not been fully established^[7]. Critics of the BCSP are sceptical of its efficacy in reducing mortality, with this being an important issue in the context of colorectal cancer referral mechanisms. Rajasekhar *et al* found that many patients undergoing colonoscopy within the BCSP already had symptoms predating screening suggesting an overall improvement in health promotion is needed rather than an increase in screening itself^[8].

In view of this, we assessed the impact of the Bowel Cancer Screening Programme on Dukes' Stage presentation in resected patients on the subsequent years following full BCSP introduction at Warrington and Halton Hospitals NHS Trust.

METHODS

All patients undergoing colorectal cancer resection between January 2008 and January 2012 at Warrington and Halton Hospitals NHS Trust were identified from a prospectively maintained multidisciplinary team database. Patients with evidence of distant metastatic disease (Dukes' D) and recurrent disease were excluded.

From the remaining MDT patients who underwent resection with curative intent, all those patients referred from the accredited local screening centres were identified.

Demographic data, age at diagnosis and histological Dukes' Stage were analysed with StatView Statistical software Chi-Square analyses.

In our unit, disease stage is recorded according to Dukes and TNM classification. Analyses were based on Dukes stage. As per the TNM classification devised by the American Joint Committee on Cancer 7th edition, Dukes A disease included T1N0M0 cancers, Dukes B included T2N0M0, T3N0M0 and T4N0M0 disease, and Dukes C included T1-4 disease with N1 or N2 involvement (see appendix 1)^[9].

Primary outcome was to assess the impact of the BCSP had on the histological Stage at presentation. The secondary outcome was to assess the age distribution of patients undergoing resection.

RESULTS

A total of 467 patients were identified over the 4 year time period. Median age was 69 and male to female preponderance of 1.67:1.

The total number of annual curative resections ranged from 111 in 2008 to 123 in 2011 (mean 117) (Table 1). BSCP referred patients accounted for 6.9% of total resections (32 patients).

A significant decrease in Dukes A cancers from 32.2% in 2008 to 15.5% in 2012 was observed ($p=0.0024$ chi-square test) in the cohort, with Dukes B cancers demonstrating a significant rise from 26.3% in 2008 to 38% in 2012 ($p=0.05$ chi-square test).

Interestingly the number of Dukes C cancers demonstrated an increase from 41.5% in 2008 to 46.3% in 2011, however this did not achieve statistical significance ($p=0.516$ chi-square test).

In addition to this, we also demonstrated a large number of resected patients in each year were aged less than 60 years which were outside the limits of the inclusion criteria of the BSCP (Table 2).

It is interesting to note that in 2008, 22.9% of the total resected patients were aged <60 years which did decrease by 2011 to 17.1%. The prevalence of Dukes C disease, however remained largely unchanged (Table 2).

DISCUSSION

Following the introduction of BCSP, the total number of annual curative resections remains unchanged in our unit. The number of patients with Dukes' A disease undergoing resection has decreased but with a steady rise in Dukes' B and C cancers is seen. This is contrary to the published results of the pilot studies undertaken in the U.K. and the prevalent screening rounds in England where the number of Dukes' A patients had increased substantially.

The decreased number of Dukes' A disease in our cohort may be attributable to more aggressive endoscopic treatment of premalignant early adenomatous disease and of endoscopic treatment of Dukes' A disease itself. Unfortunately, our study is limited in that we did not have access to the accredited screening centre data on the number of premalignant and malignant polyps treated with endotherapy. Further studies should assess the impact of the BCSP on polyp management. It remains unclear what effect increased polypectomy rates have had on stage migration if any.

In fact, despite increased endoscopic management of premalignant and Dukes A disease the overall total increased numbers of patients with more advanced disease undergoing resection has increased. In particular there are worryingly large numbers of Dukes C cancers. This is also despite uptake of BCSP screening in the Warrington and Halton NHS Trust catchment area being within recommended limits.

The unexpected increase in more advanced disease despite screening may be due to the large number of patients developing disease at a younger age (<60 years), who remain outside the scope of the BCSP. This raises the concern of a more aggressive and evolving tumour biology which cannot be ignored. Indeed this may also explain the incidence of interval cancers occurring between screening rounds.

Table 1 Table demonstrating the stage distribution of curative colorectal resections.

Year	Total Number Curative Resections	Total Number Screened	Dukes A (%)	Dukes B (%)	Dukes C (%)
2008	118	6 (5%)	32.2%	26.3%	41.5%
2009	115	13 (11.3%)	22.6%	33.9%	43.5%
2010	111	4 (3.6%)	14.4%	37.8%	47.7%
2011	123	9 (7.3%)	15.5%	38.2%	46.3%

Table 2 Table demonstrating the stage and year distribution of the patient aged <60 years over the 4 years.

Year	Total Resections	Number aged <60years	Dukes A	Dukes B	Dukes C
2008	118	27 (22.88%)	6	11	10
2009	115	25 (21.74%)	6	7	12
2010	111	20 (18%)	6	5	9
2011	123	21 (17.07%)	7	6	8

Appendix 1 American Joint Committee on Cancer TNM Staging Classification (7th edition).

Stages	TNM Classification			Dukes Classification
	T	N	M	Stages
0	Tis	0	0	
I	T1	0	0	A
	T2	0	0	
II	T3	0	0	B
	T4	0	0	
III	T1-2	N1-2	0	C
	T3-4	N1-2	0	
IV	Any T	Any N	1	D

In view of our results, we recommend further evaluation of stage migration in larger cohorts, in particular the impact on stage of bowel cancer screening in younger patient groups.

As of March 2013, the BCSP is piloting Bowel Scope, an additional screening programme in the U.K. This will involve a single screening flexible sigmoidoscopy in all male and female patients aged 55 years and will run concurrently with the ongoing BCSP FOB testing. Longer term study of stage migration both pre and post the BCSP and Bowel Scope would assist in assessing the efficacy of these screening programmes. Should stage migration to more advanced disease continue despite the above programmes, a full reassessment of endoscopic based screening is needed. Further studies at a national level should assess stage migration on a regional basis to identify those regional populations at higher risk.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests and received no financial support.

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