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Colon cancer management in New Zealand: 1996–2003

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Abstract

Aims This study provides an overview of colon cancer diagnosis and treatment in New Zealand between 1996 and 2003.

Methods A sample of 642 individuals (308 Māori and 334 non-Māori) with histologically confirmed colon cancer diagnosed between 1996 and 2003 were identified from the New Zealand Cancer Registry. Details of referral, investigations, diagnosis, treatment and follow-up were obtained from clinical notes and pathology records.

Results Fourteen percent of patients with colon cancer presented at an early stage, while 21% presented with disseminated disease. Most colon cancer was diagnosed in public hospitals, although nearly one quarter was diagnosed in private, and one third of patients presented acutely. The use of colonoscopy for diagnosis and CT for staging increased considerably over the period studied. Definitive treatment was usually undertaken within 4 weeks of seeing a specialist, and 94% of patients were treated with surgery, one-fifth of which was emergency surgery. Most surgery was undertaken by general surgeons in public hospitals. One quarter experienced some post-operative complication. Two thirds had other chronic conditions documented in their hospital notes. Of those presenting with regionally advanced disease, 69% were offered adjuvant chemotherapy, and 54% of those presenting with metastatic disease were offered palliative chemotherapy. The use of adjuvant and palliative chemotherapy increased over the time of the study.

Conclusions The pattern of colon cancer found is consistent with the largely unscreened New Zealand population. Considerable changes were seen in the use of investigations and chemotherapy for colon cancer over the time period of the study, bringing New Zealand closer to international best practice management.

Colorectal cancer is the second most common cancer in New Zealand,[1] which has one of the highest death rates from colorectal cancer in the developed world.[2] In 2004, 2735 newly diagnosed colorectal and anal cancers were registered with the New Zealand Cancer Registry and 1173 deaths from colorectal and anal cancers were recorded.[1]

Detailed data on the management of colorectal cancer in New Zealand are not routinely collected. New Zealand is currently planning to implement colorectal cancer screening. If this is to be undertaken then good information about the services currently being provided will be required for planning to cope with the increased demands of a screening programme. Furthermore, there are currently no New Zealand guidelines for the management of those with colorectal cancer, except in relation to monitoring those at high risk.[3] In order to develop useful local guidelines,

contemporary information on the presentation and management of those with colorectal cancer is required.

Previous New Zealand audits of colorectal cancer management have been conducted on colonoscopy waiting times,[4] chemotherapy use,[5] and surgical follow up,[6] however these have all been postal surveys asking clinicians about their practice. No independent audits of colorectal cancer management have previously been conducted based on reviews of clinical records.

Methods

Data were taken from a separate study investigating ethnic disparities in colon cancer (article currently in press). Incident cases of colon cancer were identified from the New Zealand Cancer Registry. All eligible Māori cases and a random sample of non-Māori cases identified through computer generated random number sampling were included in the study sample. Ethnicity information was drawn from the Cancer Registry, with any person who identified as Māori in any of the ethnicity fields of the Cancer Registry being counted as Māori.

A total of 685 patients met the eligibility criteria (see Box 1), and data were obtained for 94% of eligible patients to give a final study sample of 642 (308 Māori and 334 non-Māori). National ethics committee approval was obtained for this study.

Box 1

Study eligibility criteria:

- newly diagnosed cancer of the colon registered between 1 January 1996 and 31 December 2003
- primary tumour site in the colon:
  - ICD10-AM site codes C18-C19, not including C18.1 (appendix)
- no previous diagnosis of colon cancer
- morphology consistent with or specific to adenocarcinoma:
  - (ICD-O morphology codes 8000, 8010, 8020, 8021, 8050, 8140, 8144, 8145, 8210, 8211, 8260, 8261, 8262, 8263, 8470, 8471, 8472, 8473, 8480, 8481, and 8490)
- aged 25 years or over at diagnosis
- usually resident in New Zealand
- diagnosis made prior to death

Pathology reports were obtained for all study patients from either their health care records, the Cancer Registry or directly from the reporting laboratory. Clinical data were obtained from both public hospital and private specialists' notes by one of the authors (SH). Data included details of presentation, investigation and diagnosis with

colon cancer; comorbid conditions present at the time of diagnosis; tumour characteristics; surgical treatment; adjuvant treatment; and follow-up.

Data from histology and health care records were entered onto a standardised study pro-forma, and then into an electronic database. All data were double-entered and discrepancies were checked.

Data were analysed using Stata statistical analysis programme.[7] Survey methods were used to estimate the proportion and 95% confidence limits of all those with colon cancer over the time period described, based on the study sample. Māori and non-Māori samples were weighted as to their proportion of the entire colon cancer population. As Māori make up only 2.6% of the New Zealand Cancer Registry population meeting the study eligibility criteria over the time period studied, the population estimates generated were similar to the results for the non-Māori sample.

Comparison of the estimates given by this method to the gender and age distribution of all those with colon cancer on the Cancer Registry between 1996 and 2003 showed these estimates to be accurate. The lower confidence limit was set to zero.

Results

As expected, colon cancer was found to be equally common amongst men and women, and more common in older age groups and amongst European New Zealanders. The distribution of colon cancer was reasonably consistent with the demographic and geographic distribution of New Zealanders (data not shown).

Nearly half of tumours (46%) were located in the right colon, while a similar number were located in the left colon or at the rectosigmoid junction, and 7% were synchronous tumours. Fourteen percent presented with localised disease and a fifth presented with metastatic disease (see Table 1). Younger people appeared to be more likely to present with advanced tumours (see Table 2).

Most tumours (73%) were moderately differentiated (including 7% with no grade specified on the pathology report, which were assumed to be moderately differentiated), while 19% were poorly differentiated and 8% were well differentiated.

Table 1. Tumour stage at diagnosis*

TNM summary stage**	Description	Population estimate	95% Confidence Interval	
I	Localised to bowel wall	14.0%	10.3%	17.6%
II	Spread through bowel wall	30.2%	25.4%	35.0%
III	Spread to lymph nodes	33.7%	28.7%	38.7%
IV	Spread to distant organs	21.2%	16.9%	25.4%
unknown		0.9%	0%	1.9%

* Based on data collected within 4 months of date of diagnosis.

** Based on available data, represents minimum stage.

Table 2. Variation in tumour stage by age

TNM summary stage by age (years)		Population estimate	95% Confidence Interval	
25–54	I	6.8%	0%	15.2%
	II	23.6%	9.4%	37.8%
	III	39.3%	22.9%	55.7%
	IV	30.3%	14.9%	45.6%
55–64	I	12.6%	4.7%	20.5%
	II	25.5%	15.2%	35.8%
	III	36.2%	24.8%	47.6%
	IV	25.7%	15.4%	36.0%
65–74	I	16.9%	10.1%	23.7%
	II	26.0%	18.0%	34.0%
	III	32.0%	23.5%	40.5%
	IV	25.1%	17.2%	33.0%
75–99	I	14.3%	8.2%	20.4%
	II	38.9%	30.4%	47.4%
	III	33.4%	25.2%	41.6%
	IV	13.5%	7.5%	19.4%

Two-thirds of patients had a chronic condition documented in their notes, with hypertension (35%), ischaemic heart disease (17%), and respiratory disease (16%) being the most common. Approximately half were documented current or ex-smokers.

Most colon cancer was diagnosed in public secondary (43%) and tertiary (Auckland, Waikato, Palmerston North, Wellington, Christchurch, Dunedin) (28%) facilities, with 23% diagnosed in private, and 6% diagnosed in general practice. Between 1996–8 and 2002–3 there was an increase in diagnoses made in tertiary (from 22 to 27%) and private hospitals (from 23 to 32%), and a fall in the proportion diagnosed in general practice (from 7 to 4%) and secondary facilities (from 48 to 37%). Over two-thirds of presentations were routine, with 28% presenting acutely.

Colonoscopy was the main diagnostic investigation used (59%) while 43% had barium enema and only 8% had flexible sigmoidoscopy. Almost all (86%) had either colonoscopy or barium enema. There were substantial changes in diagnostic investigation use between 1996-8 and 2002-3, with colonoscopy rates rising from 52% to 73%, and barium enema rates falling from 55% to 26%.

Colonoscopy was used more in less advanced cancers, with 83% of those with Stage I cancers undergoing colonoscopy, compared to 61%, 55% and 47% of those with Stage II, III and IV cancers respectively. The median time from first specialist assessment to colonoscopy was 10 days, with more than half having colonoscopy within 2 weeks of seeing a specialist (Table 3); however three individuals in the study waited more than a year for colonoscopy. Median waiting time for colonoscopy decreased over the time period of the study, from 14 days in 1996–8 to 6 days in 2002–3.

Table 3. Waiting time for colonoscopy

Time from first specialist assessment to colonoscopy (weeks)	Population estimate	95% Confidence Interval	
<2	54.1%	47.0%	61.2%
2–3	13.4%	8.5%	18.3%
4–5	7.8%	3.9%	11.6%
6–7	4.0%	1.2%	6.8%
8–9	7.7%	3.9%	11.6%
10 +	12.9%	8.2%	17.7%

Based on data for 359/375 individuals who had colonoscopy (97%), and excluding nine who had colonoscopy prior to first specialist assessment.

A staging CT scan was performed within 4 months of diagnosis for 44%, and 27% of those having elective surgery had a CT prior. Ultrasound was the other main staging investigation, being performed on 31% of patients. CT scan use increased markedly over the study period, from 28% in 1996-8 to 70% in 2002-3, as did preoperative CT (prior to elective surgery) which went from 11% to 62%, while ultrasound rates remained stable over time.

The median time from first specialist assessment to treatment (either surgery or colonoscopic removal of the tumour) was 19 days, and this waiting time appeared to increase over the study, from 18 days in 1996-8 to 27 days in 2002-3. Forty percent received treatment within 2 weeks of seeing a specialist (Table 4).

Table 4. Time from assessment to treatment

Time from first specialist assessment to treatment (weeks)	Population estimate	95% Confidence Interval	
<2	39.5%	34.2%	44.8%
2–3	21.0%	16.6%	25.4%
4–5	12.8%	9.2%	16.4%
6–7	6.9%	4.1%	9.6%
8+	19.8%	15.5%	24.1%

Based on data for 588/612 individuals (who had treatment) = 96%.

Treatment = surgery or removal at colonoscopy.

Almost all patients (94%) had surgery, of which 21% was acute and the remainder was elective. Nearly a fifth of surgery was performed in private hospitals, and this increased to a quarter in the final time period examined (2002-3). Sixteen percent of surgery was performed by specialist colorectal surgeons, and this proportion increased markedly over the time of the study (from 9% in 1996-8 to 25% in 2002-3). Most operations (84%) were right or left hemicolectomies, with 6% undergoing total colectomy and 4% having Hartman's procedure. Nearly one quarter experienced some postoperative complication within 30 days of surgery, with sepsis and pneumonia being the most common complications, and 3% died as a result of surgical complications (Table 5).

Table 5. Postoperative complications

Postoperative complications	Population estimate (% of those having surgery)	95% Confidence Interval	
Any complications*	23.3%	18.7%	27.9%
Death	3.3%	1.4%	5.2%
Death following elective surgery	2.1%	0.4%	3.9%
Death following emergency surgery	7.4%	1.5%	13.3%
Pneumonia	5.8%	3.2%	8.3%
Sepsis	6.2%	3.6%	8.7%
Cardiac failure	3.6%	1.6%	5.6%
Reoperation for complications**	6.4%	3.8%	9.1%

* Includes death, organ failure, infection, MI, DVT, CVA, bowel obstruction, bleeding, anastomotic leak.

** Most common reasons for reoperation were anastomotic leakage, wound reclosure, bowel obstruction, and intra-abdominal abscess.

Nearly half of all the patients were referred to an oncologist, including three quarters of those with Stage III cancers. Adjuvant chemotherapy was offered to 69% of those with Stage III cancers (three quarters of whom went on to receive chemotherapy), and this proportion appears to have increased in the most recent time period studied. Chemotherapy offers for Stage III cancers decreased with increasing age (Table 6). Palliative chemotherapy was offered to 54% of those presenting with metastatic disease, and this proportion increased over time. However only 58% of those offered palliative chemotherapy went on to receive it, with most of the remainder declining treatment.

Table 6. Chemotherapy offers by age for Stage III colon cancer

Offered adjuvant chemo for stage III cancer (by age)	Population estimate	95% Confidence Interval	
25–54 years	98.1%	96.1%	100.2%
55–64 years	92.2%	82.9%	101.5%
65–74 years	83.0%	70.9%	95.1%
75+ years	35.7%	21.2%	50.2%

Discussion

The findings of this study show that the demographic distribution of colon cancer overall, and the disease-related characteristics of colon cancer such as stage, site and grade are largely as expected in an unscreened population in New Zealand. The finding that younger age is associated with more advanced stage at diagnosis is somewhat surprising. This inverse relationship has been demonstrated convincingly for some cancers, such as breast and lung,[8] but to date no such relationship has been established for colon cancer.[9] The majority of patients had at least one other chronic medical condition documented, which is consistent with the older age group of the patient cohort.

We found that patients were increasingly diagnosed and treated in tertiary and private settings over the study period. It is unclear how the pattern of private care seen here

relates to overall private medical services in New Zealand, because there were complex trends in private care over the time period of the study. The increased use of tertiary facilities may relate to increasing specialisation of services which is also reflected in the increasing proportion of patients treated by specialist colorectal surgeons.

This latter finding is not surprising, as specialised colorectal surgical training has only been available in Australasia for a relatively short time,[10] with colorectal surgeons in New Zealand growing in number considerably since the early 1990's, in keeping with the international trends.[11] There is evidence of improved outcomes in colorectal cancer for subspecialty surgeons,[12] suggesting that the change seen is likely to have positive effects.

No New Zealand guidelines are available as a benchmark against which to assess colon cancer management. However, recent guidelines from Australia,[13] which are endorsed by the Colorectal Surgical Society of Australia and New Zealand (CSSA), and from Great Britain and Ireland,[14] are referred to by New Zealand surgeons. These two sets of guidelines can be used to compare New Zealand practice between 1996 and 2003 with international best practice. However these guidelines were produced after the study period and have not been specifically adopted in New Zealand, and so should not be used as a benchmark of expected performance in New Zealand over the time period in question.

The 2005 Australian Guidelines on Colorectal Cancer Prevention and Management recommend that investigation for colorectal cancer includes colonoscopy and rigid sigmoidoscopy.[13] Double contrast barium enema plus flexible sigmoidoscopy, or CT colonography, are recommended as acceptable alternatives to colonoscopy where there are difficulties with availability or expertise or where colonoscopic visualisation is incomplete.

The pattern seen in this study, of a move away from barium enema towards colonoscopy use, is therefore in keeping with guidelines. It is also interesting to note that colonoscopy was used less in more advanced cancers.

This finding is similar to that found in a review of colon cancer diagnosis in the Netherlands in 2002, where overall sixty percent of patients had completed colonoscopy, ranging from 81% of patients with stage I disease to 42% of patients with stage III disease.[15] Technical difficulties presented by advanced disease (such as malignant strictures) are likely to at least partly explain these differences, although it should be noted that the colonoscopy rates recorded in this study are attempted (not necessarily completed) colonoscopy rates.

British guidelines recommend that with the exception of patients with peritonitis who require emergency surgery, all patients with colon (or rectal) cancer should have a preoperative staging CT of the chest, abdomen and pelvis.[14] However in this study less than a third of those having elective surgery had preoperative CT scanning, although this rate improved markedly over time. Moreover, only two thirds of the total sample had any staging investigations in the 4 months following diagnosis, although again this rate improved considerably over time.

The low rates of CT use found in this study may relate to the limited availability of CT scanners, particularly in smaller centres, in the late 1990s. However the absence of

New Zealand guidelines providing guidance about best practice may also be important.

Almost all patients in this cohort were treated with surgery, which is consistent with international audits.[16] [15] Postoperative complications were defined as any adverse even occurring within 30 days of surgery. Nearly a quarter of patients had some complication, with 3% dying as a result, and 6% requiring repeat operation. These complication rates are generally within the range expected compared with international audits.[12,17–19]

Guidelines recommend adjuvant chemotherapy for node positive (Stage III) colon (and rectal) cancers, and note that it can also be considered for some high risk node negative cancers.[13] [14] Increasing offers of chemotherapy to patients with Stage III disease were seen over the time period of this study, indicating a move towards best practice. Chemotherapy offers were seen to decrease with increasing age. While co-morbidity is a factor in the lower rates of adjuvant chemotherapy for older patients,[20] there is significant evidence from other countries that while chemotherapy remains useful and well-tolerated in elderly patients, it may not be offered when it is indicated.[15,21]

Waiting times for cancer treatment are often a topic of media interest, and are included in the New Zealand Health Targets.[22] We found that the waiting time between first specialist assessment and having diagnostic investigations (colonoscopy) appeared to decrease over the study period, while time between first specialist assessment and receiving definitive treatment (generally surgery) seemed to increase.

Waiting times for colonoscopy were also examined by Yeoman and Parry in 2006,[4] who found that the average wait for colonoscopy in public hospitals varied considerably between hospitals, with patients at two small hospitals waiting an average of more than 9 months. Their survey measured waiting time from specialist referral to colonoscopy, and for most hospitals surveyed the waiting time from referral to colonoscopy was on average between one and 3 months. In this study the median waiting time for colonoscopy from referral for specialist assessment was one month.

Six percent of those having colonoscopy (n=20) waited longer than 6 months for colonoscopy from referral to a specialist. This compares to the figure estimated by Yeoman and Parry of five percent of all colonoscopies being performed on people over 50 with symptoms suggestive of colorectal cancer who had been waiting longer than 6 months. Limited colonoscopy capacity causing long waiting times is felt to be a factor requiring urgent action if colorectal cancer screening is to be implemented.[23]

This study provides a snapshot of colon cancer management in New Zealand. These findings will feed into the work on colorectal cancer screening currently being undertaken by the Ministry of Health. They will also be useful in developing guidelines for colorectal cancer management which would be required by a screening programme.

Competing interests: None known.

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