Original Research Article

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Is the incidence of colorectal cancer increasing in the younger population? - a UK DGH experience

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ABSTRACT

Background: Over the past few years we have noticed increasing number of young patients diagnosed with colorectal cancer being discussed in colorectal multidisciplinary team meetings. Our aim was to look if the incidence is in fact rising in the younger age-group patients, aged below 40 years.

Methods: Retrospective data was collected from the Info flex database system at our DGH for all colorectal cancers diagnosed between January 2014-December 2019. The incidence of colorectal cancers under the age of 40 years was calculated as well as other demographics parameters were taken into consideration.

Results: Total 770 colorectal cancers were diagnosed during the study period. 451 (58.58% were male and 319 (41.42%) were female. The age range was 25-98 years. 2.06%, 3.19%, 1.14%, 0%, 2.22%, 2.38% patients below the age of 40 years were diagnosed with colorectal cancer in 2014, 2015, 2016, 2017, 2018 and 2019 respectively.

Conclusions: Our study does not show any increasing trend in the incidence of colorectal cancer in the younger population. One of the limitations of this study is the limited sample size used. A larger sample size or analysis of colorectal registries could be more informative to ascertain if there is a change in the age-distribution pattern of colorectal cancers.

Keywords: Colorectal cancer, Early-onset, Cancer, Incidence, Epidemiology

INTRODUCTION

Colorectal cancer (CRC) is the third most common cancer worldwide. It is the 2nd most common after breast cancer in females, and the 3rd most common after lung and prostate cancer in males.¹ The incidence of CRC is 1.8 million annually accounting for 862,000 deaths annually.² GLOBOCAN estimates have predicted a projected rise in incidence of CRC worldwide to 2.5 million new cases in 2035.¹

It is predominantly a disease of elderly population, with the highest incidence rates amongst adults aged 70 years and over.³

The rate of people being diagnosed with colon or rectal cancer each year has dropped overall since the mid-1980s, mainly due to more people getting screened and changing their lifestyle-related risk factors. But this trend has been seen more in older adults. From 2007 to 2016, incidence rates in people 55 years or older dropped by 3.6% each year, but it increased by 2% each year in those younger than 55 years.⁴

In the UK, approximately 42,300 cases diagnosed each year, accounting for 16,300 deaths annually.⁵

Recent population-based studies have shown that colorectal cancer incidence has been increasing in age

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groups not currently targeted by screening programmes, especially adolescents and young adults.⁶⁻¹⁰

The current screening guidelines in the UK involve: 1) aged>55 years old: automatically invited for a one-off flexible sigmoidoscopy screening test, (if the area the patient lives in provides this service) 2) aged 60 -74 years old: automatically invited to do a home testing kit (faecal occult blood test) every 2 years 3) aged>75 years old: can request for a home testing kit every 2 years.

At our district general hospital (DGH), it was an observation that an increasing number of younger patients are being discussed in colorectal multidisciplinary team (mdt) meetings. This prompted us to look into the incidence of CRC in patients in patients aged 40 years and younger and if it shows there is objective evidence to our observation then this may be potentially worth exploring.

If there is substantial data that demonstrate that the incidence of CRC in younger patients is increasing, this could potentially call for an adjustment in the age groups for CRC screening in UK.

METHODS

This study was conducted at East and North Hertfordshire NHS trust. The Trust provides secondary care services for a population of around 600,000 in East and North of Hertfordshire as well as parts of South Bedfordshire and tertiary cancer services for a population of approximately 2,000,000 people in Hertfordshire, Bedfordshire, northwest London and parts of the Thames Valley. It has four hospital, namely, Lister Hospital, New QEII Hospital, Hertford County Hospital and Mount Vernon cancer centre.

Retrospective data was collected from Info flex database System for the study period from January 2014 and December 2019. Infoflex provides the data management system for various NHS Trusts and operates by collating patient data and makes it easily accessible to all healthcare workers.

The inclusion criteria were all newly diagnosed colorectal cancer at the East and North Herts NHS Trust during the study period and the exclusion criteria was metastatic cancers involving either the colon or rectum. The data was analysed for demographics, histology, location of the tumour and multi-disciplinary discussion outcome. Decade specific sex ratio and variation in tumour location was also analysed.

The statistical analysis was done using MedCalc®. Data is expressed as percentages, mean and range.

As it is an observational study, it did not require ethical approval.

RESULTS

Total 770 colorectal cancers were diagnosed during this 6-year study period between January 2014 and December 2019 at East and North Hertfordshire NHS trust. The mean age was 70 years and the range (25-98years).

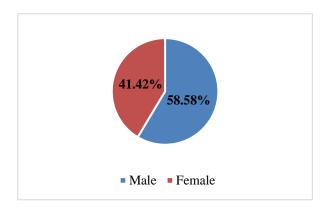


Figure 1: Gender demographics in colorectal cancer diagnosis.

Colorectal cancer was more common in males. 451 males (58.58%) and 319 females (41.42%) were diagnosed with colorectal cancer with a male to female ratio of 1.42:1 (Figure 1). Though the subgroup analysis demonstrated this was not the case for each decade. The incidence was either equal or more in females up to the age of 50 and was almost equal in 9th and 10th decade. Decade specific breakdown revealed that in the 3rd decade male and female ratio was 1:1, in the 4th decade 0.7:1, 5th decade 0.65:1, 6th decade 1.37:1, 7th decade1.25:1, 8th decade 1.75:1, 9th decade 0.98:1 and in the 10th decade it was 0.91:1 (Figure 2).

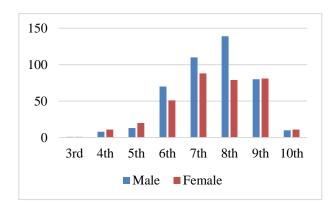


Figure 2: Male to female ratio in different decades.

Total 2.06%, 3.19%, 1.14%, 0%, 2.22%, 2.38% patients of the age 40 years or below were diagnosed with colorectal cancer in 2014, 2015, 2016, 2017, 2018 and 2019 respectively. This did not show any rising trend in our study sample (Figure 3).

The incidence of CRC rose steadily till the 8th decade then receded in the 9th and 10th decade. This possibly due to shrinkage of the population size in the elderly age group.

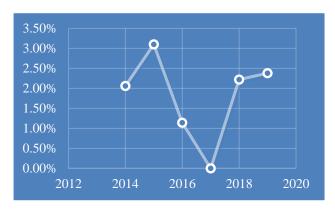


Figure 3: Incidence of CRC during the study period.

Decade specific incidence showed 2 CRC were diagnosed in their 3rd decade, 16 in 4th decade, 33 in 5th decade, 121 in 6th decade, 198 in 7th decade, 218 in 8th decade, 161 in 9th decade and 21 in the 10th decade. Overall, 2.08% (n=18) patients diagnosed with CRC were forty years or below and 97.92% (n=752) were over 40 years old.

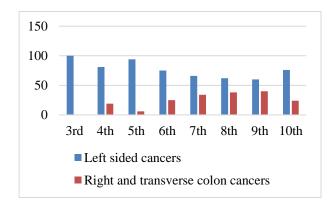


Figure 4: The distribution patten of colorectal cancer in relation to age.

Of all the 770 colorectal cancers 67% were left sided. Decade specific distribution showed all cancers were left sided in 3rd decade,81% in 4th decade, 94% in 5th decade, 75% in 6th decade, 66% in 7th decade, 62% in 8th decade, 60.9% in 9th decade and 76.2% in 10th decade. Though the left sided cancers are predominantly common there is a gradual rise in the incidence of right sided colon cancers from 5th to the 9th decade (Figure 4).

Site specific distribution showed 9.3% caecal, 9.4% ascending colon, 4.4% hepatic flexure, 6.3% transverse colon, 2.2% splenic flexure, 4.5% descending colon, 23.5% sigmoid colon, 1.8% rectosigmoid, 32.2% rectum, 1.6 % anal canal and 4.3% unspecified. Our results demonstrate that two thirds of the cancers were left sided which is similar to studies in literature.

In patients aged>40 years who were diagnosed with colorectal cancer, 24.6% (n=181) were in the sigmoid region and 32.9% (n=248) in the rectal region and below 40 years of age show that regardless of the age, the rectum and sigmoid are still the prime locations for colorectal cancers, with 44.44% (n=8) in sigmoid colon, followed by 33.33% (n=6) cancers in rectum.

Almost 79.58% of the patients Caucasians (British/Irish), 15% patients' ethnicity was either not stated, not declared, not known, 1.72% were of mixed ethnicity 1.45% were of Asian origin and other ethnic group each and 0.8% were African or Caribbean origin. These results may be reflective of the local population demographics.

DISCUSSION

CRC predominantly affects the elderly population and there is a very low incidence in the<40 years of age population. A recent study by Exarchakou et. al showed that the incidence rate of colorectal cancer among adults 20-29 years rose from 0.8 per 100,000 in 1993 to 2.8 per 100,000 in 2014 an average annual increase of 8%. An annual increase of 8.1% was also observed for adults aged 30-39 years during 2005-2014. 11

Though our study does not show any trends of increasing incidence of CRC in patients aged 40 or younger but increased incidence of CRC in 20-40-year age group has been observed in North America, Australia and China and the American Cancer Society has therefore recommended to lower the screening age from 50 to 45 years.

CRC is more common in males and the UK data reflect previous studies. ¹²⁻¹⁴ in showing that the overall incidence of bowel cancer is higher in males than in females. This increased vulnerability of men to developing CRC may be due to several biological and gender-related (behavioural) factors. ¹³⁻¹⁷ Men are more likely to have a diet high in red and processed meat, heavier consumers of alcohol, and more likely to smoke. ¹⁸⁻²⁰ Men also have a greater propensity to deposit visceral fat which is associated with increased risk of CRC. ²¹⁻²⁴ The increased incidence of CRC in younger females in our study may be reflective of changing lifestyle of females.

However, it is important to note that the female sex is more associated with hypermethylation, microsatellite instability, BRAF V600E mutation, and CpG island methylator phenotype (CIMP)-high which are more likely to result in the sessile serrated polyps (SSP). ^{25,26} These occur in the proximal colon and are more likely to be missed during colonoscopies and lead to more aggressive forms of cancer. ²⁷ Females were also found to have higher frequency of KRAS mutations in codon 12 than males, which again are associated with more advanced adenomas. ²⁸

Within the large bowel two third of the cancers originate from the left side and this led to the introduction of bowel scope screening in 2013 in England, with single flexible sigmoidoscopy for detection of adenomas. If the flexible sigmoidoscopy reveals adenomas the patient is booked for a colonoscopy to rule out any proximal neoplastic lesions. Our study also confirms that more than two third cancers originated from the left side colon. However, there was an increase in the right sided cancers starting from the 5th decade and continuing till the 9th decade. Exarchakou et al in their study showed that the increase in the right sided colonic cancer but this increase was more in younger age group. The increase was 5.2% in the age group (20-39 years) between 1991-2010 which rose to 19.4% per year between 2010 (IR=1.2) and 2014 (IR=2.5).

Age standardised rates for White males with bowel cancer range from 54.1 to 55.3 per 100,000. Rates for Asian males are significantly lower, ranging from 19.1 to 28.0 per 100,000 and the rates for Black males are also significantly lower, ranging from 29.7 to 43.8 per 100,000. For females there is a similar pattern - the age-standardized rates for White females range from 34.0 to 34.8 per 100,000, and rates for Asian and black females are also significantly lower ranging from 11.3 to 17.5 per 100,000 and 20.4 to 31.6 per 100,000 respectively.²⁹ Ranges are given because of the analysis methodology used to account for missing and unknown data. For bowel cancer, 146,495 cases were identified; 17% had no known ethnicity. Our study also reflects the similar trends in ethnicity and the incidence of CRC.

Could we be diagnosing CRC earlier due to improved screening? If studies could show that the incidence is increasing in a younger population, the stage at diagnosis should be looked into to see if we are picking up diagnoses earlier.

Limitations

The main limitation of the current study is the study period. Ideally, we should have compared the current incidence and trend at our centre with the incidence and trend 15 or 20 year earlier but this was not possible due to inconsistent data collection. The other limitations are single centre study and limited sample size and the study. The data collection had a small proportion of unspecified cancer site which can skew the results.

CONCLUSION

Our study shows that there has been no increase in the incidence of CRC in younger population. It is not fair to derive conclusion from a small sample size and single centre study. It however prompts for a large international multicenter retrospective observational study including cancer registries to look for the trends. and if it shows an increase in the incidence in the younger population then it will be pragmatic to find out the factors contributing to

this increase and take necessary preventive measures to reduce the risk to our younger population from this disease in future. It may also enable us to make recommendations about screening and prevention strategies accordingly in future.

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Conflict of interest: The abstract of this paper was presented as a poster at European Society of Coloproctology's 15th scientific and annual meeting at Vilnius in September 2020

Ethical approval: Not required

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