

Clinical and Treatment Profile with Five Year Survival Analysis of Colorectal Cancer <50 Years from Northern India

Kaushal Singh Rathore¹, U.K Chandel², Niharika Singh³

¹MS, MCH, Assistant Professor Department of Surgical Gastroenterology, SN Medical College, Jodhpur, India

Corresponding author Email: [ksrathore89\[at\]gmail.com](mailto:ksrathore89[at]gmail.com)

ORCID ID: 0009-0003-9133-2667

²MS, Professor and Head department of General Surgery, Indira Gandhi Medical College, Shimla, India

³MD, Senior Resident department of General Medicine, All India institute of medical Sciences, Jodhpur, India

Running Title: *Clinical Profile of Colorectal Cancer*

Abstract: **Background:** The incidence of colorectal cancer (CRC) has been increasing worldwide. Middle- and low-income countries are also experiencing increases in these cases. This is attributed to their large and rapidly growing populations coupled with the adoption of westernized diets and lifestyles. **Methods:** All diagnosed cases of colorectal cancer presenting to IGMC Shimla (the sole tertiary cancer care center in the state of Himachal Pradesh, India) between January 2017 and December 2018 were included. Data on the clinical characteristics, pathology, treatment received, and survival outcomes were recorded. A follow-up period of 60 months (last follow-up 31st December 2023) was recorded. **Results:** The study included 55 patients, with a male predominance, and 34% were aged <50 years. The most prevalent symptoms were anorexia and weight loss (98%), with the rectum being the most common site (45%). Histopathological signet ring-type morphology was observed in 27% of cases, and the majority of patients presented with advanced stages III (34%) and IV (30%). Radiation oncologists, surgeons, and medical oncologists use multimodal treatment approaches. After 60 months of follow-up, seven patients were lost to follow-up and only six remained alive, with a mean survival of 39 months. **Conclusion:** Most patients presented at an advanced stage with a significantly young population, which not only resulted in complex management, but also poor survival outcomes. Further epidemiological studies, including genetic analyses, are necessary to characterize the presentation of colorectal cancer in our state.

Keywords: Colorectal cancer in young patients, clinicopathological and treatment profiles, follow-up, multimodality treatment

1. Introduction

The incidence of colorectal cancer (CRC) varies world wide according to human development index and adoption of westernized lifestyles. Colorectal cancer is third most prevalent cancer worldwide and consist upto 10% of cancer cases in 2020[1]. Stabilization or decrease is seen in its incidence in high-income countries, particularly those who have implemented screening programs, but its incidence in developing countries is on the rise; CRC is the seventh most prevalent cancer in India[2], with the majority 90% of cases being diagnosed beyond 50 years of age. The U.S. Multi-Society Task Force and American Cancer Society (ACS) have proposed initiating average-risk CRC screening at the age of 45 years, based on the increasing disease burden among those under 50[3,4]. Mathew et al. found a CRC incidence of 3.5 (95% CI 3.1 to 3.9) in younger adults and 22.9 (95% CI 21.7 to 24.1) in older adults during 2012-2014, indicating relative increases of 30% and 22%, respectively, over a decade. Due to the paucity of the Population-based Cancer Registry (PBCR) in India, the question of whether to start a screening program in India remains unclear and this study aimed to analyze the clinicopathological, treatment and survival analysis of CRC patients aged < 50 years

2. Methodology

This prospective observational study was conducted in the Department of General Surgery in coordination with the Department of Pathology and Radiation Oncology at Indira Gandhi Medical College (IGMC), Shimla, Himachal Pradesh, which is the only regional cancer center for the entire state of Himachal Pradesh. Prospectively all the patients presenting with colorectal cancer with age less than 50 years from January 2017 to December 2018 were included. Patients who refused to provide consent and those with recurrence were excluded. A prospective database of colorectal cancer was created to record data pertaining to demographics, clinical profile, investigations, histopathology, staging, treatment details, and survival outcomes. All patients were evaluated with respect to detailed history and physical examination and were investigated to confirm the diagnosis and stage of the disease. The study tools included a study questionnaire, investigations [routine blood tests, colonoscopy, USG, CECT, and MRI], and histopathological reports. The parameters studied were age, sex, site of lesion, clinical presentation, histopathology of the lesion, disease stage, treatment received and five-year survival.

Treatment

All the patients received treatment according to the clinical stage of the disease. Resection was considered curative if there was no preoperative evidence of metastasis and there

Volume 14 Issue 2, February 2025

Fully Refereed | Open Access | Double Blind Peer Reviewed Journal

www.ijsr.net

was R0 resection as per the histopathological report. All other resections were considered to be palliative. Standard long-course neoadjuvant chemoradiotherapy for locally advanced rectal carcinoma rectum and 5-Fluorouracil-based adjuvant chemotherapy were advised according to institutional guidelines.

Follow up

All patients were followed up from the hospital visit, and yearly, all patients were telephonically called, and complete details of their health were documented. If a patient died, their relatives recorded the date of death. The final follow-up was conducted on December 31, 2023.

Statistical analysis

All statistical analyses were performed using SPSS software (version 21.0, SPSS Inc., Chicago, IL, USA), and numerical data are expressed as mean, median, range, frequency, and percentage. Categorical variables were presented as frequencies and percentages. Overall survival included the time from the month of diagnosis to the month of death, regardless of cause; the last follow-up was on 31st December 31, 2023. Patients who were lost to follow-up were excluded from this study.

Definition of variables

Age at diagnosis was the presenting age of the patient to IGMC, Shimla, Age <50 years was defined as young-onset CRC, and age > 50 years was defined as late-onset CRC. The Asian-Pacific BMI classification was used to define nutritional status: BMI <18.5 was malnourished and >23 was obese. Past occurrences of CRC in family members, including spouses, first-degree relatives (brothers/sisters, children, parents), and second-degree relatives (half-brothers/half-sisters, grandchildren, grandparents), are said to have a positive family history. AJCC 8 was used to determine the clinicopathological variables (7). The 2019 World Health Organization (WHO) guidelines were used to determine the histological grades (8), from the cecum to the transverse colon considered the right side, splenic flexure to the rectosigmoid was considered the left side and beyond into the rectum; those patients who did not turn up for follow-up or did not follow the treatment plan were considered defaulters.

3. Results

Table 1: Clinical and treatment profile of CRC in <50 years

Parameters	≤50 Years (n = 55)
Age mean +/- SD(Years)	39.69 ± 8.17
Age Group (Years)***	
21-30 Years	10 (18.2%)
31-40 Years	16 (29.1%)
41-50 Years	29 (52.7%)
Gender	
Male	32 (58.2%)
Female	23 (41.8%)
Co morbidity	
HTN (Yes)	5 (9.1%)
DM (Yes)	3 (5.5%)
Risk factor	
Smoker (Yes)	24 (43.6%)
Alcohol (Yes)	21 (38.2%)
Non-Vegetarian Diet (Yes)	37 (67.3%)

BMI	
<18.5 Kg/m ²	32 (58.2%)
18.5-22.9 Kg/m ²	11 (20.0%)
≥23 Kg/m ²	12 (21.8%)
Clinical Presentation	
Pain Abdomen (Yes)	28 (50.9%)
Lump Abdomen (Yes)	17 (30.9%)
Hematochezia (Yes)	31 (56.4%)
Anaemia (Yes)	44 (80.0%)
Anorexia/Weight Loss (Yes)	54 (98.2%)
Altered Bowel Habits (Yes)	45 (81.8%)
Emergency (Yes)	8 (14.5%)
Site	
Right	20 (36.4%)
Left	5 (9.1%)
Rectum	25 (45.5%)
Synchronous	5 (9.1%)
HPE	
Well Differentiated	16 (29.1%)
Moderately Differentiated	16 (29.1%)
Poorly Differentiated	5 (9.1%)
Signet Cell	15 (27.3%)
Others	3 (5.5%)
Clinical Stage	
1	4 (7.3%)
2	15 (27.3%)
3	19 (34.5%)
4	17 (30.9%)
Metastases: Liver	11 (20.0%)
Metastases: Peritoneum	2 (3.6%)
Metastases: Lung	5 (9.1%)
Metastases: Other Sites	3 (5.5%)
Treatment Received	
Curative Surgery	38 (69.1%)
Surgical Access	
Laparoscopic	6 (15.8%)
Open	29 (76.3%)
Emergency	3 (7.9%)
Adjuvant CT (Yes)	34 (61.8%)
NACRT (Yes)	11 (20.0%)
Palliative CT (Yes)	17 (30.9%)
Palliative RT (Yes)	4 (7.3%)
Palliative Surgery (Yes)	5 (9.1%)
Defaulters (Yes)	28 (50.9%)
Outcome	
Alive	6 (10.9%)
Died	42 (76.4%)
Lost to Follow-Up	7 (12.7%)
Outcome (If Known)	
Alive	6 (12.5%)
Died	42 (87.5%)
Overall Survival , mean +/-SD(Months)	39.27 ± 24.62

A total of 165 cases of CRC were registered during the study period, of which 55(33.3%) were aged less than 50 years. CRC patients under the age of 50 years constitute 55 of a total of 4548 cancer patients (1.2%), and it constitutes the fifth most common cancer in men and sixth in women, according to our institutional cancer database. There was a male predominance in 32 (58.18%) patients, and the most common risk factor was a non-vegetarian diet (non-vegetarian meals > 3 times a week) in 37 (67.3%) patients, followed by smoking in 24 (43.6%) patients. Constitutional symptoms, such as anorexia and significant weight loss (>10% of body weight in the last 3 months), were the most common presenting symptoms observed in 54(98.2%) patients with anemia (

hemoglobin <12 g/dl) and altered bowel habits being the second and third (Table 1).

On comparing the location of the tumor, the rectum was the most common site observed in 25(45.5%) cases, and the most common histopathological grade was well-differentiated adenocarcinoma seen in around 16(29.1%) patients, with the signet type seen in 15(27.3%) patients (Table 1). A significant number of patients presented with metastasis 17(30.9%), with the most common site of metastasis being the liver 11(20%), followed by the lung 5(9.1%) and peritoneum 2(3.6%)(Table 1). Most patients presented with higher stages (stage III + IV), constituting approximately 36(65.4%) (Table 1). A total of 38(69.1) patients underwent curative surgery, with the open approach being the most common 29(76.3%), while the laparoscopic approach was used in six (15.8%) patients. The patients who underwent curative resection in the emergency setting were 3(7.9%). Standard long-term neoadjuvant chemoradiotherapy was administered to 11(20%) patients, palliative surgeries in the form of ileostomy/colostomy/palliative resection were performed in approximately five (9.1%) patients, and palliative chemotherapy was administered to 17(30.9%) patients, with CAPOX/FOLFOX as the first-line treatment (Table 2). A significant number of the patients were defaulters (n = 28, 50.9%).

At the end of the follow-up period, seven (12.7%) patients were lost to follow-up, and six (10.9%) were alive (Table 1). The mean overall survival was 39.27 months.

4. Discussion

Majority of the patients were in the group of 40 – 49 years of age (52.7 %), with the most common site of tumor being the rectum (45.5%) with male predominance. Our findings were similar to those of Jones et al.[6], where carcinoma rectum was the most common site; , however in their study ,There was no particular gender predisposition for colorectal cancer among age group less < 50 years. The Mathew et al. highlights the trends in CRC in India.[5] They analyzed data from 14 PBCRs, representing 65 million people (5 % of the Indian population), and reported that the colorectal cancer incidence in younger adults during 2012–2014 was 3.5 (95% CI 3.1 to 3.9), a relative increase of 30% over a decade. These findings are similar to those of our study, as we also observed around 33% of patients aged less than 50 years in our study. The CRC in young is different from that of adults in terms of functional status of patients, co-morbidity associated and the functional and psychosocial aspects associated with it , so a cut-off value of age distribution is very important and we have used it to be 50 years as many societies have recommended the screening in less than 50 years of age.[7,8] The growing occurrence of colorectal cancer (CRC) in younger individuals is related to decrease in protective factors such as exercise (for colon cancer) and inadequate consumption of fiber-rich foods, dairy products, fruits, and vegetables. Additionally, the increased prevalence of risk factors like obesity, tobacco use, consumption of red and processed meats, and excessive alcohol intake.[9,10]. Many studies have found that obesity is associated with 20% higher risk for CRC in age less than 50 years.[11].

Colorectal cancer (CRC) can manifest in various ways, ranging from asymptomatic (discovered during routine colonoscopy screening) to severe cases requiring emergency hospitalization due to complications such as perforation, blockage, or intestinal bleeding. A large-scale retrospective study involving > 29,000 patients identified alterations in bowel habits and rectal bleeding as the most frequent initial signs [12]. In contrast, our research found that loss of appetite, significant weight reduction (exceeding 10% of body mass within a three-month period), and anemia were the predominant presenting symptoms. Upon further questioning, it was revealed that a substantial proportion of patients, 140 (85%), experienced changes in their bowel patterns. Many of these individuals had disregarded these symptoms and opted for traditional remedies and local treatments. They only sought medical attention when the disease had progressed, highlighting the lack of education and awareness regarding CRC within the community.

The majority of patients were found to be in advanced stages (III and IV) of cancer. The higher prevalence of late-stage cancer in younger individuals may be attributed to delayed diagnosis. In other nations, colorectal screening initiatives have increased the detection of CRC at earlier stages. These screening programs have primarily been implemented over the last two decades and have likely contributed to the reduced incidence of colorectal cancer in developed countries. However, India lacks systematic or community-based colorectal cancer screening programmes. The potential impact of an organized screening program, as recommended in Western nations, remains unknown in the Indian context.[13]

The most common histopathological type [14] was adenocarcinoma 16(29.1%), but a significant number of patients had signet ring cell type morphology 15(27.3%) compared to the West, where it is reported to be around 1-2% [15].

Multimodality treatment was offered to patients according to stage: 38(69%) underwent curative surgery, including laparoscopic surgery in 6(15.8%) and emergency surgery in 3(7.9%) patients; approximately 5 out of 8 patients who presented in the emergency setting underwent palliative surgery, which included formation of diversion stoma or palliative resection (in view of tumor perforation and fecal peritonitis); 11(20%) patients (ca rectum) received neoadjuvant chemoradiotherapy, and palliative chemotherapy was administered to 17(30.9%) patients, followed up to 5 years, 7(12.7%) were lost to follow-up, and 6(10.9%) were alive at 5 years with a mean survival of 39 months.

This research has certain constraints, including insufficient data on other prognostic indicators, such as pre-treatment CEA levels, MSI, and RAS status, and small sample size. Our investigation offers a distinct evaluation of the impact of CRC on young adults in northern India. The results of this study indicated an increasing prevalence of colorectal cancer among younger individuals.

5. Conclusion

Common symptoms of colorectal cancer (CRC) include changes in bowel habits and rectal bleeding, which are frequently overlooked by both patients and primary care physicians. It is crucial to raise awareness of the significance of these symptoms. CRC is not exclusive to older individuals; its occurrence is rising among younger people, who often present with advanced stages and poorly differentiated or signet-cell histology. The prevalence of CRC is rapidly increasing in low- and middle-income countries owing to population growth and the adoption of Western dietary habits. This necessitates the implementation of CRC screening programs tailored to address the psychosexual needs of the younger population. In these countries, limited awareness leads to delayed diagnosis and inadequate healthcare resources contribute to poor survival rates.

Financial support and sponsorship: nil

Conflicts of interest: There are no conflicts of interest

The manuscript has been read and approved by all the authors, that the requirements for authorship as stated earlier in this document have been met, and that each author believes that the manuscript represents honest work.

Authors' contributions

- **Kaushal Singh Rathore:** Substantial contributions to the conception, design of the work, analysis, interpretation of data, Drafting the work and reviewing it critically for important intellectual content, Final approval of the version to be published and Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.
- **UK Chandel:** Substantial contributions to the conception, Drafting the work and reviewing it critically for important intellectual content, Final approval of the version to be published and Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved
- **Niharika Singh:** Design of the work, analysis, interpretation of data, Drafting the work and reviewing it critically for important intellectual content, Final approval of the version to be published and Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

References

- [1] Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA Cancer J Clin.* 2021 May;71(3):209-249.
- [2] <http://cancerindia.org.in/colorectal-cancer/>
- [3] Patel SG, May FP, Anderson JC, Burke CA, Dominitz JA, Gross SA, Jacobson BC, Shaikat A, Robertson DJ. Updates on Age to Start and Stop Colorectal Cancer Screening: Recommendations From the U.S. Multi-

- Society Task Force on Colorectal Cancer. *Gastroenterology.* 2022 Jan;162(1):285-299.
- [4] Peterse EFP, Meester RGS, Siegel RL, et al. The impact of the rising colorectal cancer incidence in young adults on the optimal age to start screening: Microsimulation analysis I to inform the American Cancer Society colorectal cancer screening guidelines. *Cancer* 2018; 124: 2964-2973.
- [5] Mathew A, Baby B, Wang K, Sirohi B, Lei F, Chen Q, Huang B. Colorectal cancer incidence in younger adults in India. *Gut* 2020 Oct;69(10):1899-1900
- [6] Jones HG, Radwan R, Davies M, Evans M, Khot U, Chandrasekaran T, et al. Clinicopathological characteristics of colorectal cancer presenting under the age of 50. *Int J Color Dis.* 2015;30(4):483-9.
- [7] Yeo S, Chew M, Koh P, Tang C. Young colorectal carcinoma patients do not have a poorer prognosis: a comparative review of 2,426 cases. *Tech Coloproctol.* 2013;17(6):653-61
- [8] Provenzale D, Ness RM, Llor X, Weiss JM, Abbadessa B, Cooper G, Early DS, Friedman M, Giardiello FM, Glaser K, Gurudu S, Halverson AL, Issaka R, Jain R, Kanth P, Kidambi T, Lazenby AJ, Maguire L, Markowitz AJ, May FP, Mayer RJ, Mehta S, Patel S, Peter S, Stanich PP, Terdiman J, Keller J, Dwyer MA, Ogba N. NCCN Guidelines Insights: Colorectal Cancer Screening, Version 2.2020. *J Natl ComprCancNetw.* 2020 Oct 1;18(10):1312-1320.
- [9] Araghi M, Soerjomataram I, Bardot A, et al. Changes in colorectal cancer incidence in seven high-income countries: a population-based study. *Lancet Gastroenterol Hepatol* 2019;4:511-8.
- [10] Araghi M, Soerjomataram I, Bardot A, et al. Changes in colorectal cancer incidence in seven high-income countries: a population-based study. *Lancet Gastroenterol Hepatol* 2019; 4:511-8.
- [11] Liu PH, Wu K, Ng K, et al. Association of obesity with risk of early-onset colorectal cancer among women. *JAMA Oncol* 2019; 5:37-44.
- [12] Thompson MR, O'Leary DP: Clinical assessment to determine the risk of bowel cancer using Symptoms, Age, Mass and Iron deficiency anaemia (Sami). *Br J Surg.* 2017, 104:1393-1404. 10.1002/bjs.10573
- [13] Mathew A. Cancer trends and burden in India. *Lancet Oncol* 2018;19: e662
- [14] colorectal cancer in Cut Meutia hospital, Aceh-Indonesia from 2017-2020. *Bali Med J.* Sayuti, M. and Syahriza, M. and of, Ami G.C. *Histopathology* (ed): 2022. 11:1771-1773. 10.15562/bmj.v11i3.3750
- [15] Hynstrom JR: Clinicopathology and outcomes for mucinous and signet ring colorectal adenocarcinoma: analysis from the National Cancer Data Base. *Ann Surg Oncol.* 2012, 19:2814-2821. 10.1245/s10434-012-2321-7