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Clinical Presentation, Histopathological Characteristics and Outcome of Surgery in Young Age Rectum Cancer Patients: A North Indian Study

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Carcinoma rectum; Young age; Pathology; Outcome; India

1. Abstract

1.1. Introduction

The study has been carried out to understand the clinicopathological characteristics and treatment outcome in young age rectal cancer patients as compared to elderly patients in a tertiary care teaching hospital in north India.

1.2. Material and Methods

This a retrospective analysis of rectal cancer patients who were surgically treated over a period of three decades (from 1990 to 2020). In the present study young age patients were those as less or equal to 30 year (Group I) and old age more than 50 year (Group II). Analysis of clinical presentation, blood and imaging, neoadjuvant treatment, surgical procedures, histology and outcome was done.

1.3. Results

A total of 586 patients with rectal cancer were treated over a period of three decades. Twenty one percentage were in the young group , group I and 39.24% were in the old group, group II. Young patients have lower rectal cancer while elderly group had more upper rectal cancer. Young group patients were found to have more involvement of the surrounding structures. The mucinous type of tumor with the advanced T stage was predominant in young patients with more involvement of adjacent organ. There was no difference in survival between the two groups.

1.4. Conclusion

Young age onset rectal cancer is usually of higher stage compared to older population with poor histological characteristics and commonly presents with obstructive symptoms contrary to their adult counterpart. Though there was difference in the characteristic of tumour between two groups, there was no difference in survival.

2. Introduction

Carcinoma rectum is eighth most common cancer and is one of the important causes of cancer related death in the world [1]. Though incidence of rectal cancer is low (age standardized rate 7.2 per 1,00,000 among men) in India compared to other parts of the world, the rising trend of increasing in its incidence particularly in young age is a matter of concern [2,3] .The earlier observation and belief that it's a disease of older population (>60 years), is changing as there are reports from many parts of the world with increasing incidence in young age population including Asia [4]. Over the recent years there is a rising trend in rectal cancer not only in older population but also in young population in India [5]. Despite its increasing incidence in younger patients, the literature is scanty on its clinicopathological feature and prognosis in these patients [6]. The present study has been carried to understand the clinicopathological characteristics and treatment outcome in these young age rectal cancer patients as compared to elderly patients in a tertiary care teaching hospital in north India.

2.1. Methods

This is a retrospective analysis of prospectively maintained data of rectal cancer patients who were surgically treated over a period of three decades (from 1990 to 2020). The information of all patients with rectal carcinoma were retrieved from a prospectively maintained database from the hospital informatic system (HIS). The information retrieved were clinical presentation, blood investigations, imaging, neoadjuvant treatment, surgical procedures, histology and outcome. There was varying definition of 'young age 'patients in the literature. Majority defined <40 as young, although upper limit of 35years, 30 years, 50 years also have been described4. In the present study young age patients were considered those with age less or equal to 30 year (Group I) and old age more than 50 year (Group II). Middle age patients, age >30 years and <50 years were excluded from analysis to avoid the effect of middle age. Site of lesion was defined as lower rectal when it was within 5cm from anal verge, mid rectum when it was between 5-10 cm and upper rectum when it was beyond the 10 cm from the anal verge. Operative procedure was labelled as anterior resection (AR) when anastomosis was done above the peritoneal reflection and Low anterior resection (LAR) when the anastomosis was done below the level of peritoneal reflection or ultra-low when it was at the level of pelvic floor or at dentate line. Follow up information was retrieved from OPD record, telephonic interview or personal interview. Follow up was available in 44 (33.3%) patients in group I and 108 (46.95%) in group II patients. Statistical analysis was done using SPSS 25 version. Categorical variables were compared with Chi Square test and continuous variables with t-test. P value < 0.05 was considered statistically significant. Survival analysis was done with Kaplan Meier Curves and groups compared with Log Rank test.

3. Results

A total 586 patients (68.6% male and 31.4% females) of rectal cancer were treated over a period of three decade (mean 45.8year, range 12-93 year). Among them 21.16 % were in the young age group (n=124, Group I) and 39.24 % were in the elderly group (n=163, Group II). There was a steady increase in the number of patients both in the total number and in the young group rectal cancer patients, with maximum number in the second decade (Figure 1). The distribution of patients in various age groups has been shown in Figure 2. In group I, 84 patients were male (67.7 %) and 40 were females (32.2%). Group II comprised of 70.8 % males and 29.1% of female patients (Table 1). Overall lower rectum was the most common site of involvement among all patients (n=180,30.7 %) . Subgroup analysis revealed young patients have more lower rectal cancer (p<0.0006) while elderly group had more upper rectal cancer(p<0.0001) (Table 1). Over the last three decades lower rectum remained as predominant site of malignancy. There was no significant difference between the procedure performed between two groups (Table 1). During surgery young group patients were found to have more involvement of the surrounding structures as compared to the elderly group (29.83 % vs 9.52 %), which was statistically significant (P =0.0001) (Table 1). On histopathology, 66.9 % of patients in the young age group had T3/T4 disease while it was little lower in group II (54.3 %). Further analysis revealed group I patients had significant number of T4 disease (odds ratio 1.86 and P = 0.03) (Table1), but there was no significant difference between lymph node positivity between groups (Table 1). Forty-three percentage of Group 1 patients had well differentiated adenocarcinoma (WADC) and group II had 74.34 %. The difference was significant (Odds ratio 4.1864 and P <0.0001). 41.9 % of the patients in Group I had Mucinous adenocarcinoma (MUC ADC) as opposed to 15.65 % in group II. (Odds ratio 3.5926 and P=<0.0001) (Table 1). None our patients received neoadjuvant therapy during first decade. Use of neoadjuvant came into practice since early 2000. Since the introduction of neoadjuvant therapy, 36.3% of patients in young group and 20.8% of older patients received neoadjuvant therapy (p=0.0006) (Table 1). From the available follow up of 44 (33.3%) patients in group I and 108 (46.95%) in group II patients' median survival in group II was19.5 month and in group I 14.5 month. Though survival was poor in young patients compared to adult but the difference was not significant (p=0.45) (Figure 1). Discussion Colorectal carcinoma is the second most common cause of cancer death in developed countries, while similar data from developing nations is lacking. In India rectal cancer ranks 9th most common cancer in men [7]. Literature from European study reveals there is 2.6 % to 7.4 % increase in incidence in colorectal cancer in last 25 years both in men and women [8] . Incidence of colorectal cancer in young patients is reported to be 1.6 to 7% in North America and Australia and some Asian countries [9]. Only a few reports are there in literature, reporting the incidence of rectal cancer in young patients (3.9-35.5%)[10] .Various cut off point have been used to define the young age. Most groups had taken less than 40 years as young age, whereas other had taken <30 and some had taken even <50 years as young age [11]. In our study 21.16% of carcinoma rectum patients were 30 years of age or less. In another report from southern part of India, 35.5 % of patients were 40 or younger at presentation. In another Indian study 39% of their patients were of age less than 40 years [3]. Relatively high incidence of young patient could be because of the fast-increasing young population in our country, better health care awareness and diagnostic facility or it could be environmental effect or ?genetic. However exact reasons are not clear. Some studies reported increased male preponderance in young colorectal patients as compared to standard age group whereas other had reported female dominance [12,13]. In our study rectal carcinoma was twice as more common in male as compared to females in young age group and 2.5 times in older age group. In the present study, young age patients had more lower rectal cancer while older patients had upper rectal cancer, which also has been reflected in the type of surgery performed , and the need of neoadjuvant therapy. This finding can be extrapolated as most of young onset rectal cancer will eventually require neoadjuvant

therapy and APR or ultralow LAR as surgical procedure [14].

In most series cancer directed surgical resection rates are reported to be same in both the young and elderly patients (63-85%) [15]. In our study, more number of young age onset patients were significantly had T3/T4 disease (66.9%) much higher than the reported studies (35-60%). Adjacent organ involvement (29.8%) was also higher. Similar to our findings Nath et al. from India reported patients under 40 years having advanced T-stage [T0-2: 18.9%, T3: 62.3%, T4: 19.7% vs 34.5%, 56.0%, 9.5% (P = 0.027)][16]. Histopathological findings revealed young age onset rectal cancer had more of mucinous or aggressive histology while older patients had more of well differentiated tumour. Many earlier series have also reported poor histological features of colorectal carcinoma in young patients [17]. Karsten et al reported 39% mucin positive tumour in young patients as compared to 19% in elderly patients15. Similarly Chiang et al from Taiwan have reported mucin positive tumour in 36.1% of < 30years age group patients as compare to 9.6% in > 30 age group [18]. There is a big debate on survival rates in young and standard age group colorectal carcinoma patients. Some studies have predicted a poor survival in young patients [19]. Others have reported similar survival rate in young and elderly patients [13]. O' Conell et al reported one of the highest resection rates in both Young and elderly population (85.4 and 85.5%). Five-year survival rates of 63.2% in young age group vs 62.1% in elderly patients [20]. Karsten et al reported 3year survival rate of 64% in young patients as compared to 56% in elderly [15]. Similarly, Chung et al reported five-year survival rate of about 55% in both the age groups [13]. In our study, disease-free five-year survival, even after curative resection in young patient (25%) was lower than the older patients (50%), which can be explained by relatively advance stage and poor histology in these patients. In our series among 354 patients under analysis, the follow up data was available only in 162 patients (45.76%). Survival analysis revealed younger patients had mean survival of 14.5 months as compared to 19.5 months in older group patients, however this difference was not significant. This may not be a true reflection of survival as our follow of data was poor.

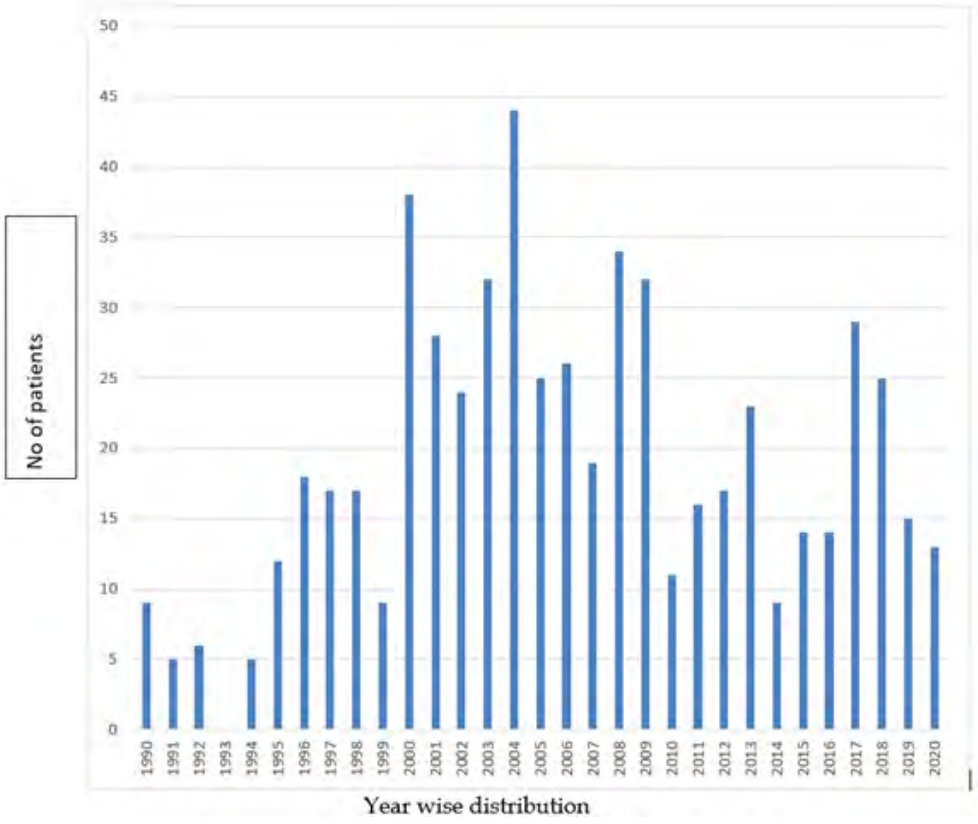

Figure 1: Year wise distribution of patients of rectal cancer treated over the years.

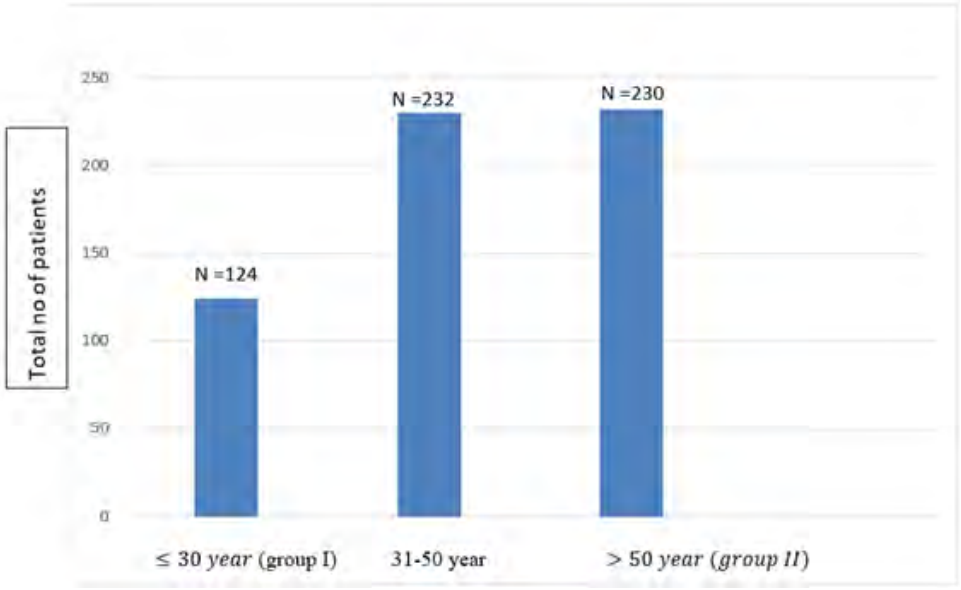

Figure 2: Age group wise distribution of patients.

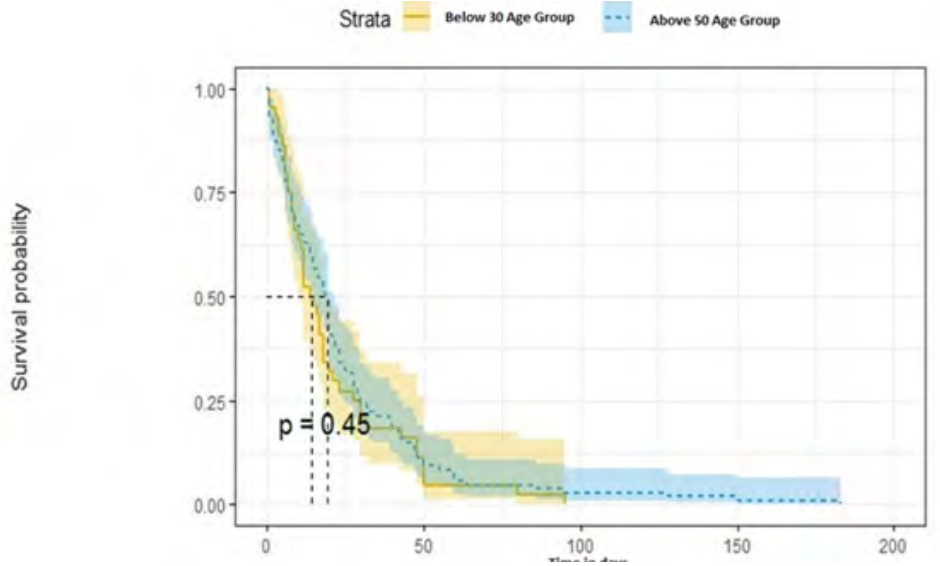

Figure 3: survival graph between two groups.

Table 1: Demography and clinicopathological characteristics of two groups of patients.

Parameters	**Group I (≤ 30 yr) N=124 (21.16%)**	**Group II (>50 yr) N= 230 (39.24%)**	**P value**
Sex			
Male	84(67.7%)	163 (70.8%)	0.35
Female	40 (32.2%)	67 (29.1%)	
Location of growth			
Upper rectum	10 (8.0%)	60(26.1%)	<0.0001
Middle rectum	35(28.2%)	69(30%)	0.84
Lower rectum	79(63.7%)	101(43.9%)	<0.0006
Type of surgery			
AR	8(6.4%)	12(5.2%)	0.82
LAR	37(29.8%)	68(29.6%)	0.93

ULAR	8(6.4%)	16(6.9%)	0.87
APR	35(28.2%)	84(36.5%)	0.12
Adjacent organ involvement	37(29.8%)	22(9.1%)	<0.0001
Received NACTRT	45(36.3%)	48(20.8%)	<0.0006
Upfront surgery	54(43.5%)	145(63.1%)	0.59
T Stage			
T1	0	1(0.4)	0.7
T2	27(21.7)	54(23.5)	
T3	37(29.8)	71(30.8)	0.03
T4	46(37.1)	54(23.5)	
N Stage			
N1	29(23.4)	68(29.5)	0.21
N2	25(20.2)	21(9.1)	
Differentiation			
Well, differentiated	64(51.6)	191(83.04)	<0.0001
Moderately differentiated	6(4.8)	15(6.5)	0.586
Poorly differentiated	54(43.5)	24(10.4)	0.624
Signet ring	6(4.8)	2(0.8)	
Mucinous	52(41.9)	36(15.6)	<0.0001

AR=Anterior Resection, LAR = Low Anterior Resection, ULAR= Ultra-low anterior resection, APR= Abdominoperineal resection.

Table 2: Published series on colorectal Cancer in young age patients.

Publication (Number of young patients)	Cut off for young age	HPE Characteristics	Survival	Disease Stage at presentation in young patients
Shrikhande et, al[21] (n=57)	40	Poorly differentiated higher in young (24 %vs 14%)	Overall survival poor in young (P<0.05)	More node positive patients(p=0.003)
Dozois et. Al[5] (n=1025)	50	Higher rate of mucinous histology	NR	Advanced stage at presentation
Stanford et. Al (n=239)[22]	55	NR	NR	Higher stage at presentation
Gupta et.al,[3] (n=119)	35	Higher incidence of mucinous and signet ring cell	Survival same as adult	
Orsini et al, [23] (n=1,102)	40	NR	Survival same as adult	
*Present study 2021 (n=124)	30	Higher incidence of poorly differentiated tumor and presence of mucinous and signet ring cell	Survival same as adult	Advanced stage at presentation

*All published data include both colon and rectal cancer except present study, where only rectal cancer patients has been include.

4. Conclusions

Contrary to common belief that rectal cancer is a disease of old age, incidence of rectal cancer in young population is increasing. Age-specific data and tumour characteristics of young rectal cancer in our study revealed that, these patients have more low rectal cancer, T4 stage tumour and poor histopathological characteristic as compared to older population and have poor survival (though not significant). Awareness about the increasing incidence of rectal cancer in young age group and high index of suspicion in patients presenting with similar symptoms may help timely detection, prompt treatment, which will improve the outcome.

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