Research Article
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Prospective evaluation of the quality of life of patients undergoing laparoscopic surgery in colorectal cancers: a single institutional Indian study

Abstract

Context: Following surgery, colorectal cancer (CRC) can affect the patient's quality of life (QoL) in a number of ways that deserve to be adequately assessed. The purpose of this study was to evaluate health-related QoL outcomes after laparoscopic surgery in CRC patients from a 12-month perspective at a single institution.

Settings and design: A single-centre, single observer, prospective study conducted at tertiary care centre.

Methods and material: A single-centre, prospective study including laparoscopically operated colorectal cancer patients from 2010-2018. The European Organization for Research and Treatment of Cancer (EORTC) core QLQ-C30, and colorectal cancer-specific QLQ-CR29 questionnaires were applied and responses were recorded telephonically 1 year after surgery.

Results: A total of 331 patients were screened for this study, out of which 84 patients were included in the final analysis. The male-female sex ratio was 4.25 (68 v/s 16). In our cohort, the majority of them (57.1%) were presented at an advanced stage (T3 and T4) of TNM staging. The mean score for global health status/quality of life (GHS/QOL) was 80.56. The physical functioning scale was found to be better in males (0.001) & age <65yrs (0.001). QoL was similar for early and advanced T stage (0.714). Similarly, QOL for N+ and N0 were not significantly different (0.680).

Conclusion: Our results showed that the QOL for all patients undergoing LACRS, were similar irrespective of age, T–stage and N stage, thus reaffirming its role even in advanced colorectal cancers. In Indian population, there is a need to optimize pre-operative nutritional status and post-operative physical activity in the sedentary lifestyle of CRC survivors to enhance overall Qol and survival.

Keywords: health related quality of life (HRQoL), laparoscopy, colorectal cancer, EORTC QLQ-C30, QLQ-C29

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Abbreviations: CRC, colorectal cancer; QoL, quality of life; EORTC, European organization for research and treatment of cancer; HRQoL, health related quality of life; RCTs, randomized clinical trials

Key messages: Our study brings out the need for pre-operative nutritional support for the colorectal cancer patients to improve QoL. There is a need to stress upon improvement in Qol of Indian females population suffering from colorectal cancers. Minimal access surgery has shown to have good overall Qol.

Introduction

Despite being the fourth most common cancer and the third leading cause of cancer related mortality worldwide,[1] the survival rate of colorectal cancer (CRC) continues to surge substantially over the past decades. In India, unlike the west, the incidence of CRC is low, but a rising trend can be observed, specifically among younger age groups increasing the expectations to optimize the quality on the well-being of patients during the post-treatment period.[2] The disease and its treatment strongly impact the quality of life (QoL) resulting in psychological, physical, functional and social impairment in these patients. The incorporation of QoL assessment along with the survival, local or distant recurrence, and treatment morbidity, was particularly emphasized considering the long term physical and emotional problems associated with the surgery.[3] Evaluation of the QoL has become increasingly crucial in recent years as it reflects the decision making of the surgery and also the cost-effectiveness of laparoscopic surgeries.[4] Since the introduction of laparoscopic surgery in the early 1990s, several multi-centre randomized clinical trials (RCTs) have established that laparoscopy is a safe and feasible approach in CRC surgery.[5,6] Moreover, QoL assessment is one of the most favored outcomes as it is reported to provide a proper, comprehensive understanding of the outcome of the surgery.

The European Organization for Research and Treatment of Cancer (EORTC) QoL questionnaire (QLQ-30) is an integrated system for assessing the functional scales (physical, role, cognitive, emotional, and social) and symptom scales (fatigue, pain, and nausea and vomiting).[7] In addition, QLQ-CR-29 which is developed as a supplement to the EORTC QLQ-C30 and used for assessing 4 scales i.e. urinary frequency, faecal incontinence, stool consistency and body image etc. is the holistic way of measuring the quality of life post-surgery.[8] A high score in symptom scales represents worse or severe symptoms whereas high score in functioning scales represents a better level of functioning. Authors demonstrated that the EORTC QLQ-CR29 has shown to be of great value if used in combination

with the EORTC QLQ-C30 in assessing patient-reported outcomes during treatment for CRC in clinical trials and other settings. On the contrary, several studies have demonstrated the laparoscopic resection for colonic cancer showing short-term advantages for a minimally invasive approach.[9–11] But there have been few international studies reporting superior or similar QoL after minimal invasive technique.[12] Furthermore, no Indian studies have reported the advantages of laparoscopic surgery influencing QoL. Understanding the characteristics or conditions that predict health-related QoL (HRQoL) along with the complexity of factors and the pattern of HRQoL is a significant step towards identifying patients who are at risk of poor HRQoL. Therefore, we took the opportunity to embark on this study to assess perceived QoL, functional outcomes and symptoms in CRC patients treated with a laparoscopic approach using the EORTC questionnaire (QLQ-C30 and QLQ-CR29). The objective of the current study is to understand the benefits of laparoscopic approach for CRC Surgery in the long term and in the Indian scenari.[13,14]

Subjects and methods

This was a prospective study designed to evaluate HRQOL in a series of patients after laparoscopic resection of colorectal cancer. The European Organization for Research and Treatment of Cancer (EORTC) questionnaire (QLQ-C30 and QLQ-CR29) was used to assess the HRQOL. The inclusion criteria included histologically documented colorectal carcinomas, age ≥18years, no previous colorectal surgeries, and patient's willingness to participate in a telephonic interview and giving consent for answering the questionnaire. Previous study findings have reported that patients with disease progression have worse QOL scores.[15,16] Therefore, patients who were reported to have any concurrent malignancy, non-malignant diseases, and recurrent diseases were excluded from the study. The exclusion criteria also include the patient's unwilling to give consent. All the patients who underwent laparoscopic-assisted CRC surgeries (LACRS) from 2010 to 2018 in our tertiary care centre were assessed for study eligibility. All patients were telephoned by a surgeon to determine HRQOL issues at 12 months postoperatively. After taking telephonic consent from the patient, EORTC (QLQ-C30 and QLQ-CR29) questionnaire was asked and responses were noted. Approval was obtained by the Institutional Ethical Committee.

The EORTC QLQ-CR29 is a 29-item questionnaire grouped into 21 domains, while the QLQ-C30 comprises a 30-item questionnaire. Descriptive analysis was used to identify the distribution of variables under study and summarize results. Normal distribution of the scores was tested using the Kolmogorov–Smirov test, and homogeneity of variance was tested using Levene's test. Categorical data were represented in the frequency form and continuous data were presented as the Mean ± SD or median (IQR). In order to evaluate the difference between groups, analysis by one-way ANOVA was made of each of the outcome measures as dependent variables. Differences in scores between groups were analysed using independent T test. All analysis was two-sided, and significance was set at a p-value of 0.05. All analyses were performed using SPSS version 2017, IBM SPSS Statistics for Windows, Version 25.0.

Results

A total of 331 patients were screened for Health related QoL with EORTC C30 and EORTC CR29 questionnaires. Data was available for 110 patients out of which 84 patients completed the questionnaire and were included in the final analysis. Majority of the patients (48) were less than 65 years old, and the mean age of all the patients was found to be (60.55) years. Sixty-eight patients (81%) were males, while sixteen (19%) were females. Tumor-node-metastasis staging system was as follows: Stage I=11 (13 %), stage II=25 (29.7 %), stage III=42 (50 %), stage IV=6 (7.1 %). Forty-eight patients (57%) had late stage (T3 & T4) disease. The baseline characteristic of the overall patient cohort is shown in Table 1. With respect to the QLQ-C30 core module, high functioning abilities were observed in our cohort with mean scores of above 80 in all aspects of functionality, except for physical functioning. Highest functioning score was reported for role functioning (mean=94.25) whereas physical functioning (mean=66.67) scored the lowest. On the contrary, higher score in symptom scales represents a common/ worst symptom. Diarrhea (mean=9.92) was the most common symptom, followed by nausea and vomiting (mean=6.55), pain (mean=6.55) and appetite loss (5.56). Financial difficulty (mean=6.75) in terms of lack of job and care-related expenditure was perceived as a relatively modest problem among colorectal cancer patients. The mean score for Global health status/QOL was found to be 80.56 indicating that the majority of patients rated their HRQOL measures as high. Table 2 presents the mean scores and standard deviations for the GHS/QOL, functioning scales and symptoms experience.

In colorectal cancer specific QLQ-CR29 module, most patients were satisfied with their body image (mean=89.58±15.62) as it scored the highest among the functioning scales covered. Mean values of Urinary dysfunction (4.37±11.31), Diarrhea (9.92±22.42) Pain (6.55±9.33) which were comparable with literature. The mean scores for sexual dysfunction in both men and women was found to be (mean=5.56±13.53) and (mean=35.42±37.45), indicating no significant sexual dysfunction in colorectal cancer patients. The most common symptoms specific to colorectal cancer reported by patients were diarrhea (mean=12.25±24.37). Table 3 presents the QLQ-CR 29 scores comparison between age, gender, T and N stage. There were no statistically significant differences in EORTC- C 30 and EORTC-CR29 QoL scores at baseline (each factor was based on a scale of 0 to 100) regarding the scores of each scale of QoL between the age groups (age < 65yrs Vs age > 65 yrs, gender (male Vs female), T-stage (early T1, T2 Vs advance T3, T4) and N stage (N0 Vs N plus). P-values were found to be >0.05 for each scale, except for physical functioning in age <65years and gender (p-value for time effect 0.001 in both groups), Role, emotional and social functioning for females, while cognitive functioning for Node positive cases. More financial problems were reported in females and node positive cases Tables 2 & 3. Sexual dysfunction was more common in females.

Table 1 Baseline characteristics of colorectal cancer patients

Characteristics	(n=84)
Age < 65 years	48
Age > 65 years	36
Males	68
Females	16
N0	47
N plus	37
T1	11
T2	25
T3	42
T4	6

(N- Nodal stage, N0– No nodes, N Plus- N1 OR N2, T-Tumor stage)

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Table 2 Overall Scores for the EORTC QLQ-C30 scores comparison between age, gender, T and N stage

Scales/single item-name	Mean (SD)	Age>65 vs<65	Gender	+T- stage	**N- stage
			Male /female	T1/T2 Vs T3/T4	N0 Vs N1/N2
		P-value	P-value	P-value	P-value
Functional scales					
Physical functioning	66.67±12.63	<0.001	<0.001	0.523	0.782
Role functioning	94.25±3.32	0.199	0.014	0.824	0.805
Emotional functioning	91.07±8.66	0.896	0.029	0.708	0.684
Cognitive functioning	94.05±9.90	0.857	0.764	0.984	0.05
Social functioning	84.92±1.16	0.346	0.004	0.768	0.412
Global health status & quality of life	80.56±0.85	0.688	0.7	0.714	0.68
Symptoms					
Fatigue	8.20±10.22	0.689	0.755	0.937	0.608
Nausea & vomiting	6.55 ± 9.33	0.765	0.933	0.064	0.552
Pain	6.55 ± 9.33	0.845	0.933	0.81	0.079
Dyspnea	3.57±10.37	0.597	0.815	0.169	0.23
Insomnia	5.16±12.13	0.339	0.707	0.258	0.985
Appetite loss	5.56±12.50	0.061	0.818	0.58	0.175
Constipation	3.17±13.31	0.797	0.265	0.867	0.336
Diarrhea	9.92±22.42	0.255	NA*	0.551	0.163
Financial	6.75±16.18	0.013	0.026	0.151	0.05

(* NA- Not applicable, **N- Nodal stage, + T- Tumor stage)

Table 3 Overall scores for the EORTC QLQ-CR 29 scores comparison between age, gender, T and N stage

Scales/single item-name	Age>65 vs<65	Gender	+T- stage	**N- stage
		Male /female	T1/T2 Vs T3/T4	N0 Vs N1/N2
	P-value	P-value	P-value	P-value
Urinary frequency	0.213	0.77	0.192	0.897
Blood and mucus in stool	0.301	0.213	0.599	0.241
Stool frequency	0.279	0.896	0.388	0.217
Body image	0.227	0.914	0.789	0.053
Urinary incontinence	0.702	0.462	0.816	0.825
Dysuria	0.79	0.703	0.718	0.033
Abdominal pain	0.578	0.685	0.173	0.47
Buttock pain	0.198	0.413	0.791	0.036
Bloated feelings	0.282	0.326	0.669	0.238
Dry mouth	0.629	0.365	0.476	0.576
Hair loss	0.754	0.224	0.446	0.438
Trouble with taste	0.143	0.247	0.039	0.094
Anxiety	0.438	0.266	0.215	0.524
Weight	0.922	0.807	0.669	0.364

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Table Continued...

Scales/single item-name	Age>65 vs<65	Gender	+T- stage	**N- stage
		Male /female	T1/T2 Vs T3/T4	N0 Vs N1/N2
	P-value	P-value	P-value	P-value
Flatulence	0.981	0.484	0.485	0.943
Faecal incontinence	0.871	0.765	0.7	0.755
Sore skin	0.634	0.279	0.753	0.626
Embarrassed by bowel movement	NA*	NA*	NA*	NA*
Stoma care problems Item	0.244	NA*	0.692	NA*
Impotence	0.328	NA*	0.132	0.835
Dyspareunia	NA*	NA*	NA*	NA*
Sexual function men	0.438	0.266	0.215	0.524
Sexual function women	0.032	NA	0.54	0.218

(* NA- Not applicable, **N- Nodal stage, + T- Tumor stage)

Discussion

Colorectal cancer in developing countries like India remains a significant public health concern. Considering the increased post-treatment survival rate, the pattern of quality of life and its associated factors is crucial to guide physicians in choosing treatment options and to improve quality of life.[17,18] In the present study, we evaluated QoL of CRC patients in the long term who received laparoscopic-assisted approach and determine the factors associated with QoL. The instrument for assessing QoL was proven for its psychometric properties; the EORTC QLQ-C30 and QLQ-CR-29, in particular, has shown its reliability and validity.[7,8] There is no current literature about QoL for laparoscopic assisted CRC surgeries (LACRS) in Indian scenario. However, the clinical and treatment characteristics of our patient cohort were generally similar to those reported by Lizdenis et al.,[19] from Lithuania,[19] hence we compare our study findings with this study. The study had a sample size of 82 patients with the mean age of 64.75 years, and similar to our study, the instrument used for assessing the QoL was EORCT C-30. The mean age of our participants was found to be 60.55 years and the majority of the patients were males (81%). Besides, 57% of patients included in this study presented with advanced stage cancer were staged TNM's Stage III and IV. This could be due to the fact that most patients diagnosed with advanced cancer were usually referred to tertiary care hospital. HRQoL among our patients was good with respect to the global health status and overall quality of life (GHS/QOL) with an overall mean score of 80.56. This is comparable with the previous study by Lizdenis et al.,[19] in which the reported mean score for global quality of life was reported to be 72.27 at 3 months post-surgery.

Apart from that, our patients reported relatively high scores (more than 80) for functionalities that include emotional functioning (tension/worry/irritability/depression), role functioning (limited in work or leisure), cognitive functioning (concentration/memory trouble) for QLQ-C30 which is similar to reference study Lizdenis et al.[19] This could be explained by the better management of CRC patients at our centre that involves multidisciplinary approach such as oncologists, colorectal surgeons, pain management team and palliative physicians. Sexual functioning is one of the most common long-term effects of cancer treatment and is an essential component of quality of life that should be addressed adequately.[20] Sexual functioning was significantly better in males as compared females. Educating patients and providing them with treatment options could help to improve sexual functioning in CRC survivors.[21] We also compared our results of quality of life (our study) with Andreas Hinz European study giving European reference value for quality of life questionnaire. EORTC-QLQ-30 was assessed. In functioning scale, physical functioning was lesser in our population. This can be attributed to poor nutritional value and fragile body build up. Thus, preoperative prognostic nutritional index in colorectal cancers may play an influential role in improving physical quality of life. Emotional functioning and role functioning were better in our population while European patients fared better in social functioning. Overall global health status and quality of life was better reported in our population. According to this analysis, our population has worse appetite loss, constipation, diarrhea and financial problems while Indian population has lesser fatigue, pain, dyspnea and insomnia. Gut transit time for Indian population is almost double as compared to western population. This can be reason for higher diarrhea rate in Indian population.

For CRC surgeries, surgical quality indicators include the CRM (circumferential resection margin), macroscopic quality of the TME (Total mesorectal excision) specimen and number of harvested lymph node.[22] To achieve all above laparoscopically, for advance T3/T4 stage tumors, is still a challenge and requires experience. Anatomically the pelvic organs and autonomic nerves are closely placed to the rectum, in good quality surgery even with nerve-sparing techniques, there is a risk autonomic nerve injury resulting in sexual and bladder dysfunction.[23] Thus, we were curious to know whether minimal invasive technique translates into a lower complication or otherwise. Currently, there is no literature comparing QoL post-minimal invasive surgeries for CRC between early and advanced T stage, and N0 and N plus stage. In our study, 36 patients with T1/T2 and 48 patients with T3/T4 stage tumor who successfully underwent LACRS with complete TME & CRM were shown similar QoL and surgical quality. During surgery, while achieving complete TME and CRM there is the handling of parasympathetic nerves which leads to bladder, sexual[24] and bowel dysfunctions.[22] In our study, these symptoms were

similar in T1/T2 and T3/T4 stage tumor patients. Our study showed that laparoscopic approach does not impact the QoL when offered to advance T- stage subset of patients. However, there were higher trends of Nausea in advanced stages. Also, in EORTC-QLQ-CR29 analysis, all symptoms were similar in either of the stages except advanced stage had significantly higher altered taste sensation; this could be the side effects of chemotherapy given in advanced stages of colorectal cancers. Adequate (N) lymph node yield has a major role as an independent prognostic marker for therapeutic decisions, adequate staging, quality of surgery, and pathologic analysis.[23] In an attempt to achieve this, there is handling of the bladder, increase chances of ureteric damage,[25] parasympathetic nerve damage[24] which also leads to impotence, defecation problems,[18] incontinence etc. These complications can have a major impact on a patient's physical, psychological, social,[18,26] and emotional functioning, as well as their overall well-being.

In our study, 47 N0 and 37 N plus cases who all underwent LACRS with adequate lymph node yields. We found Body image ($p<0.05$), Buttock pain ($p<0.036$) and Dysuria ($p=0.03$) was significantly poor in Node positive patients. However majority of the functioning scales and symptom scales were found to have similar QoL demonstrating that the laparoscopic surgery can be offered in N plus cases as well. There is a surge in the proportion of elderly CRC patients due to the increasing life expectancy, earlier diagnosis and improved surgery.[27] Improved long-term outcomes have been found in the elderly CRC patients treated with laparoscopic surgery.[28] In our study, there were 48 patients with age less than 65 years and 36 patients with age more than 65 years. All LACRS and their QoL on assessment group < 65 years showed statistically significant and better physical functioning scale as compared with group > 65 years. However, the rest of the parameters were similar in both groups again pointing towards similar QoL in both groups of patients. Our study has certain limitations that need to be addressed. Among them, it is crucial to acknowledge the relatively small number of the sample size included for the analysis. Secondly, there was a sampling bias, because the data were obtained from only one institution, which was a tertiary care medical center and therefore may not be generalized to the general population of colorectal cancer patients. On the other hand, the use of well-established instruments to assess HRQoL among CRC survivors provides a strong suit for our study, in which comparisons can be made with studies from international settings.

Conclusion

The novel findings of the present study showed that the QOL for all patients undergoing LACRS, were similar irrespective of age, T–stage and N stage, thus reaffirming its role even in advanced colorectal cancers. However, females had poorer functional quality of life with respect to physical, role, emotional, social functioning. In Indian population, there is a need to optimize pre-operative nutritional status and post-operative physical activity in the sedentary lifestyle of CRC survivors to enhance overall Qol and survival. This study demonstrated that the QoL among our colorectal cancer survivors is comparable with other studies from international settings. We hope that this study lays a foundation to conduct further RCTs in assessing QoL in laparoscopic and open CRC surgeries in an Indian scenario.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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