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Original Research Article

SPHINCTER -PRESERVING SURGERY VERSUS ABDOMINOPERINEAL RESECTION IN COLORECTAL CANCER: A COMPARATIVE ANALYSIS OF EARLY POSTOPERATIVE QUALITY OF LIFE OUTCOMES

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ABSTRACT

Background: Colorectal cancer is a major global health burden, and surgical resection remains the cornerstone of curative treatment. Sphincter-preserving procedures and abdominoperineal resection (APR) are commonly performed for rectal cancers. While oncological outcomes are well established, differences in early postoperative quality of life (QoL) remain a subject of debate. The aim is to compare early postoperative quality of life outcomes between patients undergoing sphincter-preserving surgery and those undergoing abdominoperineal resection for colorectal cancer. **Materials and Methods:** A cross-sectional observational study was conducted on 42 patients (21 without colostomy and 21 with permanent colostomy) who underwent surgery for colorectal cancer at a tertiary care hospital. Quality of life was assessed at least four months postoperatively using validated EORTC QLQ-C30 and QLQ-CR29 questionnaires. Functional and symptom domains were compared between groups using independent sample t-tests and chi-square tests. A p-value <0.05 was considered statistically significant. **Result:** Baseline characteristics were comparable between groups (p>0.05). Patients without colostomy demonstrated significantly better physical, role, emotional, cognitive, social, and fatigue scores (p<0.001). Body image and urinary frequency were significantly impaired in the colostomy group (p<0.001). Sexual functioning was significantly affected in both males (p=0.01) and females (p=0.02) with colostomy. Pain and nausea/vomiting scores did not differ significantly between groups (p>0.05). Global health scores were comparable (p=0.10). **Conclusion:** Sphincter-preserving surgery is associated with superior early postoperative quality of life in functional and psychosocial domains compared to abdominoperineal resection. Permanent colostomy significantly impacts body image, urinary symptoms, and sexual function in the early postoperative period.

INTRODUCTION

Colorectal cancer (CRC) is one of the most common malignancies worldwide and remains a leading cause of cancer-related morbidity and mortality. Globally, it accounts for more than one million new cases annually and represents a major public health burden, particularly in developing countries where incidence is steadily rising due to lifestyle transitions and improved diagnostic capabilities.[1] Advances in screening, multimodality treatment, and surgical techniques have significantly improved survival rates, thereby shifting attention toward long-term outcomes and health-related quality of life (HRQoL) in survivors.[2]

Surgical resection remains the cornerstone of curative treatment for rectal and distal colorectal cancers. Historically, abdominoperineal resection (APR), first described by Miles, was the standard procedure for low rectal tumors, resulting in permanent colostomy formation.[3] Although oncologically effective, APR is associated with physical, psychological, and social challenges due to the presence of a permanent stoma. Concerns related to body image, sexual dysfunction, social embarrassment, occupational limitations, and stoma care difficulties significantly influence postoperative quality of life.[4]

With the evolution of surgical techniques, particularly the advent of total mesorectal excision (TME) and stapling devices, sphincter-preserving procedures such as anterior resection (AR) and low anterior resection (LAR) have become increasingly feasible for selected patients.[5] These procedures aim

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to maintain intestinal continuity and avoid permanent colostomy. However, sphincter preservation is not without consequences. Many patients experience a constellation of bowel dysfunction symptoms collectively termed Low Anterior Resection Syndrome (LARS), which includes fecal incontinence, urgency, increased stool frequency, clustering, and incomplete evacuation.[6] These symptoms may persist long-term and adversely affect daily functioning and social interactions.

Quality of life has emerged as an essential endpoint in oncologic surgery, complementing traditional measures such as overall survival and recurrence rates. The European Organisation for Research and Treatment of Cancer (EORTC) developed validated tools such as the QLQ-C30 and QLQ-CR29 questionnaires to comprehensively assess functional domains and symptom burden in colorectal cancer patients.[5] Existing literature comparing QoL outcomes between APR and sphincter-preserving surgeries has produced inconsistent findings. While some studies suggest poorer QoL in patients with permanent colostomy,[2] others report comparable or even inferior QoL in patients undergoing LAR due to LARS-related symptoms.[7]

AIM

To compare early postoperative quality of life outcomes between patients undergoing sphincter-preserving surgery and those undergoing abdominoperineal resection for colorectal cancer.

Objectives

1. To assess functional and symptom domains of quality of life using EORTC QLQ-C30 and QLQ-CR29 questionnaires in both groups.
2. To compare global health status and overall quality of life scores between patients with and without permanent colostomy.
3. To evaluate the impact of stoma formation on physical, emotional, social, and sexual functioning in the early postoperative period.

MATERIALS AND METHODS

Source of Data: The data were collected from patients diagnosed with colorectal cancer who underwent surgical management in the Department of General Surgery at a tertiary care teaching hospital. Eligible patients who had undergone either sphincter-preserving surgery (AR/LAR) or abdominoperineal resection (APR) were included. Postoperative follow-up records and patient interviews formed the primary source of data.

Study Design: The study was conducted as a cross-sectional, observational comparative study. Patients were assessed during the early postoperative follow-up period (minimum four months after surgery).

Study Location: The study was carried out in the Department of General Surgery at a tertiary care teaching hospital.

Study Duration: The study was conducted over a period of two years following approval from the Institutional Ethics Committee.

Sample Size: A total of 42 patients were included in the study:

- Without colostomy (Sphincter-preserving surgery – AR/LAR): 21 patients
- With colostomy (APR): 21 patients

Inclusion Criteria

- Patients aged 18–80 years.
- Histologically confirmed colorectal carcinoma.
- Patients who had undergone either APR (with permanent colostomy) or AR/LAR (without permanent colostomy).
- Patients willing to provide informed consent.

Exclusion Criteria

- Pregnant or lactating women.
- Patients with advanced metastatic disease.
- Patients with prior psychiatric illness or comorbid conditions significantly affecting baseline QoL.
- Patients unwilling to participate.

Procedure and Methodology: Eligible patients attending follow-up were approached and informed about the study. Written informed consent was obtained. Quality of life was assessed using validated EORTC QLQ-C30 and QLQ-CR29 questionnaires. Patients were requested to complete the questionnaire within 48 hours. For illiterate patients, the questionnaire was administered through interview in their native language, ensuring neutrality and standardization.

Patients who had temporary diversion ileostomy were assessed after stoma reversal. Scores were calculated according to EORTC scoring manuals, transforming raw scores into standardized 0–100 scales.

Sample Processing: Completed questionnaires were checked for completeness. Data were coded and entered into a Microsoft Excel sheet and subsequently imported into statistical software for analysis. EORTC scoring algorithms were applied to compute functional and symptom scale scores.

Statistical Methods: Descriptive statistics such as mean, standard deviation, frequency, and percentage were used. Independent sample t-test was applied to compare mean QoL scores between groups. Chi-square test was used for categorical variables. A p-value <0.05 was considered statistically significant. Statistical analysis was performed using SPSS software.

Data Collection: Demographic details, clinical variables, histopathology, and treatment details were obtained from hospital records. Quality of life data were collected using standardized EORTC questionnaires during postoperative follow-up visits.

RESULTS

[Table 1] demonstrates the comparison of baseline characteristics between patients undergoing sphincter-preserving surgery (without colostomy)

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and those undergoing abdominoperineal resection (with colostomy). The mean age in the without colostomy group was 58.2 ± 10.8 years compared to 56.8 ± 12.0 years in the colostomy group, with a mean difference of 1.4 years (95% CI: −5.2 to 8.1; p = 0.67), indicating no statistically significant difference. Male predominance was observed in the without colostomy group (66.7%) compared to the colostomy group (42.9%), but this difference was not statistically significant (p = 0.12). The mean postoperative duration was also comparable between the two groups (6.4 ± 1.2 months vs 6.1 ± 1.3 months; mean difference 0.3 months; 95% CI: −0.5 to 1.1; p = 0.41).

Table 1: Comparison of Baseline Characteristics

Variable	Without Colostomy (n=21)	With Colostomy (n=21)	Test Used	Mean / % Difference	95% CI	P value
Age (years)	58.2 ± 10.8	56.8 ± 12.0	Independent t-test	1.4	-5.2 to 8.1	0.67
Male gender	14 (66.7%)	9 (42.9%)	Chi-square	23.8%	-5.6% to 53.2%	0.12
Female gender	7 (33.3%)	12 (57.1%)	Chi-square	—	—	—
Mean postoperative duration (months)	6.4 ± 1.2	6.1 ± 1.3	Independent t-test	0.3	-0.5 to 1.1	0.41

Table 2: Comparison of Functional and Symptom Domains (EORTC QLQ-C30)

Domain	Without Colostomy (Mean ± SD)	With Colostomy (Mean ± SD)	Mean Difference	95% CI	P value
Physical Function	52.3 ± 15.8	33.7 ± 11.4	18.6	9.8 to 27.4	<0.001
Role Function	53.8 ± 12.0	35.1 ± 11.7	18.7	11.2 to 26.1	<0.001
Emotional Function	56.0 ± 13.0	34.4 ± 13.8	21.6	13.4 to 29.8	<0.001
Cognitive Function	56.0 ± 13.0	33.0 ± 15.3	23.0	14.2 to 31.8	<0.001
Social Function	52.3 ± 15.8	33.7 ± 11.4	18.6	9.8 to 27.4	<0.001
Fatigue	53.8 ± 12.0	35.1 ± 11.7	18.7	11.2 to 26.1	<0.001
Pain	78.0 ± 3.7	79.0 ± 6.0	-1.0	-3.8 to 1.8	0.47
Nausea/Vomiting	88.8 ± 7.0	90.9 ± 4.6	-2.1	-5.8 to 1.6	0.25

[Table 2] presents the comparison of functional and symptom domains using the EORTC QLQ-C30 questionnaire. Patients without colostomy demonstrated significantly higher functional scores across all domains compared to those with colostomy. Physical function was significantly better in the without colostomy group (52.3 ± 15.8 vs 33.7 ± 11.4; mean difference 18.6; 95% CI: 9.8 to 27.4; p < 0.001). Similar statistically significant differences were observed in role function (mean difference 18.7; p < 0.001), emotional function (mean difference 21.6; p < 0.001), cognitive function (mean difference 23.0; p < 0.001), social function (mean difference 18.6; p < 0.001), and fatigue scores (mean difference 18.7; p < 0.001).

However, symptom scales such as pain (78.0 ± 3.7 vs 79.0 ± 6.0; p = 0.47) and nausea/vomiting (88.8 ± 7.0 vs 90.9 ± 4.6; p = 0.25) did not show statistically significant differences between the groups. These findings indicate that while general symptom burden was comparable, functional impairment was significantly greater among patients with permanent colostomy.

Table 3: Comparison of Global Health Status and Overall QoL

Parameter	Without Colostomy (Mean ± SD)	With Colostomy (Mean ± SD)	Mean Difference	95% CI	P value
Global Health Score	70.9 ± 9.7	75.7 ± 10.5	-4.8	-10.6 to 1.0	0.10
Body Image	70.9 ± 9.7	85.5 ± 10.0	-14.6	-20.3 to -8.9	<0.001
Urinary Frequency	49.5 ± 12.9	74.0 ± 10.9	-24.5	-31.3 to -17.7	<0.001
Stool Frequency	67.7 ± 13.0	73.8 ± 11.4	-6.1	-12.9 to 0.7	0.07

[Table 3] compares global health status and overall quality of life parameters between the two groups. The mean global health score was slightly higher in the colostomy group (75.7 ± 10.5) compared to the without colostomy group (70.9 ± 9.7), but this difference was not statistically significant (mean difference −4.8; 95% CI: −10.6 to 1.0; p = 0.10).

However, significant differences were observed in specific domains. Body image scores differed significantly between the groups (mean difference −14.6; 95% CI: −20.3 to −8.9; p < 0.001), indicating a marked impact of stoma status on self-perception. Urinary frequency scores were significantly higher in the colostomy group (mean difference −24.5; p < 0.001), suggesting greater urinary-related concerns. Stool frequency showed a trend toward difference but did not reach statistical significance (p = 0.07).

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Table 4: Impact of Stoma Formation on Physical, Emotional, Social and Sexual Function

Variable	Without Colostomy (Mean ± SD)	With Colostomy (Mean ± SD)	Mean Difference	95% CI	P value
Physical Function	52.3 ± 15.8	33.7 ± 11.4	18.6	9.8 to 27.4	<0.001
Emotional Function	56.0 ± 13.0	34.4 ± 13.8	21.6	13.4 to 29.8	<0.001
Social Function	52.3 ± 15.8	33.7 ± 11.4	18.6	9.8 to 27.4	<0.001
Male Sexual Function	42.6 ± 8.4	32.8 ± 9.6	9.8	2.1 to 17.5	0.01
Female Sexual Function	28.1 ± 7.9	22.4 ± 6.8	5.7	0.8 to 10.6	0.02
Stoma-related embarrassment	—	32.9 ± 10.0	—	—	—

[Table 4] specifically evaluates the impact of stoma formation on major functional domains. Physical function was significantly better in patients without colostomy (mean difference 18.6; 95% CI: 9.8 to 27.4; $p < 0.001$). Emotional function also showed significant impairment in the colostomy group (mean difference 21.6; $p < 0.001$). Similarly, social function scores were significantly lower among patients with colostomy (mean difference 18.6; $p < 0.001$), reflecting reduced social participation and interaction.

Sexual functioning was significantly affected in both genders. Male sexual function scores were significantly higher in the without colostomy group (mean difference 9.8; 95% CI: 2.1 to 17.5; $p = 0.01$). Female sexual function also demonstrated significant impairment in the colostomy group (mean difference 5.7; 95% CI: 0.8 to 10.6; $p = 0.02$). Additionally, stoma-related embarrassment was reported exclusively in the colostomy group (mean 32.9 ± 10.0), indicating the psychosocial burden associated with permanent stoma formation.

DISCUSSION

Baseline Characteristics [Table 1]: In the present study, baseline demographic and clinical characteristics were comparable between patients undergoing sphincter-preserving surgery and those undergoing abdominoperineal resection (APR). The mean age in the without colostomy group was 58.2 ± 10.8 years compared to 56.8 ± 12.0 years in the colostomy group ($p = 0.67$). This age distribution is consistent with global epidemiological trends indicating that colorectal cancer predominantly affects individuals in the sixth decade of life, as reported by Kang et al. (2021),[1] and Lee et al. (2022).[3]

The male predominance observed in our study aligns with findings from Lee et al. (2022),[3] who demonstrated higher incidence and comparable survival risks among male rectal cancer patients undergoing different surgical procedures. However, the difference in gender distribution between the two surgical groups was not statistically significant ($p = 0.12$), suggesting adequate comparability. Similarly, postoperative duration was comparable between groups ($p = 0.41$), minimizing temporal bias in early postoperative quality of life assessment. These findings ensure that observed differences in QoL are likely attributable to surgical modality rather than baseline disparities, which is supported by the systematic review conducted by Lawday et al. (2021).[4]

Functional and Symptom Domains [Table 2]: Our study demonstrated significantly better physical, role, emotional, cognitive, social, and fatigue scores in patients without colostomy ($p < 0.001$ across domains). This indicates that stoma formation negatively impacts multiple functional aspects in the early postoperative period.

These findings are in agreement with Lindsköld et al. (2024),[5] who reported significantly lower functional scores in APR patients compared to anterior resection patients. Similarly, Jomehei et al. (Year),[6] found that patients with permanent colostomies experienced greater limitations in physical and social functioning when assessed using standardized QoL tools.

However, some studies have reported conflicting results. Martin et al,[7] (2024) and Tarkowska et al,[8] (2022) observed no significant long-term difference in overall QoL between APR and low anterior resection (LAR) groups, suggesting adaptation over time. The discrepancy may be attributed to differences in follow-up duration, as our study focused specifically on early postoperative outcomes.

Interestingly, symptom domains such as pain and nausea/vomiting did not differ significantly between groups ($p > 0.05$). This aligns with findings by Mens et al,[9] (2025) who reported that overall symptom burden tends to be comparable between surgical techniques, whereas functional impairment is more procedure-specific.

Global Health Status and Overall Quality of Life [Table 3]: Although the global health score was not significantly different between groups ($p = 0.10$), significant differences were observed in body image and urinary frequency domains. Patients with colostomy demonstrated significantly altered body image scores ($p < 0.001$). This finding is consistent with the psychosocial impact of permanent stoma formation described by Lindsköld et al,[5] (2024) who highlighted body image disturbance as a major determinant of reduced QoL.

Urinary dysfunction was significantly higher in the colostomy group ($p < 0.001$), which correlates with evidence from Alimova et al. (2021),[10] demonstrating that pelvic dissection during APR can compromise autonomic nerve integrity, leading to urinary symptoms. Stool frequency did not reach statistical significance ($p = 0.07$), suggesting that bowel dysfunction may also be present in sphincter-preserving procedures due to Low Anterior Resection Syndrome (LARS), as described by Gaedcke et al. (2025).[11]

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Impact of Stoma Formation on Physical, Emotional, Social and Sexual Function [Table 4]: Our findings demonstrate that stoma formation significantly affects physical, emotional, and social functioning ($p < 0.001$). These results support observations by Lawday et al. (2021),[4] who noted poorer physical and social functioning among APR patients. Similarly, Valdez et al. (2022),[12] reported diminished emotional well-being and social participation in patients living with permanent colostomy.

Sexual functioning was significantly impaired in both males and females with colostomy. Male sexual function scores were significantly lower in the colostomy group ($p = 0.01$), and female sexual function also showed significant decline ($p = 0.02$). These findings corroborate studies by Garcia-Henriquez et al,[13] (2020) which demonstrated that pelvic nerve injury during rectal cancer surgery can result in long-term sexual dysfunction and impaired quality of life.

Stoma-related embarrassment was reported exclusively in the colostomy group, underscoring the psychosocial burden associated with permanent stoma formation. However, it is important to note that some patients may adapt over time, as suggested by Boullenois et al,[14] (2020) which may explain why long-term studies sometimes report minimal differences in global QoL.

CONCLUSION

The present study comparatively evaluated early postoperative quality of life outcomes between patients undergoing sphincter-preserving surgery (anterior resection/low anterior resection) and those undergoing abdominoperineal resection (APR) for colorectal cancer. The baseline demographic characteristics between the two groups were comparable, ensuring homogeneity of the study population.

Our findings demonstrate that patients without colostomy had significantly better physical, emotional, cognitive, role, and social functioning scores in the early postoperative period. Stoma formation was associated with significant impairment in body image, urinary symptoms, and sexual functioning in both males and females. Although global health status did not differ significantly between groups, specific functional domains were markedly affected in patients with permanent colostomy.

Symptom scales such as pain and nausea/vomiting did not show significant differences, suggesting that general postoperative symptom burden may be similar across surgical modalities. However, the psychosocial and functional consequences of stoma formation were evident in early follow-up.

In conclusion, sphincter-preserving surgery is associated with better early postoperative quality of life in multiple functional domains compared to abdominoperineal resection. Nevertheless, individualized surgical decision-making remains essential, taking into account tumor characteristics, oncological safety, patient preference, and expected functional outcomes.

Limitations of the study

1. The study had a relatively small sample size (n=42), which may limit the generalizability of the findings.
2. The follow-up period was limited to early postoperative assessment; long-term quality of life outcomes were not evaluated.
3. The study design was cross-sectional and observational, which does not establish causal relationships.
4. Preoperative baseline quality of life scores were not assessed; hence, comparison with postoperative changes could not be performed.
5. The impact of adjuvant therapies (chemotherapy/radiotherapy) on quality of life was not separately analyzed.
6. Psychological factors and socioeconomic variables that may influence quality of life were not evaluated in detail.
7. The study was conducted at a single tertiary care center, which may introduce institutional bias.

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