

The Comparison of Quality of Life of Patients after Abdominoperineal Resections and Sphincter Saving Operations. What to Expect?

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Abstract

Background: The aim of the review is to assess the quality of life of patients with rectal cancer who underwent different surgical approaches such as abdominoperineal resection of the rectum (APR) and sphincter saving operations SSO (low anterior resection - LAR, intersphincteric resection - ISR) based on modern literature data.

Methods: The studies considering functional outcomes after APR and SSO and published over the last decade were randomly reviewed.

Results: The social, emotional, physical and cognitive abilities are impacted equally by both methods. The rate of specific functional outcomes after APR or SSO can be different depending on the anatomical features, stage of the disease, localization of the tumor in the rectum. The rate of sexual impairment fluctuates and tends to worsen in the patients after APR in some studies whereas SSO is quite often followed by LARS which significantly impaired QOL in 20 - 75% of the patients. In addition, APR impacted body image which causes dissatisfaction in 15 - 80% of patients and can be worse when the cultural issues are considered. Radiation therapy and chemotherapy may exacerbate various functional problems such as urogenital and sexual impairments of the patients after both surgical approaches. In addition, the experience of cancer by patients may temporarily mitigate the perception of the functional consequences with the first year after treatment. The patients must be informed about the consequences of SSO such as LARS and about that than those who would have a permanent stoma after APR may be surprised later on that their preoperative anxieties over the colostomy would not be turned into reality after treatment.

Conclusion: The long-term QOL of the patients with permanent stoma is equivalent to those with preserving anus for low rectal cancer.

Keywords: Rectal Cancer; Abdominoperineal Resection; Sphincter Saving Operations; Functional Outcomes; Quality of Life

Abbreviations

CRC: Colorectal Cancer; APR: Abdominoperineal Resection; SSO: Sphincter Saving Operations; QOL: Quality Of Life; LARS: Low Anterior Resection Syndrome; CRA: Colorectal Anastomosis; CAA: Coloanal Anastomosis; LAR: Low Anterior Resection Of The Rectum; uLAR:

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Ultra-Low Anterior Resection Of The Rectum; NeoCRT: Neoadjuvant Chemoradiotherapy; ISR: Intersphincteric Resection Of The Rectum; MIS: Minimally Invasive Surgery; ELAPR: Extralevator Abdominoperineal Resection

Introduction

According to worldwide data sources, CRC is the third most common oncological disease. It is a burning issue especially in developed countries where about two-thirds of all colorectal cancer cases have occurred. The modern data also suggests that there are some differences in the rates of CRC among genders [1-3]. Introduction of cutting-edge technologies in daily surgical practice and diagnostic, improvements in radiation therapy and chemotherapy of rectal cancer patients make a breakthrough in the treatment of such complicated anatomical and functional site. Currently, the overall survival and disease-free survival rates have been grown markedly in comparison with previous decades and account for 50% of five-year survival even in stage IV disease [4-9]. At present different surgical approaches are used. All methods have a pursuit of the best oncological outcomes as the most important result of the treatment which is understandably so. However, it seems to be clearly seen from recent data that the modern surgical paradigm shifts towards sphincter-saving operations. It is likely explained by the purpose to make the quality of life of the patients better. So, which surgical approach whether it is APR with permanent stoma or sphincter preservation operation tackle better with this extremely important task is still controversial. In our review study, we try to find and discuss all the benefits and drawback of each surgical approaches and make a robust conclusion based on recent data.

Methods

The studies considering functional outcomes after APR and SSO and published over the last decade were randomly reviewed using PubMed e-resource.

Results

Functional outcome after surgical treatment of CRC

Functional outcomes after rectal cancer surgery are the burning issue for both the patients and the surgeons. There are several things that may influence the functional status of the rectal cancer patients before and after surgical treatment such as tumor itself, preoperative chemoradiotherapy and surgical approach. That is why to choose an appropriate treatment plan with a particular surgical method and performed it with high quality is critical. Currently, it is believed that minimally invasive approach has gained the superiority over open surgery with QOL. However, there are no randomized studies that proved the benefits of MIS in comparison with other surgical methods in terms of QOL. Moreover, there is no specific and definitive treatment strategies exist so far that can improve functional complications after rectal surgery [10].

Functional outcomes comprise of various impairments and symptoms. They depend on the surgical approach such as APR and SSO. These methods have the same oncological but almost different functional goals. As a result, the functional consequences of these methods are different as well. Considering various functional complications related to APR or SSO, for better understanding, all of them presented in table 1.

Controversies regarding surgical approach

It is obvious that to sum up data of all studies existed so far and devoted to the QOL after SSO and APR of the patients with low rectal cancer are appeared to be quite a painstaking process. Pulled data from some studies presented in table 2. Many controversial results were revealed due to several weaknesses in most studies such as the cross-sectional design, the possibility of response bias, the lack of

preoperative patient QOL data, determining clinical significance from statistical significance, the potential presence of a response shift and retrospective nature of the cohorts and lack of randomized studies. However, the conclusions that made at the end of each study were often similar. Each surgical approach whether it is APR or SSO has specific functional outcomes and the rate of them can be different depending on anatomical features, stage of the disease, localization of the tumor in the rectum. SSO is quite often followed by LARS which significantly impaired QOL in 20 - 75% of the patients. Whereas, APR impacted body image which causes dissatisfaction in 15 - 80% of patients. In addition, the dissatisfaction may be much worse when the cultural issues are considered. Moreover, the quality of operating performance in such a delicate area as pelvis surrounded by nerves and vessels may influence QOL outcomes after both methods.

SSO (LAR+ISR) Open/MIS		APR (APR+ELAPR) Open/MIS	
Specific for SSO		Common for both	Specific for APR
1. LARS: <ul style="list-style-type: none"> <input type="checkbox"/> Fecal incontinence <input type="checkbox"/> Frequent bowel movement <input type="checkbox"/> Urgency of stool <input type="checkbox"/> Bowel fragmentation <input type="checkbox"/> Rectal evacuatory dysfunction 		1. Sexual function: Male: <ul style="list-style-type: none"> <input type="checkbox"/> Erection problems <input type="checkbox"/> Ejaculation problems Female: <ul style="list-style-type: none"> <input type="checkbox"/> Vaginal dryness during intercourse <input type="checkbox"/> Dyspareunia 2. Urinary incontinent 3. Gastrointestinal symptoms <ul style="list-style-type: none"> <input type="checkbox"/> Nausea <input type="checkbox"/> Vomiting 4. Intrusive thoughts 5. Depression	1. Permanent stoma <ul style="list-style-type: none"> <input type="checkbox"/> Dissatisfaction with stoma function <input type="checkbox"/> Dissatisfaction with body image

Table 1: Common functional outcomes after SSO and APR.

Author	N	Surgical group (n)	Results C30	Results C38						Conclusion
			GQL	BI	SP M/W	UI	FI	IP	SP	
Trenti L., et al. [11]	358	APR 132	67	68	40.5/14	18.6	-	59	11.7	- Equal global QOL
		SSO 226	68	81	44/17	12.6	43.6 (15*)	57		- worse BI and urinary in APR - high LARS after SSO
Silvia M., et al. [12]	125	APR 42	75	86.1	33/68	-	-	100	-	- Equal global QOL
		SSO 83	75	89.9	33/68		33	66.7		- APR worse sexual function - SSO worse micturition

Honda M [18]	277	APR 47	71	27		23		25	-	- NeoCRT significant impact on QOL after SSO
	(SSO: LAR/ISR) (NeoACRT +/-)	SSO 231	69	26.5		21	23	43	-	- Sexual problems higher in SSO - Equal global QOL
Kasperek M., et al. [19]	168	APR 85	73	73	68/60	21	-	76	-	Equal QOL
		SSO 83	78	58	83/67	29		27		
Konanz J., et al. [21]	124	APR 50	59.2	62.4	81/44	34.3	-	81	-	- Equal global QOL
		LAR 41	65.9	75.3	55/42	28.2	9.5*	56		- APR worse male sex function
		ISR 33	58.1	72.7	53/33	30	12.9*	54		
Russell M., et al. [22]	987 (completed 1 year QOL protocol)	APR 372	89	70	60/50	28	-	30	-	- APR worse body image, male sexual enjoyment and mic-turition
		SSO 615	88	78	45/50	21		32		

Table 2: Overview of Studies Comparing QoL Between Patients After APR and SSO.

Trenti L., et al. compared answers from the questionnaires of 358 patients operated on for mid- to low rectal cancer with three different surgeries: APR, low mechanical CRA and hand-sewn CAA in a cross-sectional cohort survey study. According to the results, the body image perception was significantly better after CRA or CAA than after APR. Significantly higher LARS was observed in of the patients who underwent CAA 83.3% whereas in those who underwent CRA LARS was 56.6%. Neoadjuvant radiotherapy (p 0.048) and CAA (p = 0.005) were associated with a major LARS [11].

Silvia M., et al. compared the same methods on 125 patients. In this study global QOL scores did not differ between groups, patients who underwent definitive colostomy had significantly better functional and symptom scale scores, reflecting greater function with fewer symptoms than those who underwent SSO [12]. Another multicenter retrospective study provided by Digennaro R., et al. assessed QOL of patients who underwent APR or CAA for very low rectal cancer. Sixty patients with low rectal cancer within 4 cm above AV underwent APR (24 patients) or CAA (36 patients). General and disease-specific changes in QOL and severity of disease were evaluated by various EORTC and other questionnaires. The median Stoma-QOL was 58.2 indicating a good stoma function in 95% of patients. QOL did not differ significantly between the two groups. APR patients had worse sexual function (p = 0.01). More patients had urinary incontinence after CCA than after APR. LARS symptoms occurred in more than in a half of patients after CAA. In CCA group fecal incontinence was in 55% of patients, obstructive defecation was in 32% of patients and with severe impact on QOL in 36% of patients [13].

Unfortunately, there is a lack of studies provided a profound assessment of functional outcomes after APR. Although, some of them are not recent but showed interesting results. Thus, a prospective longitudinal evaluation of the quality of life after abdominoperineal resection was performed by Gervaz P., et al. from University Hospital Geneva, Switzerland. QOL of the patients was repeatedly assess 1, 6, and 12 months after treatment. EROTC-QLQ-C30 and QLQ-CR38 were used for the assessment of physical, social, emotional, cognitive QOL as well as functional symptoms such as body image, sexual and urological problems and stoma-related problems. Within 1-year follow-up patients reported significant improvement in global QOL, physical function (p = 0.001), in symptoms such as fatigue and pain (p = 0.01). However, there was no improvement in body image, sexual dysfunction and stoma-related problems (p = 0.34) [14]. Wang XT., et al. pro-

vided almost similar results. He found that such complications as voiding difficulty, sexual dysfunction, erectile dysfunction and ejaculatory dysfunction are much higher in the APR group than in the LAR group. These functional problems explained as a direct dependence on the accuracy of autonomic nerve preservation during the operation. Only 20.9% of patients in the APR group satisfied with the permanent stoma [15,16].

Honda M., *et al.* evaluate the adverse effects of Neo CRT in patients with rectal cancer after SSO compared with surgery alone and abdominoperineal resection (APR). SSO divided into two groups: Intersphincteric resection of the rectum (ISR) and ultra-low anterior resection of the rectum (ultra-LAR). All groups divided into subgroups depends on the presence or no NeoCRT. There were 278 patients participated in the study. ISR - 68 patients, uLAR - 163 and 47 - APR. NeoCRT - 117 patients and without Neo CRT - 161 patients, respectively. EORTC QOL questionnaires were used to assess QOL at least 2 years after treatment. In our opinion, this study is worth the attention because results reflect most of the other studies considering QOL after APR and SSO with CRT or without combine treatment. The results showed that the continence function of patients who received Neo RCT was significantly worse than that without Neo CRT. Eventually, the impact of Neo CRT on fecal incontinence was significantly greater in the patients who underwent ISR than in patients who underwent uLAR. The Wexner score might have been significantly worse in the patients who underwent uLAR than in the patients who underwent ISR. In fact, these results suggest that ISR and uLAR are significantly different procedures in terms of anal function after Neo CRT. General symptoms scale has no statistically significant differences in the QOL between all groups. Also, no differences were observed in function or symptom scores of the patients who underwent ISR with or without Neo CRT. In contrast, appetite loss was found to be significantly more severe in the patients who underwent uLAR without Neo CRT, and the abdominal and pelvic pain was significantly more severe in the patients who underwent uLAR with Neo CRT. Insomnia was significantly more severe in patients who underwent APR with Neo CRT. No other statistically significant differences were observed. Constipation, defecation problems, and anxiety were worse in the patients who underwent ISR with Neo CRT in comparison with APR group. Global health status, cognitive, physical, social, emotional status were quite good in APR and no-Neo CRT uLAR groups in comparison with others. Sexual problems were higher in SSO with NeoCRT than in APR group, respectively [18]. Also, the role of neoadjuvant and adjuvant treatment emphasized Saito., *et al.* It has been found that despite 70% of patients showing good continence (Wexner score ≤ 10) at > 5 years post-ISR, neoadjuvant chemoradiotherapy and male sex contributed to the poor postoperative functional outcomes [17,18].

However, the assertion that a colostomy has an adverse impact on the social, physical and mental condition of the patients due to its effect on the patient's body image and the problems associated with managing a colostomy based on obsolete data, when both the post-operative stoma care and the instruments to measure QOL were not as accurate as they are now [18,19]. Kasperek M., *et al.* from Mayo clinic tried to prove this misunderstanding in his retrospective study. There were three groups of patients with low lying rectal cancer underwent APR, LAR with CAA with intestinal continuity, and CAA patients without intestinal continuity. Patients in CAA groups were younger in comparison with APR group. Other parameters considering gender, stage, pelvic RT etc. were comparable. No significant differences were found in QOL outcomes of patients undergoing CAA or APR for distal rectal cancer. These results challenged the belief held by both surgeons and patients with distal rectal cancer that their QOL will be improved by avoiding a permanent stoma. Even the rate of body image dissatisfaction and sexual problems were almost similar between all groups. However, it is worth pointing out, that female sexual problems, defecations problems and weight loss were worse in LAR CAA group [19]. In the meta-analysis of 11 studies provided by Cornish., *et al.* included 1433 patients where 486 of them underwent APR, no differences in the general QOL of patients were found. The authors of another meta-analyses presented in the Kasperek's study sum up that it was not possible to make the conclusion that functional outcomes and QOL of patients with permanent stoma were worse than in patients without a stoma. Furthermore, they have also found that patients undergoing a low anastomosis have significantly worse bowel function compared to patients undergoing a high anastomosis when evaluating QOL outcomes of patients after rectal cancer surgery [19,20]. However, it was also found that male sexual functioning was significantly worse after APR than after SSO, but this may have been biased by the older age in the APR group in the study provided by Konanz], *et al.* [21].

In addition, some significant differences in QOL between two groups of 987 patients underwent APR or SSO with rectal cancer within 12 cm from AV were found in a randomized controlled trial provided by Russell M., *et al.* Scientists have also assessed the same parameters as in previous studies using EORTC-QLQ-C38 functional scales and FACT-C general well-being questions. They found that at one year, APR patients reported worse body image, male sexual enjoyment and micturition symptoms than did those who received SSS. However, after SSO patients reported worse symptoms in the GI tract and weight loss than APR patients at one year. There were no differences reported between the two surgical groups at one year for the functional scales of future perspective, male or female sexual function, and female sexual enjoyment [22].

As seen above from detailed analysis of some studies, both surgical approaches comprise common functional outcomes and their rate differ slightly from one study to another. The social, emotional, physical and cognitive abilities suffer from both methods almost equally. However, the rate of specific functional outcomes after APR or SSO can be different depends on anatomical features, stage of the disease, localization of the tumor in the rectum. The rate of sexual impairment fluctuates and tends to worsen in the patients after APR in some studies whereas SSO is quite often followed by LARS which significantly impaired QOL in 20 - 75% of the patients. In addition, APR impacted body image which causes dissatisfaction in 15 - 80% of patients. The dissatisfaction may be much worse when the cultural issues are considered.

Other functional problems such as urological, bowel movements, GI symptoms etc. appeared to be similar after both surgical approaches in many studies. Furthermore, additional treatment such as radiation therapy and chemotherapy may exacerbate various functional problems such as urogenital and sexual impairments of the patients after both surgical approaches. It is worth pointing out that all patients reassess their QOL by comparing their expectations with the experience of cancer which may temporarily mitigate functional consequences with the first year after surgical or combined treatment. It makes the assessment of QOL of the patients being inappropriate to some extent.

Conclusion

In conclusion, there is enough evidence to suggest that long-term QOL of the patients with permanent stoma is equivalent to those with preserving anus for low rectal cancer and that the choice of the type of surgery should consider not only the surgeon's preference but also with understanding and the consensus of the patient about the functional outcomes of both surgical approaches. Especially, patients must be informed about the consequences of SSO such as LARS. The patients should also be informed that those who would have a permanent stoma after APR may be surprised later on that their preoperative anxieties over the colostomy would not be materialized after surgery.

Conflict of Interest

The author has no potential conflicts of interest to declare. The author received no commercial support for this study.

Based on EORTC QLQ-C30 and EORTC QLQ-CR38 questionnaires developed by the QOL Study Group of the European Organization for Research and Treatment of Cancer. Values in the functional scales range from 0 (worst outcome) to 100 (best outcome); those in the symptom scales range from 0 (no symptoms) to 100 (most symptoms). APR- abdominoperineal resection, LAR low anterior resection, ISR intersphincteric resection, SSO - sphincter saving operation, Neo CRT- neoadjuvant chemoradiotherapy, QOL quality of life, GQL global quality of life scale, BI- body image, SP - sexual interest, UI - urinary incontinence, FI- faecal incontinence, IP - impotence, SP - stoma problems.

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