

Quality of Life in Colorectal Cancer

Stoma *vs.* Nonstoma Patients

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PURPOSE: The bowel and sexual function of colorectal cancer patients undergoing either sphincter-saving or sphincter-sacrificing surgical procedures may be impaired. A legitimate question is how these different surgical techniques affect the patients' quality of life. **METHODS:** Seventeen studies were identified that compared at least one of four aspects of patient functioning (*i.e.*, physical, psychologic, social, and sexual) between stoma patients and nonstoma patients. **RESULTS:** Although the literature does not yield entirely consistent findings, some long-term effects of surgery can be identified: 1) both patient groups are troubled by frequent or irregular bowel movements and diarrhea; 2) stoma patients report higher levels of psychologic distress than do nonstoma patients; 3) although both stoma patients and nonstoma patients report restrictions in their level of social functioning, such problems are more prevalent among patients with a colostomy; 4) sexual functioning of male and female stoma patients is consistently more impaired than that of male and female patients with intact sphincters. Results of the current review were compared with those of other, related areas. **CONCLUSIONS:** Although nonstoma patients generally fare better than do stoma patients, they also suffer from physical impairments induced by sphincter-saving procedures (*e.g.*, impaired bowel and sexual function). These impairments may become more prevalent as ultralow anastomosis is more frequently applied, resulting in bowel and sexual dysfunction and related psychologic distress. Well-designed studies are needed that examine whether quality-of-life benefits are to be gained by use of ultralow anastomosis compared with colostomy. [Key words: Colorectal cancer; Quality of life; Surgery; Stoma]

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Colorectal cancer is a major health problem in advanced societies. Recent data indicate that, in the United States, the average age-adjusted incidence rate of colorectal cancer for males is 46.5 and for females 33.2 per 100,000 inhabitants per year. Colorectal cancer has become the third and second most common cancer among men and women, respectively, in the United States.¹ These data are similar for

the majority of Western European countries, including the Netherlands.² Approximately one-half of these tumors are localized in the rectosigmoid region.

Patients with a tumor situated in the lower part of the rectum (*i.e.*, 0-5 cm from the anal verge) usually require an abdominoperineal resection, resulting in a permanent colostomy. Additionally, in men, it may destroy nerve fibers that are vital to the genital system. In women, the abdominoperineal resection conserves most of the nerve supply, allowing them, in principle, to maintain sexual function.³

A sphincter-preserving resection is feasible for patients with a tumor situated in the upper or middle part of the rectum (*i.e.*, above 5 cm from the anal verge). A variety of surgical techniques are available that preserve sphincter function. High and low anterior resections are the most common techniques for carcinoma involving the upper and lower colon, respectively. However, these procedures also necessitate dissections that may damage the pelvic nerves that are involved in sexual function. Furthermore, increased frequency of bowel movements and urgency with fecal leakage are not uncommon side effects.^{4,5}

Because sexual and bowel function of patients undergoing sphincter-saving rectal excisions may be impaired, it cannot be assumed that these patients will always fare better than patients in whom sphincter function has been sacrificed.⁵ Because mortality and morbidity rates are comparable across surgical techniques,⁶ a legitimate question is how these different surgical techniques affect the patient's quality of life.

It is generally accepted that quality of life is a multidimensional construct, incorporating minimally three broad domains, physical, psychologic, and social functioning.⁷⁻¹⁰ Beyond this core set of quality-of-life domains, sexual functioning is an issue that may be of relevance to colorectal cancer patients who are treated surgically. Additionally, there is consensus that patients should be the *primary* source of infor-

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mation regarding their quality of life.⁷⁻¹⁰ The question central to this review is what is the prevalence of self-reported physical, psychological, social, and sexual dysfunction among colorectal cancer patients whose sphincter function has been sacrificed (stoma patients) compared with those patients whose sphincter function has been conserved (nonstoma patients)?

METHODS

A series of literature searches was conducted on the MEDLINE database for the years 1969 to 1992 to identify studies that investigated the quality of life of colorectal cancer patients. The medical subject headings "quality of life" and its corollaries (*i.e.*, "well-being," "health status," and "mental health") were combined with "colon or rectal neoplasms." Additional searches were conducted *via* the reference lists of selected articles. Studies published in English, French, German, or Dutch were included in the search.

Empiric studies were selected for review in which 1) the quality of life of patients with a stoma was compared with that of patients whose sphincter function was left intact, 2) patients were the primary source of quality-of-life information, either by interviews or by completion of self-report questionnaires, and 3) at least one of the following quality-of-life dimensions was assessed: physical, psychological, social, or sexual functioning. Studies were excluded that did not provide frequencies of these functions for both patient groups (*i.e.*, stoma patients *vs.* nonstoma patients).

The search identified 17 studies that met these criteria.^{3-5, 11-24} All of these investigations made use of a cross-sectional study design. Whereas one study failed to report on the length of the follow-up period,²⁴ the remaining 16 investigations addressed the quality of life of patients who were minimally one year postsurgery. The time elapsed since surgery varied widely within these studies: between 1 and 10 years^{3-5, 12, 14-16, 20-22} or more than 10 years.^{11, 13, 17-19, 23} Consequently, the results of these studies pertain to long-term effects of surgery on quality of life, rather than to acute postsurgical problems.

Formal statistical testing was done by authors of individual articles. Significance of the difference between percentages was assessed by the chi-squared test.^{4, 5, 16-18} In two previously published studies no information was provided as to the derivation of the *P* values.^{11, 19}

In contrast to an earlier review on a subset of the current 17 studies,²⁵ the present article focuses on those studies that directly compare the quality of life of stoma and nonstoma patients. Additionally, issues that are particularly relevant to clinical practice will be emphasized in the present review.

RESULTS

Physical Functioning

The studies comparing general physical functioning and site-specific symptoms between patients requiring a stoma and patients with intact sphincters are summarized in Table 1. When asked for a general evaluation of their health, most stoma and nonstoma patients (range, 64 percent-76 percent) reported being in good health.¹⁹ Diarrhea may prevent patients from leaving their home and may, therefore, lead to isolation and a decreased quality of life. This problem can affect patients whose sphincter remains intact as well as those who defecate by a colostomy, as both patient groups have a risk of (minor) fecal leakage. Bowel function usually improves and stabilizes during the first year following surgery,⁴ although bowel problems may persist.²⁶ Both stoma and nonstoma patients report frequent bowel movements, however, with no clear differences between the two groups in this regard.^{4, 5}

Several other related problems have been studied: flatus or gas, urinary problems, and disturbed sleep caused by urgency, leakage, or gas. Both stoma patients and nonstoma patients suffer from these problems, although not to the same degree. Stoma patients report more problems with gas and urinary function, whereas patients with intact sphincters report more constipation.^{5, 18, 23, 24} No consistent differences between these patient groups have been found in the use of bowel-stabilizing drugs.^{4, 5} There is some evidence that stoma patients are more restricted in their diet than nonstoma patients,^{5, 14} although Frigell *et al.*⁴ could not substantiate this finding.

Psychologic Functioning

The operational definition of psychologic functioning varied widely across studies (Table 2). With the exception of one study,⁵ all investigations used unstandardized measures of psychologic functioning with unknown reliability and validity.

Psychologic dysfunction pertaining to depression, loneliness, suicidal thoughts, feelings of stigma, and

Table 1.
Prevalence of Physical Dysfunction Among Colorectal Cancer Patients with a Stoma (Stoma Patients) and Among Colorectal Cancer Patients with Intact Sphincters (Nonstoma Patients)

Dimension	Study	Stoma Patients		Nonstoma Patients	
		Sample No.	%	Sample No.	%
General state of health					
Good	19	114	72-76	110	64-73*
Bowel movements					
>3 per day	5	38	55	40	35
<3 per day	4	29	62	31	23†
Bowel problems					
Flatus/gas	18	265	49	155	37†
	5	38	50	40	15†
Diarrhea	18	265	17	155	10
Constipation	18	265	13	155	23†
Use of bowel-stabilizing drugs	4	30	13	36	44†
	5	38	60	40	30†
Urinary problems	18	265	24	155	12†
	23	93	31	17	0*
	24	61	20	160	14*
Disturbed sleep because of urgency, leakage, or gas	4	29	28	36	31
Diet					
Normal	14	83	47	38	74*
Change	4	30	23	36	26
3-5 restrictions	5	38	42	40	15†
Stoma-related problems					
Odor problems	5	38	63	40	20†

* Not tested statistically.

† Statistically significant (*i.e.*, $P < 0.05$).

All percentages refer to patients' current functioning, *i.e.*, at least one year postsurgery. Data based on long-term recall of presurgical and immediate postsurgical functioning are not reported because of questionable reliability of such retrospective reporting. Change refers to the perceived difference in quality of life between presurgical and current levels of functioning.

Sample sizes can vary within studies because of missing or not applicable data.

low self-esteem were, despite a high degree of overlap, significantly more prevalent in stoma patients (range, 10 percent-54 percent) than in nonstoma patients (range, 3 percent-43 percent).^{5, 17, 19} The prevalence of closely related problems such as anxiety, feelings of discomfort, and hopelessness was also higher in stoma patients, although not significantly so.^{4, 18, 19} Distress related specifically to bowel surgery (*e.g.*, concern with appearance and change in body image) was most prominent among stoma patients.^{5, 17}

In general, the psychologic functioning of younger, female patients is more impaired than that of older male patients. For example, MacDonald and Anderson¹⁷ found that feelings of stigma were most prominent in younger stoma patients and that the stigma of changed appearance was most strongly felt by

women. Additionally, initial depression is highest among young and female stoma patients.¹⁷

Social Functioning

The operational definition of social functioning was diverse, covering such issues as work, frequency of social contacts, quality of relationships, and limitations in social activities because of illness or treatment (Table 3). All investigations used unstandardized, study-specific questionnaires.

In three studies, 20 percent to 72 percent of stoma patients had resumed their work, compared with 79 percent to 93 percent of nonstoma patients.^{4, 5, 13} This difference may be partly explained by age differences (*i.e.*, stoma patients tend to be older).^{4, 5}

The bond with the partner was impaired in 25

Table 2.
Prevalence of Psychologic Dysfunction Among Colorectal Cancer Patients with a Stoma (Stoma Patients) and Among Colorectal Cancer Patients with Intact Sphincters (Nonstoma Patients)

Dimension	Study	Stoma Patients		Nonstoma Patients	
		Sample No.	%	Sample No.	%
Generalized forms of distress					
Depression	18	265	26	155	24
	19	214	22-50	110	7-43*
	5	38	32	40	10*
Anxiety	18	265	28	155	23
Feelings of discomfort	4	29	21	36	19
Psychologic disturbance	14	83	23	38	3†
Hopelessness	19	214	28-39	110	25-28
Loneliness	19	214	27	110	12*
Suicidal thoughts	19	214	10	110	3-4*
Feelings of stigma	17	265	26-54	155	13-41*
Low self-esteem	17	265	43	155	27*
Specific forms of distress					
Feeling of unpleasant odor	4	30	37	36	19
Concern for appearance	17	265	20	155	9*
Change in body image	5	38	66	40	5*

* Statistically significant (*i.e.*, $P < 0.05$).

† Not tested statistically.

All percentages refer to patients' current functioning, *i.e.*, at least one year postsurgery. Data based on long-term recall of presurgical and immediate postsurgical functioning are not reported because of questionable reliability of such retrospective reporting. Change refers to the perceived difference in quality of life between presurgical and current levels of functioning.

Sample sizes can vary within studies because of missing or not applicable data.

percent to 29 percent of stoma patients and in 14 percent to 20 percent of nonstoma patients.^{16, 17} In one of these studies, stoma patients reported significantly more marital problems than nonstoma patients.¹⁷ Few patients reported a decrease in the frequency of their contacts with relatives and friends (range, 11 percent-29 percent).^{4, 18, 19}

Both stoma patients and nonstoma patients reported restrictions in their level of social activities (range, 8 percent-63 percent). Stoma patients are more confined in social activities, such as visiting cinemas¹⁹ and leisure pursuits,⁵ and they report loss of interest in social activities to a greater extent than nonstoma patients.¹⁸

In general, the findings from these studies support the hypothesis of MacDonald and Anderson,¹⁸ that having a colostomy is associated with reduced interest and participation in outside activities, although in-house activities, such as contacts with friends and relatives, are less affected. Moreover, anecdotal information from these investigations suggests that restriction in outside activities is primarily related to fear of being a nuisance to others (*e.g.*, because of offensive

smells) or to general embarrassment at having a stoma.^{5, 19}

Sexual Functioning

Relative to other aspects of quality of life, sexual dysfunction among male colorectal cancer patients has received much attention (Table 4). The overall prevalence of sexual dysfunction (range, 66 percent-100 percent) is consistently higher in stoma patients than in patients whose sphincters have been left intact (range, 30 percent-75 percent).^{5, 13, 20, 22} The principal sexual problems assessed pertain to erectile function and ejaculation. There is a wide variation in the reported prevalences of such problems across studies. For example, the frequency of complete impotence in men with colostomies ranges from 18 percent²³ to as high as 100 percent.³ Despite a high degree of overlap in the prevalence of impotence and other sexual problems (*e.g.*, erectile dysfunction, ejaculatory impotence) between stoma and nonstoma patients, the prevalence is consistently lower among the latter group.^{11, 12, 15, 16, 20, 22, 24}

Table 3.
Prevalence of Social Dysfunction Among Colorectal Cancer Patients with a Stoma (Stoma Patients) and Among Colorectal Cancer Patients with Intact Sphincters (Nonstoma Patients)

Dimension	Study	Stoma Patients		Nonstoma Patients	
		Sample No.	%	Sample No.	%
Work					
Return to work	13	*	20	*	79†
	4	7	72	15	93
	5	15	40	18	83‡
Decreased working activity	16	20	45	40	35-50
Relationships					
Worsening partner relationship	16	20	25	40	15-20
	17	265	29	155	14‡
Contacts					
Visiting friends less	19	114	27	110	17‡
	18	265	27	155	29
Receiving visitors less	19	114	12	110	11
Sees relatives less than once per month	18	265	17	110	24
Decreased contact with relatives/friends	4	29	17	37	19
Specific social activities					
Visiting cinema less	19	114	61	110	42‡
Visiting restaurants less	19	114	40	110	42
Decrease in leisure pursuits	5	38	50	40	18‡
Change in spare time activities	4	28	25	36	14
Avoidance of traveling	4	27	33-48	36	14-36
General social activities and interest					
Less participation in activities	18	265	63	155	49‡
Leaves house less than once per week	18	265	18	155	8‡
Loss of interest in social activities	18	265	43	155	31‡

* Not reported.

† Not tested statistically.

‡ Statistically significant (*i.e.*, $P < 0.05$).

All percentages refer to patients' current functioning, *i.e.*, at least one year postsurgery. Data based on long-term recall of presurgical and immediate postsurgical functioning are not reported because of questionable reliability of such retrospective reporting. Change refers to the perceived difference in quality of life between presurgical and current levels of functioning.

Sample sizes can vary within studies because of missing or not applicable data.

In five of six studies reporting on sexual activity, stoma patients were less sexually active than nonstoma patients.^{5, 15, 16, 19, 20} In the one study that tested these differences formally, they reached statistical significance.¹⁶ Only two studies have addressed the subjective sexual experience of male patients. In one investigation, sexual desire and pleasure decreased significantly from presurgery to postsurgery in stoma and nonstoma patients, with a more pronounced reduction in the former group.¹⁶ In another study, a comparable percentage of stoma and nonstoma patients reported loss of their sexual desire after surgery (22 percent and 24 percent, respectively).²⁰

In contrast to the 13 studies that assessed sexual dysfunction in males, which included approximately 750 patients for the 13 samples combined, only three

investigations involved females (including 120 patients in total) (Table 4). Percentages of sexual dysfunction (*i.e.*, dyspareunia and diminished orgasm) and of reduced sexual activity were higher among female stoma patients, although formal statistical comparisons were not performed.^{14, 19, 24}

Age may play an important role in the impairment of sexual function after rectal surgery.^{15, 18} Most colorectal cancer patients are relatively old (60-70 years) at the time of surgery. Consequently, their sexual capacity and interest may already have been declining. In the study of Weinstein and Roberts,³ in which the highest prevalence of complete impotence (100 percent) was reported, the mean age was 67 years, whereas the mean age was lower (55 years) in the study of Balslev and Harling,²³ which reported the

Table 4.
Prevalence of Sexual Dysfunction Among Colorectal Cancer Patients with a Stoma (Stoma Patients) and Among Colorectal Cancer Patients with Intact Sphincters (Nonstoma Patients)

Dimension	Study	Stoma Patients		Nonstoma Patients	
		Sample No.	%	Sample No.	%
MEN					
Dysfunction					
Overall incidence of sexual dysfunction	13	*	88	*	33-75†
	5	18	67	20	30‡
	20	9	100	17	59†
	22	9	66	16	50†
Complete impotence	14	55	53	15	13†
	3	12	100	10	80†
	5	17	47	20	0†
	21	25	64	40	45†
	22	9	44	16	25†
	23	93	18	17	0†
Incapable of erection and ejaculation	12	31	52	30	23†
	20	9	56	17	24†
Total erectile impotence	11	81	28	14	14
	15	20	45	40	5-25†
	16	20	50	40	5-20‡
	24	30	60	31	39†
Ejaculatory impotence	11	81	60	14	50
	15	20	50	40	5-20†
	16	20	70	40	25-40‡
	22	9	67	16	50†
Incapable of orgasm	11	81	36	14	14
	20	9	78	17	29†
Incapable of penetration	15	20	60	40	5-30†
	16	20	55	40	10‡
Activity					
Diminished activity	14	55	27	15	27†
Cessation of activity	15	20	60	40	5-20†
	5	17	71	20	45†
	20	9	78	17	29†
Less frequent/cessation of intercourse	19	48	75	28	38†
	16	20	60	40	5-25‡
Desire					
Loss of desire	20	9	22	17	24†
WOMEN					
Dyspareunia	24	15	65	26	24-44†
Diminished orgasm	24	15	70	26	44-65†
Less frequent/cessation of intercourse	19	29	62	29	38†
	14	12	50	9	33†

* Not reported.

† Not tested statistically.

‡ Statistically significant (*i.e.*, $P < 0.05$).

All percentages refer to patients' current functioning, *i.e.*, at least one year postsurgery. Data based on long-term recall of presurgical and immediate postsurgical functioning are not reported because of questionable reliability of such retrospective reporting. Change refers to the perceived difference in quality of life between presurgical and current levels of functioning.

Sample sizes can vary within studies because of missing or not applicable data.

Koukouras *et al.*¹⁵ did not statistically test group differences (*i.e.*, stoma vs. nonstoma patients) for each dysfunction. However, the sum of all dysfunctions was significantly higher among stoma patients than among nonstoma patients.

lowest prevalence of complete impotence (18 percent). When stratification procedures have been used to control for age, sexual functioning is still most severely impaired in stoma patients.¹⁵

Other factors that may affect sexual functioning include tumor size and location, extent of tumor spread at time of surgery, the patient's general physical condition, emotional reaction to the mutilating effects of surgery, and presence of a permanent stoma.²⁷ These factors may account, in part, for the wide variability in the reported prevalence of sexual dysfunction.

SUMMARY

Studies that have assessed the quality of life of colorectal cancer patients are characterized by a high degree of heterogeneity with respect to patient samples (*e.g.*, patients with different disease stages who had undergone a variety of surgical procedures) and the quality-of-life domains. Additionally, most studies have been characterized by the use of small samples and/or unstandardized, study-specific instruments, whereas all studies made use of cross-sectional rather than prospective designs. Moreover, the time elapsed since surgery varied widely and, with only one exception,¹⁸ was never controlled for statistically.

Despite the heterogeneity in study procedures, the methodologic shortcomings, and the need for additional confirmation of these findings, some relatively consistent findings regarding long-term effects of surgery emerge from this review. 1) A sizable percentage of both stoma patients and patients with intact sphincters report limitations in all four areas of quality of life (*i.e.*, physical, psychologic, social, and sexual function), although not necessarily to the same extent. 2) Although both patient groups often report their general health state to be reasonably good, both groups are troubled by frequent or irregular bowel movements and diarrhea. In comparison with patients with intact sphincters, patients with a stoma suffer more from flatus or gas and urinary problems, whereas the former group suffers more from constipation. 3) Stoma patients report higher levels of generalized forms of distress and a more negative body image than do nonstoma patients. These problems tend to be more common among younger patients and among women. 4) Colorectal cancer and its treatment clearly can have an adverse effect on social functioning, including work and productive life, relationships with friends, relatives, and partners, and other social

activities and interests. Although both stoma patients and nonstoma patients report restrictions in their level of social functioning, such problems are more prevalent among the former group. Because stoma patients tend to be older, these differences may be partly explained by age effects. 5) The sexual functioning of male stoma patients (*e.g.*, erectile or ejaculatory functioning, sexual activity) is consistently more impaired than that of patients with intact sphincters. Such impairments increase with age. 6) Sexual dysfunction (*e.g.*, dyspareunia, cessation of intercourse) is more prevalent among female stoma patients than among female nonstoma patients.

DISCUSSION

Relatively few studies have compared physical, psychosocial, and sexual functioning of stoma with nonstoma patients with colorectal cancer. Because these patients are faced with comparable surgical interventions as those of inflammatory bowel disease patients (*e.g.*, ulcerative colitis), it is instructive to compare the quality of life between these malignant and benign disease patient groups. The few studies that have directly compared the quality of life of colorectal cancer and inflammatory bowel disease patients indicate that the level of sexual functioning and activity is most severely impaired in colorectal cancer patients,^{12, 23, 28-30} whereas conflicting results have been reported with respect to psychologic distress.²⁹⁻³¹ However, it should be kept in mind that such direct comparisons may not be entirely appropriate. For example, surgery for a malignant disease necessitates wider resections and as a consequence may damage nerves and tissue to a greater extent than surgery for benign disease. Moreover, the purpose of surgical interventions differ. In inflammatory bowel disease, surgery is carried out to resolve an incapacitating or acute disease and is thus frequently perceived as a relief. Conversely, in cancer, surgery is frequently aimed at removal of a malignancy in a previously symptom-free person and may not be perceived as an alleviation of complaints and symptoms. Because colorectal cancer patients are also generally older, the physical condition after surgery among benign disease patients will, in general, improve more rapidly than among colorectal cancer patients.

The major finding of this review is that *both* groups of colorectal cancer patients, those with and those without a stoma, report limitations in all four domains of quality of life (*i.e.*, physical, psychologic, social,

and sexual), although stoma patients generally report more impairments. It has been widely assumed that patients who undergo mutilating and disfiguring surgery have a worse quality of life compared with patients who receive sparing procedures. However, this assumption is not entirely supported by the current review and by empiric data from related areas. For example, in extremity sarcomas one would intuitively assume that patients whose limbs have been amputated would have a poorer quality of life than patients whose limbs have been spared. However, retrospective studies that examined the psychologic outcome of extremity survivors who either were treated by amputation or by limb salvage failed to find significant differences between treatment groups.^{32, 33} Moreover, results of a randomized trial in soft-tissue sarcoma indicated that, contrary to expectation, amputees exhibited better emotional adjustment and fewer sexual problems than did the limb-spared patients.³⁴ Additionally, more than 12 studies have compared the psychosocial outcome of breast-conserving surgery with that of mastectomy in breast cancer patients. Contrary to expectation, no differences have been found between these patient groups with respect to psychologic distress (*i.e.*, depression and anxiety) and fear of recurrence. The only area in which breast conserving surgery has consistently been found to yield advantages over mastectomy has been in preserving a woman's body image and sense of self.³⁵ The current review and empiric findings of these related areas indicate that surgical procedures preserving body parts such as a sphincter, a limb, or a breast do not convey automatically a good quality of life or "normal" physical, psychosocial, and sexual functioning.

As the population curve shifts toward increasing age and surgical techniques advance, the number of colorectal cancer patients undergoing sphincter-saving surgery will increase. Impairments resulting from such surgery (*i.e.*, impaired bowel function and sexual and psychosocial dysfunction) may become even more prevalent as use of ultralow anastomosis (up to 2.5 cm from the anal verge) increases. Such procedures have been shown to be associated with problems with bowel frequency, urgency of defecation, and fecal leakage.^{26, 36} Additionally, very low anterior resections may result in rates of impotence, comparable with those after abdominoperineal resection.²²

Consequently, well-designed studies are needed that examine whether quality-of-life benefits are to be gained by use of ultralow anastomosis compared with

colostomy. These future studies should preferably use prospective study designs, large sample sizes, and standardized quality-of-life measures. A number of such measures that are specifically designed for evaluation of cancer therapies are currently available, including the Cancer Rehabilitation Evaluation System,³⁷ the Functional Assessment of Cancer Therapy,³⁸ and the European Organization for Research and Treatment of Cancer Core Quality of Life Questionnaire.³⁹ The reliability and validity of these measures are well documented.

The current review provides information regarding adverse effects of sphincter-saving and sphincter-sacrificing surgery on patients' quality of life. In clinical practice, it is important that physicians inform all patients about these potential effects, with special attention devoted to those patients who are particularly vulnerable to the adverse sequelae of surgery. For example, risks of bowel and sexual dysfunction should be discussed extensively with older men, while young, female patients need to be fully informed about potential psychologic problems, such as changed body image. Such information, in addition to clinical data, will enable clinicians and their patients to make an informed decision regarding choice of treatment. Moreover, as patients' expectations about postsurgical functioning become more realistic, they will be in a better position to cope with the debilitating consequences of their treatment.

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