



# Quality of Life Outcomes Following Organ-Preserving Treatment in Rectal Cancer

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## Abstract

*Organ-preserving strategies for rectal cancer -- watch-and-wait surveillance after a clinical complete response to neoadjuvant therapy, and local excision of near-complete-response tumors -- now rest on a substantial base of registry and randomized-trial evidence supporting their oncologic safety in appropriately selected patients. Less consolidated is the quality-of-life (QoL) case for these strategies specifically: whether avoiding radical resection actually translates into better patient-reported bowel, urinary, sexual, and global function, and by how much. This short communication synthesizes that evidence using validated instruments -- the EORTC QLQ-CR29 module and the Low Anterior Resection Syndrome (LARS) score in particular -- across matched-cohort and long-term follow-up studies comparing organ preservation with standard total mesorectal excision. The bowel-function advantage for organ preservation is the most consistent and quantitatively largest finding, with major LARS symptoms reported by roughly one-third of watch-and-wait patients versus two-thirds of matched surgical patients in the best available matched comparison, alongside better global health status and body image. Evidence for sexual, urinary, and psychological outcomes specific to the organ-preservation comparison remains comparatively thin. We conclude that standardized, longitudinal, patient-reported outcome collection, as recently called for by international consensus, is needed to convert a directionally favorable but methodologically uneven QoL picture into evidence solid enough to fully inform shared decision-making.*

**Keywords:** organ preservation; rectal cancer; quality of life; watch-and-wait; low anterior resection syndrome

## 1. Introduction

Rectal cancer treatment has, for most of the past four decades, been organized around a single non-negotiable step: removal of the mesorectum, either with sphincter preservation via low anterior resection or, for the lowest tumors, with a permanent colostomy via abdominoperineal resection. Total mesorectal excision (TME) remains the oncologic gold standard and has driven local recurrence rates down substantially since its introduction, but it does so at a real functional cost -- bowel, urinary, and sexual dysfunction that patients live with for the rest of their lives, and, for a meaningful subset, a stoma. Over the past two decades a parallel literature has accumulated around organ-preserving strategies -- watch-and-wait surveillance after a clinical complete response to neoadjuvant therapy, and local excision of residual or near-complete-response tumors -- that avoid radical resection altogether for carefully selected patients [1]. The oncologic safety of this approach, at least for patients achieving a true clinical complete response and enrolled in surveillance programs with structured follow-up, is now supported by large multicentre registries and randomized trials [2,3,4].

What has received comparatively less synthesis, even as the oncologic case for organ preservation has solidified, is the quality-of-life (QoL) evidence specifically -- not simply whether patients who avoid surgery survive as well as those who do not, but whether they actually feel and function better, and by how much, across the domains that matter to a person living with a rectum that was nearly, but not quite, removed. This short communication summarizes that evidence: what validated instruments show about bowel, urinary, sexual, and global QoL outcomes after organ-preserving treatment for rectal cancer, how those outcomes compare with standard TME, and where the comparative evidence base remains thin.

## 2. Rationale and Trial Evidence for Organ Preservation

The nonoperative management concept traces to Habr-Gama and colleagues' early Brazilian cohort, who observed that a subset of patients achieving a complete clinical response to neoadjuvant chemoradiotherapy could be surveilled rather than operated on without an apparent survival penalty, reporting comparable 5-year overall and disease-free survival between operative and

nonoperative groups in their long-term series [1]. That single-institution observation has since been tested at much larger scale. The International Watch & Wait Database (IWWD), a retrospective multicentre registry pooling clinical complete responders managed nonoperatively across dozens of centres, reported 5-year overall survival above 90% and local regrowth in roughly a quarter of patients, the great majority of whom were successfully salvaged with surgery when regrowth was detected early [2]. The OnCoRe project, a propensity-score-matched comparison of watch-and-wait against surgical resection run out of Manchester, similarly found no significant difference in 3-year overall or disease-specific survival between the two strategies, while roughly a third of the watch-and-wait cohort avoided major resection entirely [3].

Prospective randomized evidence has followed. The OPRA trial randomized patients with locally advanced rectal cancer to induction or consolidation total neoadjuvant therapy (TNT) followed by selective, response-adapted watch-and-wait, and reported that roughly half of patients achieved sustained organ preservation at 3 years, with disease-free survival statistically indistinguishable from a matched TME comparison [4]. Long-term follow-up of the same cohort has since confirmed that organ preservation achieved by 2 years after starting treatment tends to be durable, with a comparatively low rate of late regrowth beyond that window [5]. The German CAO/ARO/AIO-16 trial applied a comparable TNT-plus-organ-preservation protocol prospectively in a single-arm phase 2 design and reported organ preservation in a majority of clinical complete or near-complete responders at short-term follow-up [6]. For tumors amenable to local excision rather than pure surveillance, the French GRECCAR 2 trial randomized patients with a good clinical response to neoadjuvant chemoradiotherapy to local excision versus TME and found no significant difference in a composite morbidity/mortality/local-recurrence endpoint, while a meaningful fraction of the local-excision arm avoided a major resection [7], and the American ACOSOG Z6041 single-arm phase 2 trial demonstrated that neoadjuvant chemoradiotherapy followed by local excision was feasible for select cT2N0 distal tumors, at the cost of a non-trivial local recurrence rate in patients with residual disease in the excision specimen [8]. Taken together, this body of trial and

registry evidence establishes organ preservation as an oncologically defensible strategy for a defined subgroup of rectal cancer patients -- which is precisely what makes the QoL question consequential rather than academic: if oncologic outcomes are comparable, the functional and quality-of-life comparison becomes the deciding factor for many patients choosing between strategies.

### 3. Measuring Quality of Life After Rectal Cancer Treatment

Comparing QoL across organ-preserving and radical-surgery cohorts depends on having instruments that actually capture the domains that differ between them, and the field has converged on a small set of validated tools. The EORTC QLQ-CR29, a colorectal-cancer-specific module developed to supplement the generic QLQ-C30 core questionnaire, captures bowel, urinary, and sexual function items alongside body image and stoma-related concerns, and its psychometric validation established it as the standard disease-specific instrument for this population [9]. For bowel function specifically -- the domain most directly affected by sphincter-preserving resection -- the Low Anterior Resection Syndrome (LARS) score, developed and validated by Emmertsen and Laurberg, provides a short, patient-reported symptom scale that classifies patients into no, minor, or major LARS categories based on incontinence, urgency, clustering of bowel movements, and frequency [10]. Applied at population scale in a Danish cross-sectional cohort, the LARS score demonstrated that major bowel dysfunction after low anterior resection is common -- reported in roughly 40% of resected patients in that cohort -- and is more frequent among patients who received neoadjuvant radiotherapy than those who did not, directly implicating pelvic irradiation, not just the resection itself, as a driver of long-term bowel dysfunction [11]. That last point matters for the organ-preservation comparison, because most organ-preserving protocols also involve pelvic (chemo)radiotherapy -- the QoL question is not simply "surgery versus no surgery" but "surgery plus radiotherapy versus radiotherapy alone," and any interpretation of comparative QoL data needs to keep that distinction in view rather than attributing every functional difference to the presence or absence of the operation.

Sexual and urinary function deserve equal weight in this comparison and are frequently under-reported relative

to bowel outcomes. A systematic synthesis of sexual dysfunction after rectal cancer surgery documents high rates of erectile and ejaculatory dysfunction in men and dyspareunia and reduced sexual interest in women following pelvic dissection, driven by autonomic nerve injury during TME regardless of whether sphincter preservation is achieved [12]. Because organ-preserving strategies avoid the pelvic dissection step altogether, they plausibly spare much of this nerve-related morbidity, though direct head-to-head sexual-function data remain sparser than bowel-function data in the organ-preservation literature specifically.

**Table 1: Validated instruments used to assess quality of life and functional outcomes after organ-preserving versus radical treatment for rectal cancer, with the domain each instrument targets. [9,10,11,17].**

| Instrument                                         | Source                      | Primary Domain                                                                                      | Relevance to Organ Preservation                                                       |
|----------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| EORTC QLQ-CR29                                     | Whistance et al. [9]        | Colorectal-cancer-specific health-related QoL (bowel, urinary, sexual, body image, stoma)           | Standard disease-specific companion to the QLQ-C30 core module in comparative cohorts |
| LARS score                                         | Emmertsen and Laurberg [10] | Bowel dysfunction after sphincter-preserving surgery (incontinence, urgency, clustering, frequency) | Primary tool for quantifying the bowel-function gap between watch-and-wait and TME    |
| Population-based LARS cross-sectional survey       | Bregendahl et al. [11]      | Population prevalence of major LARS and association with neoadjuvant radiotherapy                   | Separates the contribution of pelvic radiotherapy from that of resection itself       |
| Stoma versus sphincter-preservation QoL comparison | Feddersen et al. [17]       | Global QoL with permanent stoma versus intact but often dysfunctional bowel continuity              | Cautions against assuming sphincter/organ preservation dominates on every QoL axis    |

Local excision occupies an intermediate position on this instrument map, because it removes the tumor -- avoiding pure surveillance -- without the pelvic dissection that drives much of TME's autonomic-nerve morbidity. Doornebosch and colleagues' comparison of transanal endoscopic microsurgery (TEM) against TME for early rectal cancer, using generic and disease-specific QoL instruments, found that TEM patients reported better physical functioning and less interference from bowel symptoms with daily activities than TME patients, consistent with the broader pattern that the amount of pelvic tissue disturbed, not merely whether the sphincter is technically preserved, tracks closely with the

degree of functional impairment reported [13].

#### 4. Comparative Quality-of-Life Findings

The most direct evidence comes from matched-cohort comparisons of watch-and-wait against standard resection using these validated instruments. Hupkens and colleagues' matched-controlled study compared patients managed by watch-and-wait after a clinical complete response with a matched cohort who underwent standard TME after chemoradiotherapy, and found that the watch-and-wait group reported better physical and cognitive function, better physical and emotional role function, and better global health status than the resected comparison group, alongside fewer problems with defecation, sexual function, and urinary function [14]. The bowel-function difference was the single largest and most clinically striking finding: major low anterior resection syndrome symptoms were reported by roughly one-third of the watch-and-wait patients, compared with 66.7% of the patients in the TME comparison group -- a roughly two-fold difference in the proportion of patients living with major bowel dysfunction, concentrated in exactly the domain the LARS score was purpose-built to capture [14,10]. Long-term follow-up of watch-and-wait cohorts using the same instrument battery has extended this picture: Custers and colleagues' long-term QoL and functional-outcome study of patients managed by watch-and-wait found that bowel function and global QoL scores in this population were largely comparable to or better than population norms and to resected comparators over extended follow-up, without progressive deterioration over time, which is a reassuring finding given that any late functional decline specific to organ preservation would substantially weaken the case for the strategy [15].

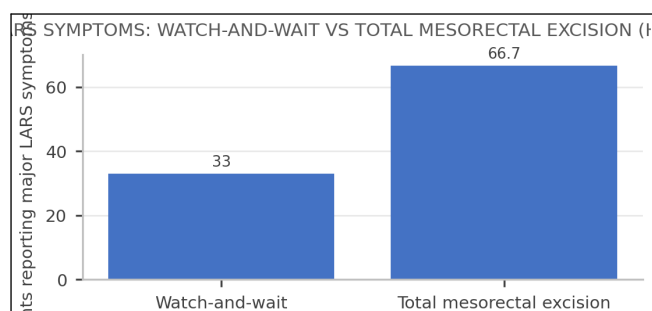


**Figure 1:** Proportion of patients reporting major low anterior resection syndrome (LARS) symptoms in Hupkens et al.'s matched-controlled comparison of watch-and-wait versus standard total mesorectal excision (TME) after chemoradiotherapy for rectal cancer -- the largest single functional difference identified between the two strategies [14].

The comparator side of this literature -- what QoL actually looks like after standard TME -- is anchored by long-running trial cohorts. The Dutch TME trial's longitudinal QoL follow-up tracked health-related quality of life and symptom burden for years after treatment and documented persistent bowel dysfunction, urinary symptoms, and reduced global QoL relative to baseline that, for several domains, did not fully normalize even years after surgery, particularly among patients who received preoperative radiotherapy in addition to surgery [16]. A separate comparison specifically contrasting sphincter-preserving resection against permanent stoma found that, contrary to a common clinical assumption, patients with a permanent stoma did not consistently report worse global QoL than those with sphincter preservation and intact but often dysfunctional bowel continuity -- a finding that complicates any simple narrative in which sphincter preservation is unambiguously the better functional outcome, and by extension complicates any simple narrative in which organ preservation (which by definition preserves both the sphincter and avoids a stoma) is assumed to dominate on every QoL axis without direct comparative data [17]. This nuance is a useful corrective: the QoL case for organ preservation rests most solidly on bowel function and, to a lesser extent, global health status and body image, and is considerably less settled for domains such as psychological distress related to ongoing surveillance anxiety, which several of the studies above note but few quantify with the same rigor applied to bowel and sexual function.

#### The Psychological Burden of Surveillance

None of the gains described above are free of cost, and the cost that is hardest to capture on a standardized questionnaire is the psychological weight of surveillance itself. A qualitative study of patients undergoing non-operative management after neoadjuvant therapy found that, alongside genuine relief at avoiding a stoma or altered bowel function, patients consistently described anxiety tied to the intensive surveillance schedule -- frequent digital rectal examinations, endoscopy, and imaging -- and to the persistent, low-grade uncertainty of not knowing whether a regrowth would be detected in time [18]. This is a genuinely distinct axis from the bowel-, sexual-, and urinary-function domains the LARS score and EORTC QLQ-CR29 were built to measure, and it is not obviously

captured by either instrument as currently administered. A full accounting of organ-preservation QoL therefore has to hold two findings side by side without letting one erase the other: physical function is, on the available comparative evidence, meaningfully better after watch-and-wait than after TME, while the psychological experience of living under active surveillance carries its own burden that patients report directly but that the field has only recently begun to measure with the same rigor.

## 5. Open Questions and Reporting Standards

Several limitations recur across this literature and are worth stating plainly rather than glossing over. First, most comparative QoL studies, including the best available matched-cohort work, are observational rather than randomized with respect to treatment strategy -- patients are not randomized to watch-and-wait versus TME, they are selected into watch-and-wait based on achieving a complete clinical response, which is itself correlated with tumor biology and treatment response in ways that could independently affect QoL, so residual confounding cannot be fully excluded even with propensity matching [14,3]. Second, follow-up duration varies substantially across studies, and the field lacks long-run (10-year-plus) prospective QoL data for organ-preserving cohorts comparable to what exists for the Dutch TME trial [16]; whether the favorable early and mid-term bowel-function findings for watch-and-wait persist across a full survivorship horizon is not yet fully established. Third, instrument and reporting heterogeneity across studies -- some using LARS score, some EORTC QLQ-CR29, some both, with inconsistent timing of assessment relative to treatment completion -- makes cross-study synthesis harder than it should be, a problem the field has begun to address explicitly through international consensus efforts. The consensus recommendations from Fokas and colleagues on standardized key outcome measures for organ preservation after (chemo)radiotherapy, developed through a structured multidisciplinary process, specifically call for consistent, longitudinal, patient-reported outcome collection -- bowel function, sexual and urinary function, and global QoL among them -- as a required companion to oncologic endpoints in future organ-preservation trials, precisely because the current literature this article has synthesized is more consistent in its direction of effect than in its methodological rigor [19]. Fourth, and closely related,

surveillance-related anxiety and decisional regret are almost never captured with a validated psychometric instrument in the same study that reports LARS or EORTC scores, which means the field currently has two separate, rarely-overlapping evidence bases -- one quantitative and favorable to organ preservation on physical function, one qualitative and more ambivalent on psychological burden -- rather than one integrated picture a clinician could use directly in a shared-decision-making conversation [18].

## 6. Conclusion

The available evidence, read across validated bowel-function instruments, disease-specific QoL questionnaires, and matched or long-term cohort comparisons, supports a reasonably confident conclusion for the domain most directly affected by the choice between organ preservation and radical resection: patients managed by watch-and-wait or successful local excision report meaningfully better bowel function and comparable-to-better global quality of life than matched patients undergoing standard TME, without evidence of that advantage eroding over available follow-up [14,15,11]. The evidence is directionally consistent but thinner for sexual and urinary function specifically in head-to-head organ-preservation comparisons, and thinner still for psychological outcomes related to ongoing oncologic surveillance, an emotional cost of watch-and-wait that is real for many patients but not yet well quantified alongside the physical-function gains [12,19]. As organ-preserving strategies move from selected centres into broader practice on the strength of the oncologic trial evidence summarized above [4,6,7], standardized, longitudinal, patient-reported outcome collection -- along the lines the field's own consensus statement now calls for -- will be what turns a currently favorable but methodologically uneven QoL picture into evidence solid enough to fully inform shared decision-making with individual patients weighing organ preservation against radical surgery.

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### Conflict of Interest

The authors declare that they have no competing interests relevant to this article.

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No new patient data were generated or analyzed for this short communication, which synthesizes previously published, publicly available literature; readers should consult the cited original studies for their respective data availability statements.

### Ethical Approval

Not applicable. This article did not involve human participants, animal subjects, or the collection of primary clinical data.

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