

# Patient Experiences after Intracorporeal Right Hemicolectomy: Evaluating Patient Reported Outcome Measures via Short Form-36

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## ABSTRACT

**Objective:** To identify the patient-reported outcome measures (PROMs) after intracorporeal anastomosis (ICA) during laparoscopic right hemicolectomy.

**Study Design:** An observational study.

**Place and Duration of the Study:** Department of General Surgery, Griffith Base Hospital, New South Wales, Australia, from August 2022 till February 2023.

**Methodology:** Participants who underwent laparoscopic intracorporeal right hemicolectomy were included in this study. Patients requiring emergency procedures or with a history of psychiatric illness were excluded. The Short Form-36 (SF-36); a quality of life (QoL) questionnaire employed focusing on physical health-related domains post laparoscopic intracorporeal hemicolectomy. The relationship between QoL domains and operative outcomes specific to this anastomotic technique was also assessed.

**Results:** The SF-36 scores at six weeks and six months postoperation revealed shifts in the overall QoL following ICA. Notably, physical function showed significant improvement, while bodily pain remained a significant concern. The correlation analysis found operative blood loss and the length of the extraction site to be significantly correlated with postoperative physical role.

**Conclusion:** The study determined that decreased operative blood loss and a shorter extraction site were associated with improved postoperative physical role. It showed the overall QoL improved within six months of the procedure, with the bodily pain domain still an area requiring attention. Understanding the impact of laparoscopic ICA on patient-reported outcomes may help in tailoring patient-centred approaches and enhancing the overall quality of care.

**Key Words:** Intracorporeal, Right hemicolectomy, Patient-reported outcome measures, Colorectal anastomosis.

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## INTRODUCTION

Laparoscopic right hemicolectomy is a preferred surgical approach for treating various right-sided colonic pathologies, including cancer and benign conditions. Two principal techniques exist for creating the ileocolic anastomosis are extracorporeal anastomosis (ECA) and intracorporeal anastomosis (ICA). ECA has been the conventional technique in laparoscopic right hemicolectomy, as it closely resembles the open surgical approach. This method involves the laparoscopic mobilisation of the right colon, followed by exteriorisation of the bowel segments through an incision to perform the anastomosis extracorporeally.

However, with advancements in laparoscopic surgery, ICA has gained increasing interest among colorectal surgeons.

ICA, initially developed for robotic surgery, involves performing the anastomosis entirely within the peritoneal cavity, thus eliminating the need for extended exteriorisation. Extracorporeal anastomosis may require a larger incision, which can increase postoperative pain, lengthen recovery time, surgical site infection (SSI), and potentially affect patients' quality of life.<sup>1</sup> ICA, on the other hand, is performed entirely within the peritoneal cavity using laparoscopic or robotic instruments. This approach offers several advantages over the extracorporeal technique, including a smaller incision, reduced tissue manipulation, and better resection of the mesenteric envelope, which is associated with an increased number of lymph nodes in the resected specimen. Studies have shown that increased nodal count is directly associated with survival prognosis.<sup>2</sup> Other benefits may contribute to less postoperative pain, shorter hospital stays, and faster recovery.<sup>3</sup> Despite the obvious benefits of ICA, its adoption among laparoscopic surgeons remains slow. This can be attributed to the inherent technical challenges and longer operative times associated with ICA. Furthermore, more extensive data are available on patient-reported outcomes using robotic rather than laparoscopic techniques.

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In randomised-controlled trials (RCTs) comparing ECA and ICA, the primary emphasis is often on postoperative outcomes such as leaks, postoperative ileus, or SSI. However, as modern healthcare shifts towards a more patient-centred approach, it becomes essential to determine whether this also translates to patient-reported outcome measures (PROMs) with ICA technique. Understanding the effects of laparoscopic ICA on patient-reported outcomes is crucial. By identifying the most favourable techniques, surgeons can tailor patient-centred approaches and improve the overall quality of care.

Thus, the study aimed to evaluate the quality of life (QoL) of a local group of patients who underwent laparoscopic intracorporeal right hemicolectomy using the Short Form-36 (SF-36). Additionally, it aimed to establish a link between specific operative outcomes and these QoL domains.

## METHODOLOGY

This study was conducted at Griffith Base Hospital, New South Wales, Australia. Two of the surgical consultants routinely perform laparoscopic ICA after right hemicolectomy. The study population consisted of patients who underwent these elective procedures from August 2022 to February 2023. Patients who had emergency surgery, a history of psychiatric illness or unable to consent were excluded. Initially, 38 patients met the inclusion criteria. However, two patients subsequently developed anastomotic leaks and required re-operations. To preserve the effect of the intervention on the postoperative course, these patients were excluded from the data collection and analysis phase.

The SF-36 questionnaire comprises 36 questions that correspond to eight domains. These domains can be broadly categorised into physical and emotional/psychological well-being. For this study, the main focus was on the physical health-related domains, which provided insights into the patients' physical functioning, role limitations due to physical health, pain, general health, and vitality perceptions following the laparoscopic intracorporeal right hemicolectomy. All patients were encouraged to complete these questionnaires during their follow-up visits. Descriptive statistics were used to summarise the demographic and clinical characteristics of the study participants. Categorical and nominal variables, including gender, diagnosis, comorbidities, and ASA scores, were analysed in percentages. Continuous variables such as age and total operating time were analysed with mean, mode, and standard deviations. All the statistical analyses were performed via JAMovi software with R module. Paired t-tests were used to compare the mean scores in each physical domain between the two-time points (six weeks and six months post-surgery) and to assess the statistical significance of changes in each domain ( $p$ -value  $< 0.05$ ). Evaluation in two follow-up visits allowed us to determine the impact of laparoscopic intracorporeal right hemicolectomy on patients' physical well-being in the short and medium terms.

A correlation analysis was conducted using Pearson's correlation coefficient to assess the relationship between each domain of QoL and various operative outcomes and complications.

## RESULTS

A total of 32 patients were included in the final analysis. The average age was  $59 \pm 20.77$  years. The average BMI was  $25.3 \pm 5.06$  kg/m<sup>2</sup>. Most of the patients had a diagnosis of adenocarcinoma. Common comorbidities included hypertension (46.9%), diabetes (18.8%), and cardiovascular disease (9.4%). The prevalence of comorbidities such as hypertension, diabetes, and cardiovascular disease reflects the typical health challenges faced by regional Australians, which may be influenced by factors such as limited access to healthcare services and lifestyle choices. The patient characteristics in this study are representative of a regional Australian population. This allowed us to assess the impact of laparoscopic ICA on patient-reported outcomes in this specific context.

Significant improvements were noted in physical function ( $p < 0.001$ ) and role-physical ( $t(31) = -5.46$ ,  $p < 0.001$ ) with reduced bodily pain at 6 months ( $t(31) = 4.67$ ,  $p < 0.001$ ). General health was impacted ( $t(31) = 3.03$ ,  $p = 0.005$ ), but vitality showed no change ( $t(31) = 0.41$ ,  $p = 0.688$ ) as detailed in Table I.

Reduced operative blood loss and shorter extraction site lengths were linked to better postoperative physical roles, with coefficients of 0.40 and 0.41, respectively (Table II).

**Table I: Statistical results for SF-36 domains: Comparison of temporal means.**

Domains of SF-36	Df*	Two-tailed T Statistics**	p-value
Physical Function	31.00	-5.01	<0.001
Role Limitations	31.00	-5.46	<0.001
Bodily Pain	31.00	4.67	<0.001
General Health	31.00	3.03	0.005
Vitality	31.00	0.41	0.688

\*Degree of Freedom. \*\*Two tailed t-test with hypothesis:  $H_0: \mu \text{ Measure 1} - \mu \text{ Measure 2} = 0$

## DISCUSSION

In the current era, which emphasises value-based healthcare, it is essential to pursue treatments that align with scientific evidence and patient preferences, resulting in more satisfying outcomes for all stakeholders.<sup>4-6</sup> The popularity of minimally invasive surgery has led to a well-established improvement in the QoL compared to open resection.<sup>7</sup> This enhanced QoL can be attributed to the short-term benefits of laparoscopic surgery, such as reduced blood loss, diminished postoperative pain, and shorter hospital stays.<sup>8</sup> There is no statistically significant difference in cancer recurrence between the laparoscopic and open approach.<sup>9</sup>

The findings indicate that while patients may experience initial postoperative discomfort and physical limitations following ICA in right hemicolectomy, there is a marked improvement in bodily pain and physical function by the 6-month mark.

**Table II: Pearson's analysis of correlation between operative and patient-reported out-comes.**

	Physical Function	Role Limitations	Bodily Pain	General Health	Vitality
Total operating time (minutes)	0.03(p=0.85)	0.13(p=0.47)	0.13(p=0.46)	0.15(p=0.42)	0.08(p=0.67)
Operative blood loss (ml)	-0.33(p=0.06)	-0.40*(p=0.02)	0.27(p=0.14)	0.37(p=0.03)	0.36(p=0.04)
Extraction site length (cm)	-0.33(p=0.06)	-0.41*(p=0.02)	0.27(p=0.13)	0.36(p=0.04)	0.38(p=0.03)
Time to 1 <sup>st</sup> flatus	-0.13(p=0.48)	-0.07 (p=0.68)	-0.11(p=0.56)	0.03 (p=0.88)	-0.10(p=0.58)

\*Significant correlation. *p*-value <0.05 was considered statistically significant.

Furthermore, the positive correlations between reduced operative blood loss and shorter extraction site lengths with enhanced postoperative physical roles suggest surgical precision can directly influence postoperative recovery. These insights emphasise the importance of surgical technique optimisation for improved patient outcomes in the long term.

The intracorporeal colorectal anastomosis is more feasible with a robotic approach than a laparoscopic one, owing to a wider range of hand-like movements and an enhanced ability to dissect tissue planes. However, there is a scarcity of robotic facilities in rural and regional areas of Australia. This lack of access should not disadvantage the local population in receiving an improved anastomotic technique. Thus the findings of the study suggest that laparoscopic variant of a similar technique can enhance value-based care in the same fashion.

A qualitative study by Wrenn *et al.* showed that 2-4% of patients considered the appearance and length of the incision as important factors for recovery,<sup>10</sup> highlighting the significance of these factors for the psychological well-being of cancer patients. Studies have indicated that ICA is associated with shorter times to first flatus, defecation, liquid diet, and hospital stay.<sup>11</sup> Longer postoperative hospital admissions have been linked to worse QoL, with Sharma *et al.*<sup>12</sup> suggesting that longer stays result in reduced well-being, poorer functional well-being, and heightened cancer-related concerns. The authors also argued that postoperative morbidity contributes to higher anxiety and depression levels. ICA has been associated with fewer postoperative infectious and overall complications compared to ECA.<sup>1</sup> This study's favourable results can be attributed, in part, to the low rate of postoperative complications and shorter hospital stays observed in this patient population.

The SF-36 questionnaire is commonly used in cancer cohorts. This generic self-reported questionnaire evaluates three health parameters: Functional status, well-being, and general health perceptions, as well as overall QoL.<sup>13</sup> While less prone to floor and ceiling effects and validated across various populations,<sup>4</sup> the SF-36 is lengthy, taking 7-15 minutes to complete. In contrast, other questionnaires, such as the EuroQol EQ-5D-3L and EuroQol EG-5D-5L, take less than 5 minutes to complete and have fewer questions. These alternative questionnaires have been extensively utilised in the National Health Services, United Kingdom (NHS) and have proven sensitive, valid, and reliable in English-speaking populations.

Condition-specific questionnaires, such as FACT-C, EORTC QLQ-CR38, and the Colostomy Impact Score, provide a more detailed analysis of patients' emotional states, radiotherapy experiences, or permanent colostomy experiences, respectively. However, these lengthy questionnaires do not apply to the patients in this cohort. The rationale for using this questionnaire was due to its widespread use and validation in assessing PROMs in colorectal surgery.<sup>14,15</sup>

This study has limitations in evaluating the ICA technique, as no direct comparison between ICA and ECA was conducted. The sample size was relatively small and limited to a regional Australian population. Larger, multi-centric studies are needed to confirm these findings. Additionally, only patients undergoing elective procedures were included, which could introduce a selection bias. Additionally, patients were assessed postoperatively. This lack of baseline QoL data limits the ability to determine the overall impact on general QoL.

## CONCLUSION

Patients who underwent ICA experienced good levels of physical function and pain relief, generally feeling well despite decreased vitality. The SF-36 questionnaire allowed for a comprehensive assessment of the patient population's QoL following colorectal cancer surgery, revealing significant improvements throughout the first postoperative year.

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## ETHICAL APPROVAL:

This study was part of the research project 2022/ETH01366: approved by the Greater Western Human Research Ethics Committee (HREC) of Western New South Wales Local Health District.

## PATIENTS' CONSENT:

All the participants provided informed consent based on detailed information regarding the nature and protocol of the project while maintaining the confidentiality of the relevant data.

## COMPETING INTEREST:

The authors declared no conflict of interest.

## AUTHORS' CONTRIBUTION:

ZN: Conceptualisation, data curation, formal analysis, project administration, writing-original draft, writing-review, and editing.

AFK: Writing-original draft, review, editing, and formal analysis.

KAH: Methodology, data curation, and formal analysis.

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