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Effect of the Oncology Pack Supplement on Preoperative Nutritional Status and Recovery in Patients with Operable Gastrointestinal Cancer: Prospective Case Series

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Abstract

Introduction: Malnutrition is a common condition in cancer patients, especially those with tumours located in the digestive tract, and it is associated with increased postoperative morbidity. Nutritional intervention in the perioperative period may improve the surgical prognosis. Oncology Pack (CATALYSIS S.L., Spain) is a product that combines immunonutrients and probiotics, with the potential to optimise nutritional status in this context. **Objective:** To evaluate the effect of perioperative administration of the Oncology Pack supplement on nutritional status in patients with operable gastrointestinal cancer. **Materials and Methods:** An observational, prospective study was conducted in 37 patients with gastrointestinal cancer and a surgical indication. The Oncology Pack was administered for 15 days prior to and for 15 days after surgery. Nutritional status was assessed using the Patient-Generated Subjective Global Assessment (PG-SGA) prior to administration and on postoperative day 15. Changes in overall scores and individual components were analysed. **Results:** 89.2% of patients were at high nutritional risk at baseline. After treatment, a significant reduction in the proportion of patients at high risk was observed (from 89.2% to 40.5%; $p = 0.019$), with improvement in the weight, food intake, and symptom components of the PG-SGA ($p < 0.01$), suggesting a reduction in the frequency and/or severity of symptoms such as nausea, anorexia, dysgeusia, and fatigue, among others. There were no adverse events reported during the study period. **Conclusion:** The perioperative use of Oncology Pack was associated with a significant improvement in nutritional sta-

tus in patients with gastrointestinal cancer. These findings support its potential as an immunonutritional support strategy in enhanced recovery protocols. Controlled clinical trials are required to confirm these results and assess the product's impact on the incidence of complications associated with oncological surgery.

Keywords

Gastrointestinal Cancer, Immunonutrition, Perioperative Period, Nutritional Status, Postoperative Complications

1. Introduction

Malnutrition is a common clinical condition in cancer patients, especially those with digestive tract tumours, due to tumour localisation, disease progression, and adverse effects related to cancer-specific treatments [1]-[4]. This condition is associated with increased postoperative morbidity, an increased risk of infectious complications, delayed healing, and decreased quality of life [5]-[9].

The European Society for Clinical Nutrition and Metabolism (ESPEN) clinical guidelines recommend systematic assessment of nutritional status in all cancer patients, especially before major surgery [10]-[12]. In patients with nutritional risk or malnutrition, a structured nutritional intervention should be implemented in the context of multimodal prehabilitation programmes that include nutritional support, physical exercise, and psychological support. These recommendations are aligned with the principles of the Enhanced Recovery After Surgery (ERAS) protocol, which aims to optimise postoperative outcomes by reducing complications, preserving physiological function, and reducing the duration of hospital stay in patients undergoing cancer surgery [13] [14].

A cancer patient's nutritional status may deteriorate significantly before surgery due to adverse effects related to cancer-specific treatments such as chemotherapy, radiation therapy, and immunotherapy. These therapies can cause anorexia, nausea, vomiting, mucositis, dysgeusia, diarrhoea, fatigue, and metabolic disturbances that compromise nutrient intake and absorption [15]-[18]. In addition, systemic inflammation caused by both the tumour itself and the associated treatment may contribute to loss of muscle mass and the development of cancer cachexia, a condition that adversely affects tolerance to treatment and postoperative recovery [19]-[23].

Validated instruments such as the PG-SGA are used to assess nutritional status in cancer patients. This tool, developed specifically for the oncology population, enables comprehensive assessment of nutritional status through components such as weight loss, daily food intake, symptoms associated with changes in nutrition, physical examination, and the patient's functional status [24]-[28]. In addition, it includes a triage system that guides the need for and urgency of nutritional intervention. Various studies have demonstrated the ability of this instrument to pre-

dict clinical outcomes such as duration of hospital stay, response to treatment, and survival [29]-[31]. Therefore, both the ESPEN guidelines and other scientific societies recommend its systematic use in patients with malignant tumours, especially during cancer-specific treatments.

The Oncology Pack (CATALYSIS S.L., Spain) is an immunonutritional support product composed of four products: Ocoxin® oral solution [32]-[39], Ocoxin® capsules [32], Viusid® oral solution [39]-[44], and Viusid Biotic®. These products have been combined to meet specific nutritional requirements in situations of high metabolic demand, such as in the perioperative period in cancer patients. Its combination of amino acids, vitamins, minerals, plant extracts, and probiotics aims to modulate the immune response, preserve mucosal integrity, and promote functional recovery. L-arginine and L-glycine are involved in protein synthesis, tissue healing, and immune activation [45]-[48], while glutamine acts as an energy substrate for enterocytes and lymphocytes [49]-[51], helping to preserve the integrity of the intestinal barrier [52]-[54]. Malic acid and the B vitamins (B5, B6, B9, and B12) are involved in metabolic pathways essential for energy production, nucleic acid synthesis, and haematopoiesis [55]-[58], which are critical for preventing anaemia [56] [59] and maintaining neurological function [60] [61]. Minerals such as zinc and manganese act as enzyme cofactors in tissue regeneration, antioxidant defence, and immune signalling processes [62]-[67]. Meanwhile, green tea extracts (rich in epigallocatechin-3-gallate), liquorice, and cinnamon contribute bioactive compounds with anti-inflammatory and immunomodulatory properties [68]-[71], with potential effects on the regulation of cell proliferation [72]-[75] and cytokine modulation [70] [71] [76]. Finally, the mixture of 20 probiotic strains together with fructooligosaccharides included in Viusid Biotic® promotes restoration of gut microbiota [77]-[79], improves barrier function [50] [54] [80], and contributes to the control of systemic inflammation [81]-[83]—key aspects in post-surgical recovery [84] [85]. These products combine plant extracts, amino acids, vitamins, minerals, and probiotics with immunomodulatory, hepatoprotective, and intestinal balance-regulating properties.

Clinical evidence accumulated in observational studies and controlled trials suggests that the combined use of these products may contribute to improving nutritional status, reducing gastrointestinal symptoms, and promoting quality of life in patients with gastrointestinal cancer undergoing surgery. That is why, in this context, the present study evaluates the effect of the Oncology Pack protocol administered perioperatively on nutritional status, for which the PG-SGA instrument was used as an assessment tool.

2. Materials and Methods

2.1. Study Design

An observational, prospective, longitudinal, case series study was conducted to evaluate the effect of an oral immunonutritional supplement on the nutritional status of patients with operable digestive tract cancer. The study was conducted

in the Oncological Surgery Department of the Institute of Oncology and Radiobiology (IOR) in Havana, Cuba, between October 2023 and December 2024. The sample size was determined by the number of eligible patients recruited during the study period.

2.2. Population and Inclusion Criteria

Adult patients with a confirmed histopathological diagnosis of malignant tumours located in the oesophagus, stomach, colon, rectum, pancreas, liver, gallbladder, or duodenum, with surgical indication, either with curative or palliative intent, based on multidisciplinary evaluation and performance status between 0 and 3 according to the ECOG scale, were included [86]. The exclusion criteria were: contraindication for surgery, known allergy to any of the components of the supplement, or non-compliance with the supplement protocol.

2.3. Nutritional Intervention

Each patient was given the Oncology Pack oral supplement for four weeks in the perioperative period: 15 days before surgery and 15 days after surgery. This supplement is composed of:

Ocoxin oral solution [per 30 mL, contains: glucosamine sulphate potassium chloride (600 mg), L-glycine (600 mg), malic acid (360 mg), L-arginine (192 mg), L-cysteine (61.2 mg), liquorice extract (*Glycyrrhiza glabra L.*) (60 mg), vitamin C (L-ascorbic acid) (36 mg), sodium benzoate (30 mg), potassium sorbate (30 mg), zinc sulphate (24 mg), passion fruit flavour (15 mg), green tea extract (*Camellia sinensis L.*) (7.5 mg), sucralose (7.2 mg), pantothenic acid (calcium D-pantothenate) (3.6 mg), manganese sulphate (1.2 mg), vitamin B6 (pyridoxine hydrochloride) (1.2 mg), cinnamon extract (*Cinnamomum verum J. Presl*) (0.9 mg), folic acid (pteroylmonoglutamic acid) (120 μg), and vitamin B12 (cyanocobalamin) (0.6 μg)].

Ocoxin capsules [each capsule contains: maltodextrin (272.7 mg), L-arginine (72 mg), L-cysteine (61.2 mg), microcrystalline cellulose (42 mg), talc (21 mg), vitamin C (L-ascorbic acid) (20 mg), zinc sulphate (12 mg), green tea extract (*Camellia sinensis L.*) (7.5 mg), manganese sulphate (3 mg), cinnamon extract (*Cinnamomum verum J. Presl*) (0.9 mg), and vitamin B6 (pyridoxine hydrochloride) (0.66 mg)].

Viusid oral solution [per 30 mL, contains: glucosamine sulphate potassium chloride (600 mg), L-arginine (600 mg), malic acid (600 mg), L-glycine (300 mg), liquorice extract (*Glycyrrhiza glabra L.*) (30 mg), sodium benzoate (30 mg), potassium sorbate (30 mg), vitamin C (L-ascorbic acid) (18 mg), lemon flavour (15 mg), sucralose (7.2 mg), zinc sulphate (4.5 mg), pantothenic acid (calcium D-pantothenate) (1.8 mg), vitamin B6 (pyridoxine hydrochloride) (0.6 mg), folic acid (pteroylmonoglutamic acid) (60 μg), and vitamin B12 (cyanocobalamin) (0.3 μg)].

Viusid Biotic [each 4 g sachet contains: fructooligosaccharides (1201.56 mg), maltodextrin (1200 mg), L-glutamine (985 mg), malic acid (666 mg), L-arginine (656.02 mg), glucosamine sulphate potassium chloride (652.68 mg), orange fla-

vour (648.34 mg), citric acid (400 mg), L-glycine (328 mg), alfalfa extract (*Medicago sativa* L.) (40 mg), liquorice extract (*Glycyrrhiza glabra* L.) (32.34 mg), vitamin C (L-ascorbic acid) (19.8 mg), aspartame (16 mg), zinc sulphate (5 mg), honey (4 mg), sodium benzoate (4 mg), potassium sorbate (4 mg), pantothenic acid (calcium D-pantothenate) (1.8 mg), vitamin B6 (pyridoxine hydrochloride) (0.48 mg), folic acid (pteroylmonutamic acid) (64 μg), vitamin B12 (cyanocobalamin) (0.292 μg), and a probiotic bacteria mixture (1000 mg) with a potency of 1.25 million CFU/g per strain].

The daily administration schedule was as follows:

- **Ocoxin capsules**: 2 capsules on an empty stomach, 2 before lunch, and 2 before dinner.
- **Ocoxin oral solution (30 mL)**: 1 vial of 30 mL orally twice daily, after meals (lunch and dinner).
- **Viusid (30 mL)**: 1 vial of 30 mL daily in the morning, after breakfast.
- **Viusid Biotic**: 1 sachet daily at bedtime.

The administration schedule was monitored and supervised by the clinical team, and possible adverse reactions related to the supplement were recorded. Adverse events monitored included gastrointestinal symptoms, allergic reactions, and any other unexpected clinical manifestations. All patients completed the full 30-day protocol. No other nutritional counselling, enteral feeding, or dietitian input was provided during the study period.

2.4. Nutritional Assessment

Assessment of nutritional status was carried out using the **PG-SGA** tool, validated in its Spanish version [87]. This tool was used at two time points: at the beginning of the protocol (before the supplement was administered) and at the end of the four-week intervention period. The PG-SGA (**Supplementary Material are available in Appendix**) was used, with risk categories defined as low (0 - 3), moderate (4 - 8), and high (≥9). Weight, height, and body mass index (BMI) were recorded at both time points. In addition, nutritional risk, overall nutritional status, and the type of nutritional intervention recommended according to the PG-SGA triage were classified.

2.5. Ethical Aspects

All participants signed an informed consent form prior to their enrollment in the study. The research was approved by the Research Ethics Committee and the Scientific Council of the Institute of Oncology and Radiobiology, in agreement number 54, established in Havana on 19 July 2023. The study was conducted in accordance with the national good clinical practice guidelines for observational studies.

2.6. Statistical Analysis

The data were analysed using **SPSS software, version 22**. Student's t-test was used for related samples to compare quantitative variables with normal distribution.

For non-parametric variables, the Wilcoxon and McNemar tests were used. Differences between ratios were analysed using the chi-squared test (χ^2). A **p value < 0.05** was considered statistically significant.

3. Results

3.1. Demographic Results

Table 1. Demographic and clinical characteristics of patients enrolled in the study. *Distribution by age, gender, tumour localization, neoadjuvant treatments, performance status, and clinical stage.*

Variable	N	%
Age (median, 95% CI; years)	67	(63 - 71)
Minimum (years)	31	
Maximum (years)	81	
Sex		
Female	12	32.4%
Male	25	67.6%
Tumour localisation		
Pancreas	9	24.3%
Colon	8	21.6%
Oesophagus	6	16.2%
Stomach	5	13.5%
Rectum	4	10.8%
Duodenum	3	8.2%
Liver	1	2.7%
Gallbladder	1	2.7%
Neoadjuvant treatment		
Chemotherapy	12	32.4%
Radiation therapy	4	10.8%
Performance status (ECOG)		
0	5	13.5%
1	12	32.4%
2	13	35.1%
3	7	18.9%
Clinical Stage		
I	7	18.9%
II	11	29.7%
III	11	29.7%
IV	8	21.6%

Notes: 95% CI: 95% confidence interval; ECOG: Eastern Cooperative Oncology Group; N: absolute number of patients; %: percentage of the total sample (n = 37).

37 patients with a confirmed histopathological diagnosis of digestive tract cancer, with surgical indication, were included in the study. The median age was 67 years (95% CI: 63 - 71), with a predominance of male patients (67.6%). The general characteristics are shown in Table 1.

The Oncology Pack supplement was administered for two weeks prior to surgery and two weeks post-surgery. No adverse effects or treatment discontinuations were reported.

3.2. Nutritional Status and Clinical Course

Nutritional assessment using the short form of the PG-SGA showed a significant improvement in the distribution of nutritional risk after treatment (see Table 2). At baseline, there were no patients with low nutritional risk. After treatment, 21.6% of patients were classified in this category, representing a significant improvement in the overall nutritional status of the cohort.

Patient distribution by nutritional risk level changed significantly ($p = 0.019$), with a notable reduction in the high-risk group (from 89.2% to 40.5%), and an increase in the low- and medium-risk groups after the use of Oncology Pack.

Table 2. Nutritional risk classification before and after use of Oncology Pack. *Distribution of patients according to the level of nutritional risk* (*low*, *medium*, *high*) *at both assessment time-points*.

Nutritional Risk Level	Before Oncology Pack	After Oncology Pack	*p*
	No. of patients (%)	No. of patients (%)	
Low	0 (0.0%)	8 (21.6%)	
Moderate	4 (10.8%)	14 (37.8%)	0.019
High	33 (89.2%)	15 (40.5%)	

Note: A chi-squared test was performed to assess the association between nutritional risk before and after treatment. The p-value obtained was $p = 0.019$, indicating a statistically significant difference.

Likewise, statistically significant improvements were observed in the individual components of the PG-SGA (see Table 3). After use of Oncology Pack, the median weight increased from 60.0 kg (95% CI: 58.0 - 62.0) to 62.0 kg (95% CI: 60.0 - 64.0), with a significant difference ($p = 0.0001$). The PG-SGA food intake score decreased from a median of 2 (95% CI: 1 - 3) to 1 (95% CI: 0 - 2), also with significance ($p = 0.002$). For the symptom component, the score was reduced from 3 (95% CI: 2 - 4) to 1 (95% CI: 0 - 2), with $p = 0.0001$. No significant differences were found in the functionality component, which remained stable after the use of Oncology Pack, at a value of 1 ($p = 0.134$).

The overall classification of nutritional status also showed improvement (see Figure 1). A notable increase is observed in the percentage of patients classified as well nourished (Category A: 0% → 67.5%) and a significant reduction in cases

of moderate malnutrition (Category B: 43.2% → 32.4%) and severe malnutrition (Category C: 56.8% → 0%) after treatment. These results suggest a substantial improvement in preoperative nutritional status attributable to the immunonutritional support administered.

Table 3. Differences in PG-SGA (short form) component scores before and after treatment. *Medians and confidence intervals for weight, food intake, symptoms, and functionality.*

Component	Before		After		*p*
	Median	95% CI	Median	95% CI	
Weight	**60.0 kg**	58.0 - 62.0 kg	**62.0 kg**	60.0 - 64.0 kg	**0.0001**
Food Intake	**2**	1 - 3	**1**	0 - 2	**0.002**
Symptoms	**3**	2 - 4	**1**	0 - 2	**0.0001**
Functionality	**1**	0 - 2	**1**	0 - 2	0.134

Note: The weight component assesses recent body weight loss; food intake assesses the amount and type of food consumed in the last few days; the symptom component reflects any problems that interfere with eating (such as nausea, anorexia, or dysgeusia); and functionality reflects the patient's level of physical activity. In all cases, a higher score indicates worse nutritional status. 95% CI = 95% confidence interval. The Wilcoxon test was used for related samples.

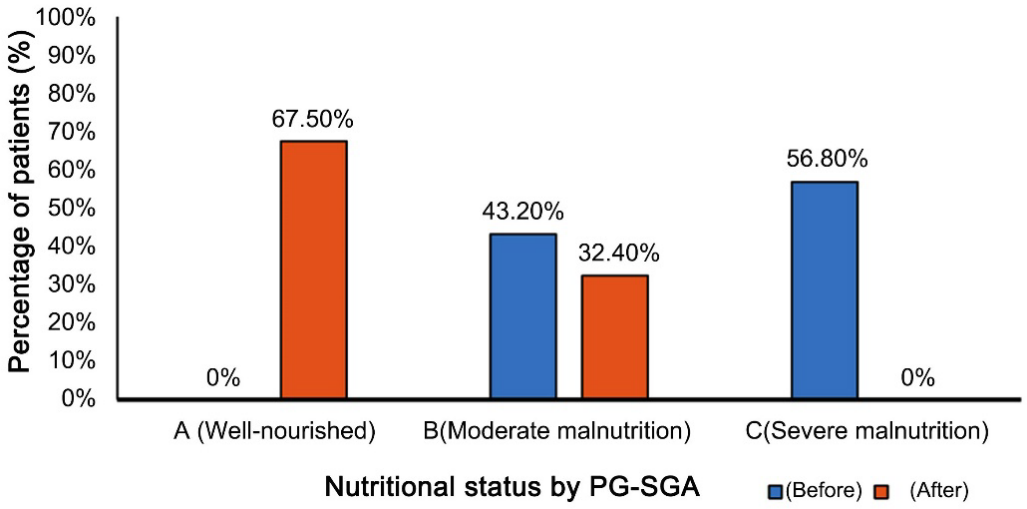

Figure 1. Percentage distribution of patients according to nutritional status assessed by PG-SGA before (blue) and after (orange) treatment with the perioperative immunonutritional protocol (Oncology Pack).

3.3. Nutritional Triage

Triage for nutritional intervention showed significant improvement (see Figure 2): before treatment, 100% of patients required dietary or critical intervention. After supplement use, 8.1% did not require intervention, 70.3% were classified as needing dietary education, and 21.6% required dietary intervention (p = 0.0173).

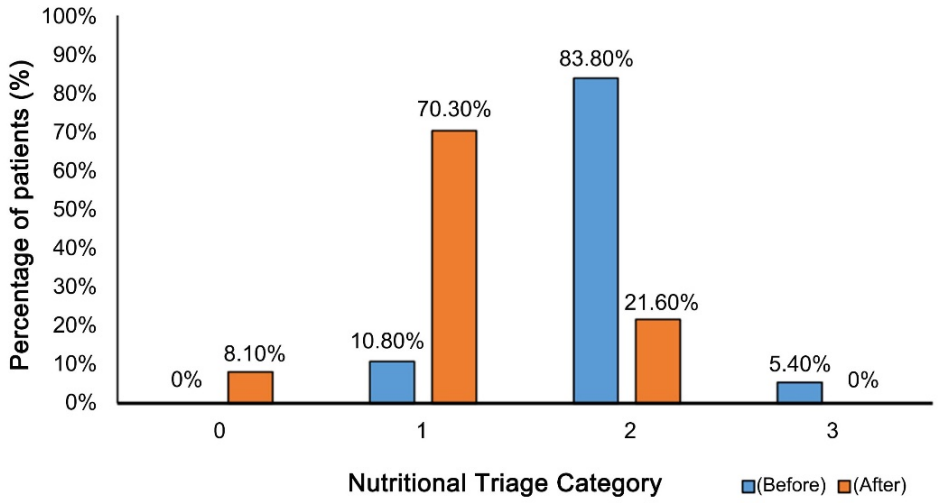

Figure 2. Distribution of nutritional triage before (blue) and after (orange) use of Oncology Pack. Grouped bar chart with the four nutritional triage categories: 0 (no nutritional interventionrequired), 1 (patient or caregiver nutrition education recommended), 2 (dietitian intervention required with patient and/or caregiver), and 3 (immediate critical and symptomatic nutritional intervention required).

3.4. Association with BMI

No significant association was found between changes in BMI and nutritional risk ($p = 0.480$) or with the PG-SGA category ($p = 0.113$). However, a significant association was observed between changes in BMI and nutritional triage ($p = 0.001$), as shown in Table 4.

Table 4. Frequency distribution of PG-SGA components and changes in BMI.

PG-SGA Component		Changes in BMI								
		Lower		Unchanged		Higher		Total		*p*
		N (%)		N (%)		N (%)		N (%)		
Nutritional Risk	Low	**0**	(0.0)	**2**	(25.0)	**6**	(75.0)	**8**	(21.6)	
	Moderate	**3**	(21.4)	**3**	(21.4)	**8**	(57.2)	**14**	(37.8)	0.480
	High	**3**	(20.0)	**1**	(6.7)	**11**	(73.3)	**15**	(40.5)	
PG-SGA Classification	Well nourished	**0**	(0.0)	**1**	(9.1)	**10**	(90.9)	**11**	(29.7)	
	Moderate malnutrition	**4**	(22.2)	**5**	(27.8)	**9**	(50.0)	**18**	(48.7)	0.113
	Severe malnutrition	**2**	(25.0)	**0**	(0.0)	**6**	(75.0)	**8**	(21.6)	
Nutritional recommendation triage	No intervention	**0**	(0.0)	**0**	(0.0)	**3**	(100.0)	**3**	(8.1)	
	Dietary education	**1**	(3.8)	**4**	(15.4)	**21**	(80.8)	**26**	(70.3)	0.001
	Dietary intervention	**5**	(62.5)	**2**	(25.0)	**1**	(12.5)	**8**	(21.6)	
Total		**6**	(16.2)	**24**	(64.9)	**7**	(18.9)	**37**	(100.0)	

Notes: BMI: body mass index; N (%): number of patients and percentage within each category; *p*: statistical significance value (chi-squared test); PG-SGA: Patient-Generated Subjective Global Assessment.

3.5. Post-Operative Course

In terms of clinical course, the most frequent surgery was pancreatectomy (16.2%). Median hospital stay was 5 days (95% CI: 4 - 6). Only one patient had postoperative complications (surgical wound dehiscence). The use of antimicrobials was 40.5% as prophylaxis and 59.5% in the postoperative period (see Table 5).

Table 5. Type of surgery performed and postoperative clinical course. *Frequency of surgical procedures and postoperative events.*

Type of Surgery	N	(%)
Resection with curative intent		
Pancreatectomy	**6**	(16.2)
Hemicolectomy	**4**	(10.8)
Oesophagectomy	**3**	(8.1)
Dixon	**3**	(8.1)
Gastrectomy	**3**	(8.1)
LAR + metastasectomy	**1**	(2.4)
Hepatectomy	**1**	(2.7)
Colostomy closure	**1**	(2.4)
Palliative Intent		
Biliodigestive Shunt	**6**	(16.2)
Laparotomy + jejunostomy	**4**	(10.8)
Shunt + metastasectomy	**2**	(5.4)
Colostomy + biliodigestive shunt	**2**	(5.4)
Gastrostomy	**1**	(2.4)
Post-operative course		
Hospital stay (median, 95% CI)	5 days (4 - 6)	
Complications (wound dehiscence)	1	
Prophylactic antimicrobials	15	
Postoperative antimicrobials	22	

Notes: LAR (lower anterior resection); 95% CI: 95% confidence interval for median hospital stay; N: absolute number of procedures or events; Complications: only one case was reported (surgical wound dehiscence).

4. Discussion

This prospective case series provides preliminary evidence on the beneficial effect of the Oncology Pack supplement on the nutritional status of patients with operable gastrointestinal cancer, as assessed by the PG-SGA tool. The high prevalence of elevated nutritional risk at baseline (89.2%) coincides with that reported in the literature for cancer patients with digestive tract tumours, where tumour localisa-

tion, disease progression, and cancer-specific treatments contribute to malnutrition [1]-[9]. After treatment, a significant reduction in high nutritional risk was observed (from 33 to 15 patients), with a proportional increase in the medium and low risk categories (from 4 to 14 and from 0 to 8 patients, respectively), suggesting a clinically relevant impact of the supplement on the nutritional status of the patients in the study.

The individual components of the PG-SGA also showed significant improvements, particularly in weight (median increase from 60.0 kg to 62.0 kg), food intake [from 2 points (only a few solid foods) to 1 point (less than usual amount of food)], and associated symptomatology [from 3 points (severe symptoms such as vomiting or diarrhoea) to 1 point (mild symptoms such as nausea or dry mouth)], reinforcing the hypothesis that the supplement contributes to improving food and digestive tolerance, as well as nutrient availability in a context of high metabolic demand [88]-[90]. The absence of significant changes in the functionality component could be explained by the short duration of postoperative follow-up and the lack of structured physical intervention such as motor rehabilitation, an aspect that has been indicated in the ESPEN guidelines and in the ERAS protocols as an essential part of multimodal prehabilitation.

It is important to consider that 32.4% of patients received neoadjuvant chemotherapy and 21.6% were classified as stage IV. These factors are known to negatively affect nutritional status due to treatment-related symptoms and advanced disease burden. Despite this, significant improvements were observed in PG-SGA scores, suggesting that the Oncology Pack may have helped mitigate these negative effects. However, tumour stage and prior therapies may act as confounding variables, and future studies should consider stratified analyses to better isolate the impact of the intervention.

The improvement in the overall classification of nutritional status, with an increase in well-nourished patients (from 4 to 11) and a reduction in severely malnourished cases (from 15 to 8), reinforces the usefulness of the Oncology Pack supplement in preventing the risk of associated complications in cancer patients with surgical indication. Likewise, nutritional triage showed a favourable redistribution of patients, with a reduction in patients requiring critical intervention and an increase in those who only needed dietary education or no intervention, which could have implications for the optimisation of care resources and minimisation of the risk of complications.

Although no significant association was observed between changes in BMI and PG-SGA classification, a correlation was identified between the change in BMI and nutritional triage, suggesting that the supplement could indirectly influence anthropometric parameters through the improvement of symptomatology and food intake. This finding is consistent with previous studies that have pointed to the limitations of BMI as the sole marker of nutritional status in cancer patients, especially in the presence of sarcopenia or redistribution of body mass [91].

Clinically, the treatment was well tolerated, with no reports of adverse events

or treatment discontinuations, and it was associated with a favourable postoperative course, with a median hospital stay of five days and a low incidence of surgical complications. These results are consistent with the evidence supporting the perioperative use of immunonutrients to reduce infectious complications, improve healing, and shorten hospital recovery time.

The limitations of this study included the observational design, the absence of a control group, the reduced sample size, and the lack of biochemical or immunological biomarkers, which would enable the exploration of underlying pathophysiological mechanisms. The absence of a control group may introduce placebo or Hawthorne effects, limiting causal inference. However, the results obtained justify conducting controlled clinical trials to confirm these findings, establish comparisons with other nutritional strategies, and assess their impact on clinical outcomes such as postoperative complications, quality of life, and survival.

5. Conclusion

In this prospective case series, perioperative administration of the immunonutritional supplement Oncology Pack was associated with a significant improvement in nutritional status in patients with operable gastrointestinal cancer, evidenced by reduction of high nutritional risk, improvement in the individual components of the PG-SGA (weight, food intake, and symptoms), and favourable shifts in the overall classification of nutritional status and nutritional triage. The treatment was well tolerated by the patients, with no reported adverse events, and was accompanied by a favourable postoperative course, with a low incidence of complications and a median hospital stay of five days. These findings support the use of Oncology Pack as a safe and potentially effective immunonutritional support strategy in the context of enhanced recovery programmes in gastrointestinal cancer surgery, warranting controlled studies with a larger number of patients to confirm its clinical impact on postoperative outcomes, quality of life, and survival.

Author Contributions

A.S.C. (Dr. Alberto Suárez Cuevas) and **I.R.C.C.** (Dr. Ivanis Ruíz Calderón Cabrera) contributed to the study design, patient recruitment, and performed the surgical procedures. **O.N.R.M.** (Dr. Olga N. Rodríguez Marrero), **R.M.O.R.** (Dr. Rosa M. Ortiz Reyes), and **R.J.R.T.** (MSc. Ramón de J. Ropero Toirac) participated in the study design, data interpretation, manuscript preparation, and performed the statistical analysis. **M.L.L.** (MSc. Marta Lugioyo Lugo) and **M.B.C.** (MSc. Mircea Betancourt Cabeza) were responsible for patient data collection, product administration, and clinical follow-up as part of the nursing team. **D.M.S.** (MSc. David Márquez Soriano) contributed to the literature review, scientific contextualization of the nutritional intervention, and editorial support of the manuscript.

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This study did not receive external funding. The nutritional supplements included

in the Oncology Pack protocol were provided free of charge by Catalysis S.L. for use in the clinical setting at INOR (Havana, Cuba).

Conflicts of Interest

The authors declare no commercial or financial conflicts of interest related to this study. The products used in the intervention were donated by Catalysis S.L. (Madrid, Spain), which had no role in the study design, data collection, analysis, or manuscript preparation.

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Appendix

GLOBAL SUBJECTIVE ASSESSMENT GENERATED BY THE PATIENT – SHORT FORM

Identification ID: _____ **Date:** /__/__//__/__//__/__/__/__/

1. WEIGHT	
Considerations about my current weight and its evolution over the past weeks:	
My current weight is approximately:	
My height is approximately:	
One month ago, I weighed approximately:	
Six months ago, I weighed approximately:	
Over the last two weeks, my weight has:	
Decreased	☐
Not changed	☐
Increased	☐
2. DIET	
Compared to my usual state, I would rate my diet over the past month as:	
No changes	☐
Better than usual	☐
Worse than usual	☐
Currently, I eat:	
Normal foods but in smaller quantities than usual	☐
Few solid foods	☐
Only liquids	☐
Only nutritional supplements	☐
Very little	☐
Only tube or intravenous feeding	☐
3. SYMPTOMS	
I have had the following problems that prevented me from eating enough over the past two weeks (check all that apply):	
No problems with eating	☐
Loss of appetite	☐
Nausea	☐
Vomiting	☐
Constipation	☐
Mouth sores	☐
Diarrhea	☐
Dry mouth	☐
Food tastes strange or tasteless	☐

Continued

Difficulty swallowing	☐
Dislike of smells	☐
Feeling full quickly	☐
Pain (where?)	
Other (e.g., depression, dental, financial issues)	

4. FUNCTIONAL CAPACITY

Over the past month, I would rate my general activity level as:

Normal, no limitations	☐
Not completely normal, but able to stay active and perform fairly normal activities	☐
No desire to do most things, but spend LESS than half the day in bed or seated	☐
Able to do small activities, but spend MOST of the day in bed or seated	☐
Bedridden, rarely out of bed	☐

GLOBAL SUBJECTIVE ASSESSMENT GENERATED BY THE PHYSICIAN

Diseases

Select the disease (s) the patient presents:

☐ Cancer
☐ HIV/AIDS
☐ Pulmonary or cardiac cachexia
☐ chronic kidney disease
☐ Pressure ulcers, open wounds or fistulas
☐ Presence of trauma
☐ Age over 65 years
☐ Other relevant conditions (specify):

_____

Stage
Oncological treatment
Other treatments

Weight change:

Weight loss in 1 month (%): _____

Weight loss in 6 months (%): _____

Physical examination:

Loss of adipose tissue:

☐ Yes. Grade: _____ (Orbital fat pads, triceps skinfold, waist fat deposits)
☐ No

Loss of muscle mass:

☐ Yes. Grade: _____
☐ No

Muscle Groups	Category
Temporal muscles:	
Clavicles (pectorals and deltoids):	
Shoulders (deltoids)	
Interosseous muscles	
Scapula (latissimus dorsi, trapezius, deltoids)	
Quadriceps	
Gastrocnemius	

Edema and/or ascites: ☐ Yes. Grade: _____ ☐ No
Pressure Ulcers: ☐ Yes ☐ No
Fever: ☐ Yes ☐ No

Edema	Category
Ankle	
Sacrum	
Ascites	

Albumin before oncological treatment: _____ g/dl
Prealbumin after oncological treatment: _____ mg/dl
Metabolic Demand

Stress Level	None	Mild (1)	Moderate (2)	High (3)
Fever	No fever	37˚C < 38˚C	38˚C < 39˚C	≥39˚C
Duration of Fever	No fever	<72 hours	72 hours	>72 hours
Steroids	None	Low dose (<10 mg/day Prednisone or equivalent)	Moderate dose (10 - 30 mg/day)	High dose (≥30 mg/day)

☐ No metabolic stress
☐ Mild metabolic stress
☐ Moderate metabolic stress
☐ High metabolic stress