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Nutritional Assessment in Digestive Carcinology Surgery

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Abstract **Original Research Article**

Malnutrition is a major public health concern, particularly among patients with digestive cancers, where it contributes to higher rates of postoperative complications, delayed healing, and increased morbidity. This retrospective study, conducted over six months from January to June 2024 in the visceral surgery department of Ibn Tofail Hospital, CHU Mohammed VI in Marrakech, aimed to evaluate the perioperative nutritional management of patients undergoing digestive oncologic surgery and assess adherence to current guidelines. A total of 31 patients were included, with a mean age of 59.6 years (range 37–89) and a sex ratio of 1.07. The most frequent cancers were gastric and colorectal (38.7% each), followed by pancreatic-duodenal cancers (22.6%). Malnutrition (GN4) was identified in 61.3% of patients, based on recent weight loss (61.3%), low BMI (25.8%), and hypoalbuminemia (12.9%). Only 25.8% received preoperative nutritional support—Oliclinomel (12.9%), albumin (9.7%), or oral supplements (6.4%)—while 67.7% received postoperative nutrition. Malnutrition was significantly associated with older age (p=0.01) and persistent digestive symptoms (p=0.003). Additionally, 25.8% had postoperative complications, and 12.9% required ICU admission, with no reported deaths. These findings highlight a high prevalence of preoperative malnutrition and inconsistent nutritional support, particularly in the use of recommended supplements such as immunonutriments and trace elements. Improving preoperative nutritional assessment, especially during anesthesia consultations, is essential for optimizing postoperative outcomes in this vulnerable population.

Keywords : Malnutrition, Digestive cancers, Nutritional support, nutritional grade, nutritional assessment.

INTRODUCTION

Denutrition is a serious public health problem, resulting from an imbalance between nutritional needs and intake. Although common in developing countries where poverty and limited resources are widespread, malnutrition also occurs in industrialized countries due to psychosocial factors or as a result of acute or chronic illness [1].

In the case of digestive cancers, malnutrition is an unavoidable consequence that stands out for its frequency and severity. It is the result of a variety of mechanisms and has serious repercussions. In the perioperative period, denutrition is a factor in its own right in postoperative complications, delayed healing, longer hospital stays and even postoperative mortality [2].

MATERIALS AND METHOD

The objective of this study is to report the experience of the Intensive Care-Anesthesia Department in collaboration with the Visceral Surgery Department of Ibn Tofail Hospital in Marrakech concerning perioperative nutritional management of 31 patients operated on for digestive carcinological surgery. The specific objectives included identifying patients at risk of postoperative complications, assessing the risks according to the severity of the operation, detecting denutrition or vulnerable nutritional status, reviewing the recommendations for artificial nutrition (oral, enteral or parenteral route, substrates, duration), and studying the impact of nutritional assessment and assistance on short- and medium-term prognosis.

This is a retrospective analytical study of patients operated on for digestive carcinology at Ibn Tofail Hospital in Marrakech, carried out over a 6-month period from January 2024 to June 2024. The inclusion criteria were patients over 16 years of age who had

undergone scheduled surgery for digestive cancer, while the exclusion criteria concerned patients with advanced or complicated cancers (such as peritoneal carcinosis or intestinal obstruction), tumors that could not be removed, those who had undergone hepatic oncology surgery, or those who underwent emergency surgery.

The survey was carried out using a form filled in from the patients' medical records. Statistical analysis was performed using SPSS software. Finally, patient anonymity and confidentiality were guaranteed throughout data collection and the study.

RESULTS

Part 1: Descriptive Study:

I. Epidemiological Data:

1. Age of Patients:

The age of the patients recruited in our study ranged from 37 to 89 years, with a mean age of 59.6 years and a median age of 61 years.

2. Gender of Patients:

Among the patients recruited, we counted 16 men with a frequency of 51.6% and 15 women with a frequency of 48.4%, resulting in a male/female sex ratio of 1.07.

3. Location of Digestive Cancers:

In our study, we included a total of 31 patients with digestive cancers, distributed as follows: 12 patients with stomach cancer (38.7%), 12 patients with colorectal cancer (38.7%), and 7 patients with duodeno-pancreatic cancer (22.6%). This breakdown shows that stomach and colorectal cancer are equally prevalent, while duodeno-pancreatic cancer, although less frequent, highlights the diversity of pathologies encountered in this population.

II. Nutritional Assessment:

1. Risk Factors for Peri-Operative Malnutrition:

1.1. Patient-Related Risk Factors for Malnutrition:

Of the 10 patient-related risk factors for undernutrition identified according to SFAR and SFNEP recommendations, only 4 parameters were represented in our study. Each patient presented at least two risk factors for undernutrition, having all undergone cancer surgery and suffering from persistent digestive symptoms. In addition, 8 patients were over 70 years of age and 8 others had chronic pathologies in their history, underlining the importance of these risk factors [3].

1.1.1. Persistent Digestive Symptoms:

a. Frequency of Persistent Digestive Symptoms:

In our study, the frequencies of digestive symptoms observed in patients varied. Abdominal pain was the most common symptom, present in 77.4% of patients. This was followed by rectal discharge/melena, observed in 19.3% of patients, and icterus, reported by 12.9%. Nausea/vomiting was also reported by 12.9% of patients, followed by constipation and cessation of feces and gas, each affecting 9.7% of patients. Anorexia and dysphagia were identified in 9.7% and 6.4% of patients, respectively. Finally, rectal syndrome and dyspepsia were observed in 3.2% of patients. This distribution highlights the significant prevalence of abdominal pain and reveals the variety of digestive symptoms observed in patients with digestive cancers.

b. Association of Persistent Digestive Symptoms:

Analysis of persistent digestive symptoms in patients in our study shows that 52% had a single symptom, 35% had two, 10% had three, and 35% reported more than four associated symptoms. These results highlight the clinical complexity of patients with digestive cancers.

1.1.2. Chronical Diseases:

a. Prevalence of Chronical Diseases:

In our study, the prevalence of chronical diseases among patients was significant. Arterial hypertension was the most common condition, affecting 16.1% of patients, followed by type 2 diabetes, observed in 12.9%. Other pathologies were also present, including endocrine disorders linked to goiter (3.2%), hematological disorders such as iron deficiency anemia (3.2%), as well as heart failure and asthma, each also affecting 3.2% of patients.

b. Combination of Several Chronical Diseases:

The combination of two chronical diseases was observed in 12.9% of patients with comorbidities, while 3.2% of cases had the combination of three chronical diseases.

1.2. Treatment-Related Risk Factors:

Treatment-related risk factors were significant in our study. Polymedication, defined as taking more than five medications, was observed in 13 cases. In addition, prolonged corticosteroid therapy of over one month was noted in 3 patients. Regarding to carcinological treatment, 7 cases were identified, of which 3 patients had received both chemotherapy and radiotherapy, while 4 others had received chemotherapy sessions only.

1.3. Association of Risk Factors for Malnutrition:

The association of risk factors for denutrition in the patients in our study revealed significant results. Fourteen patients had two risk factors, while five patients had three. Three patients had four risk factors, and nine patients had five or more risk factors.

2. Nutritional Status:

Assessment of nutritional status is essential to identify clinically relevant denutrition likely to lead to postoperative complications and medico-economic consequences. This assessment takes into account at least one of the following parameters:

- BMI < 18.5 or BMI < 21 in patients over 70 years of age.
- Recent weight loss > 10%.
- Serum albumin < 30 g/L regardless of CRP.

- **Distribution of Patients According to Nutritional Status:**

Undernutrition was revealed by: underweight in 25.8%, recent weight loss in 61.3% and hypoalbuminemia in 12.9%.

3. Nutritional Grade:

To stratify nutritional risk, we need to take into account all the elements mentioned above: risk factors, clinical and biological parameters and the nature of the surgical procedure. These make it possible to distinguish nutritional grades in order to have optimal, codified management for each group of patients.

In our study, all patients had cancer and had undergone digestive carcinological surgery, considered to be at high risk of morbidity. Their nutritional grade (GN) was assessed, with a classification of GN2 for those who were not malnourished and GN4 for those who were malnourished. We observed that 19 patients were classified as GN4, representing 61.3% of the cohort, while 12 patients were classified as GN2, or 38.7%.

III. Nutritional Management:

1. Distribution of Patients According to Their Nutritional Preparation:

Table I: Patients receiving perioperative nutritional support

Nutritional Grade	Number (percentage)	Number of patients receiving exclusive preoperative nutritional support	Number of patients receiving exclusive postoperative nutritional support	Number of patients who received both pre-op and post-op nutritional support
GN 2	5 (16,2 %)	0	3	2
GN4	17 (54,8 %)	0	11	6
Total (percentage)	22 (70.9%)	0 (0%)	14 (45.2%)	8 (25.8%)

2. Preoperative Nutrition:

In our study, in terms of pre-operative nutrition: 25.8% received nutritional support based on a multifibre foodstuff “Fortimel” orally or and an emulsion for infusion containing amino acids, glucose, a lipid emulsion and electrolytes “oliclinomel” assistance.

A difference is described between what is recommended (Figure 1) (4) and what is applied in current practice, in our context this amounts to:

- The unavailability of recommended nutritional products in the hospital structure of our study.
- The high workload in hospital departments.

Table II: Patients receiving preoperative nutritional support, their characteristics and the nutritional support received

Grade	Sexe	Age	Localisation	Type	Oral / Parenteral	Duration
GN 2	M	64	Colon	Oliclinomel n4 1000 ml/j	Pareneéral vvp	2j
	F	62	Colon	Fortimel 200 ml/j	Orale	3j
GN 4	M	89	Vaterian ampulloma	Oliclinomel N4 1000 ml/j	Parenteral VVP	2j
	F	60	Pancreas	Albumin 50 ml (200 mg/ml)	Parenteral vvp	1j
	F	75	Sigmoid	Oliclinomel n4 1000 ml/j	Parenteral vvp	2j
	M	68	Stomach	Albumin 50 ml (200 mg/ml)	Parenteral VVP	1j
	M	82	Stomach	Albumin 50 ml (200 mg/ml)	Parenteral vvp	1j
	M	67	Colon	Oliclinomel n4 1000 ml/j	Parenteral vvp	2j

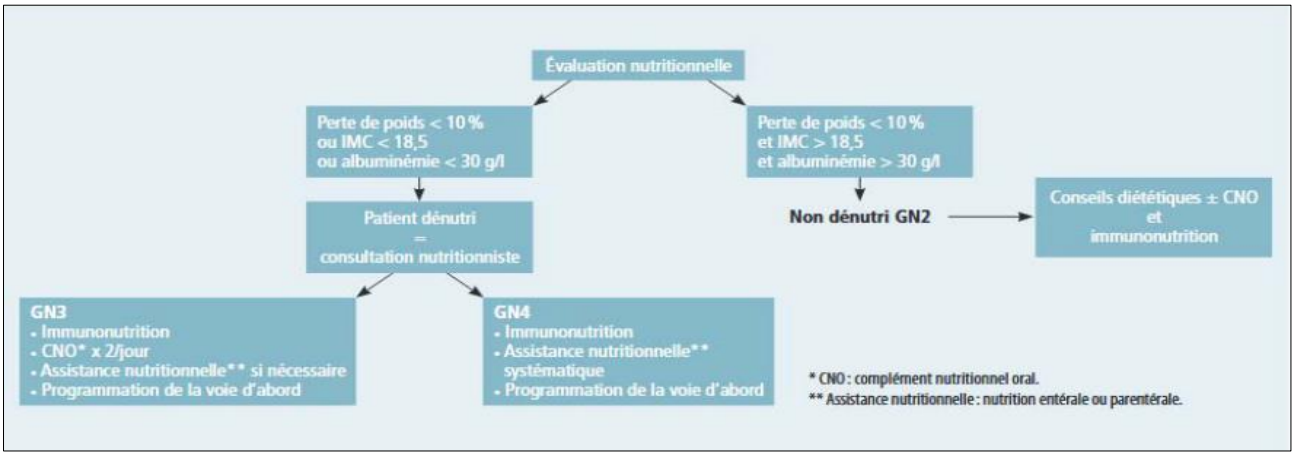

Figure 1: Decision tree for the management of malnourished patients in the perioperative period [4]

3. Postoperative Nutrition:

Regarding postoperative nutrition, 70.9% of patients in our series received postoperative nutritional assistance. These rehabilitated patients were dispatched 54.8% with GN4 and 16.2% with GN2. The products used were always the same: ACTIMEL by enteral route or via the jejuno stoma, and oliclinomel by venous route. The start and duration of treatment were not recorded in the medical records in only 27% of cases. Each patient was managed independently of the recommendations. The start of food intake varied between D0 and D5, on a case-by-case basis, depending on the patient's postoperative condition. In order to compare our results with those of other studies, the table below summarizes them:

Table III: The prevalence of patients who received post-op artificial nutrition

Authors	Number of patients (n)	Postoperative nutritional assistance (%)
Rakotondrainibe (5)	30	70
Y. Karmouta (6)	69	67
M.H. Charfi (7)	287	1,74
W. Chentoufi (8)	100	16
M.Bensenane (9)	87	35,7
Notre série	31	22

Table IV: Patients receiving postoperative nutritional support, their characteristics and the nutritional support received

Grade	Sexe	Age	Localisation	Type	Oral / Parenteral
GN 2	M	64	Colon	High-protein diet	Oral
	M	60	Sigmoid	High-protein diet	Oral
	F	62	Colon	High-protein diet	Oral
	M	52	Colon	High-protein diet	Oral
GN 4	F	59	Duodenum	High-protein diet	Oral
	F	60	Colon	High-protein diet	Oral
	M	68	Pancreas	Oliclinomel - high-protein diet	Parenteral – Oral
	M	70	Caecum	Actimel	Oral
	F	85	Stomach	High-protein diet	Oral
	M	74	Stomach	High-protein diet	Oral
	F	75	Sigmoid	High-protein diet	Oral
	M	89	Duodenum	Oliclinomel	Parenteral
	M	71	Stomach	High-protein diet	Oral
	F	43	Pancreas	High-protein diet	Oral
	F	60	Pancreas	High-protein diet	Oral
	F	68	Stomach	Actimel	Oral
	F	75	Sigmoid	High-protein diet	Oral
	F	68	Stomach	High-protein diet	Oral
	M	82	Stomach	High-protein diet	Oral
	F	37	Rectum	High-protein diet	Oral
	M	67	Colon	Actimel - oliclinomel	Parenteral-oral

IV. Postoperative Evolution:

1. Post-Operative Complications:

Table V: Postoperative complications recorded in study patients:

Grade	Localisation	Complications	Nutritional support
4	Stomach	- Hydroelectrolytic disorder	Pre-op and post-op
	Colon	- Fistulisation	
	Vaterian ampulloma	- Wall infection - Hydroelectrolytic disorder	
4	Duodenum	- Haemorrhagic shock - Hydroelectrolytic disorder	Post-op
	Caecum	- Sepsis - Hydroelectrolytic disorder	
	Stomach	- Hydroelectrolytic disorder	
		- Postoperative anaemia	
2	Recto-sigmoid hinge	-Fistulisation	Post-op

Post-operative complications are defined throughout the thirty days following surgery [10].

The overall morbidity rate was 25.8%, with 12.9% admitted to intensive care. There was no mortality.

1. Overall Mortality:

The mortality rate in our sample was 0%.

Q Denost *et al*., [11], found a low mortality rate because surgical causes of death were not taken into account. The mortality represented in the work of H.M Charafi [7], was zero in all these cases, and similar to our results.

Table VI: comparison of mortality within study groups

Authors	Number of patients	Mortality rate
Q. Denost [11]	490	1
H. Charfi [7]	287	0
W. Chentoufi [8]	100	6
M.Bensenane [9]	87	3,4
Notre série	31	0

Part 2: Analytical Study:

1- Correlation between Malnutrition Factors and Risk of Malnutrition in Patients of Our Study:

- Statistically significant association between age and denutrition, since the p value was 0.008, we conclude that there is a link between older age and an increased risk of denutrition in our sample.
- Significant correlation between persistent digestive symptoms and denutrition, indeed the existence of an association of persistent digestive symptoms is linked to an increased risk of malnutrition.

Table VII: Correlation between malnutrition factors and risk of malnutrition in patients of our study:

	Total (N=31)	Malnutrition		p value
		No (N=12)	Yes (N=19)	
Age				0.008
Mean (SD)	62.2 (12.8)	54.8 (8.8)	66.9 (12.9)	
Age>70ans				0,01
No	23.0 (74.2%)	12.0 (100.0%)	11.0 (57.9%)	
Yes	8.0 (25.8%)	0.0 (0.0%)	8.0 (42.1%)	
Association of persistent digestive symptoms				0,003
No	15.0 (48.4%)	10.0 (83.3%)	5.0 (26.3%)	
Yes	16.0 (51.6%)	2.0 (16.7%)	14.0 (73.7%)	

2-Correlation between Malnutrition Factors and the Risk of Complications in Our Study:

Statistically significant association between older individuals who are malnourished and the risk of morbidity. This association highlights the importance of tailored nutritional care, especially for elderly patients.

Table VIII: Correlation between malnutrition factors and the risk of complications in our study:

	Total (N=31)	Morbidity		p value
		No (N=23)	Yes (N=8)	
Age				0.011
Mean (SD)	62.2 (12.8)	58.8 (12.0)	71.9 (10.4)	
Localisation				0.058
Duodenum	2.0 (6.5%)	0.0 (0.0%)	2.0 (25.0%)	
Stomach	12.0 (38.7%)	9.0 (39.1%)	3.0 (37.5%)	
Colon	12.0 (38.7%)	9.0 (39.1%)	3.0 (37.5%)	
Pancreas	5.0 (16.1%)	5.0 (21.7%)	0.0 (0.0%)	

2. Correlation between Nutritional Status and Risk of Complications:

Association between nutritional status and the incidence of adverse clinical outcomes.

Table IX: Correlation between nutritional status and risk of complications:

	Total (N=31)	Morbidity		p value
		No (N=23)	Yes (N=8)	

Malnourished patients				0,086
No	12.0 (38.7%)	11.0 (47.8%)	1.0 (12.5%)	
Yes	19.0 (61.3%)	12.0 (52.2%)	7.0 (87.5%)	

CONCLUSION

Perioperative undernutrition is a key factor in poor prognosis following digestive carcinology surgery, leading to postoperative complications, prolonged stays and frequent readmissions. It results from nutritional deficiencies and a hypercatabolic state linked to the disease and ageing. Perioperative nutritional management, which has been codified for 30 years, is based on nutritional assessment, risk stratification and specific measures, with nutritional rehabilitation as the central element for improving prognosis.

The retrospective study conducted at the Ibn Tofail Hospital in Marrakech (2024) in the visceral surgery and intensive care-anesthesia departments shows that undernutrition particularly affects men (51.6%) with an average age of 59.6 years. Gastric and Colorectal cancer was the most common pathology (38.7%). All patients had at least two risk factor, 5 had three, 3 had four, and 9 had five or more. Of the patients, 61 % were malnourished (GN4) and 39% not malnourished (GN2).

With regard to nutrition, 14.6% of patients received preoperative nutrition and 39% postoperatively. Post-operative outcomes showed a morbidity rate of 19.5% and a mortality rate of 7.3%. To improve management, it is essential to raise awareness among healthcare teams of the problem of perioperative undernutrition and to implement an algorithm for assessing nutritional status in order to initiate appropriate nutritional management, thereby helping to reduce postoperative complications. The aim of this study is to describe the day-to-day nutritional approach and propose solutions to improve the prognosis and quality of care.

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