Preoperative nutritional and anaesthetic management of patients undergoing digestive carcinology surgery

Abstract

Introduction:

Peri-operative undernutrition is one of the complications that can hamper postoperative rehabilitation and increase morbidity and mortality in digestive surgery. It is currently recommended to assess the nutritional status of patients, especially pre-operatively.

The objective of this study was to evaluate the nutritional and anaesthetic management in major digestive surgery at the Ibn Rochd Casablanca Hospital. Methods: A two-month retrospective study of patients undergoing scheduled digestive carcinological surgery. Before and after the operation, a weighing was done, the notion of weight loss was looked for, the albumin level was measured and the body mass and nutritional risk indices were calculated. Nutritional stratification of each patient was performed.

Results: Nine patients, predominantly male and with a mean age of 46.9 years, were included in the study. The average duration of preoperative hospitalisation was 8.7 days, 28.2% of the patients were undernourished with a body mass index (BMI) of less than 18.5%, and 25% of the patients were undernourished with a weight loss of over 10%. 9.4% of patients were undernourished with an albumin level below 30g/l, the rate of postoperative complications was almost similar in patients with a weight loss of 10% or more.

Conclusion:

The management of patients in scheduled carcinological surgery must respond to the question of comprehensiveness and multidisciplinarity due to the complexity of the interventions and the postoperative complications secondary to any invasive procedure.

Key words: undernutrition, albumin, pre-anaesthetic assessment, immunonutrition

Introduction

Digestive carcinological surgery is a major surgery associated with an increase in postoperative mortality and also with a significant morbidity due essentially to an alteration in immune functions, the ageing of the population, and potentially more significant comorbidities, particularly cardiac. Pre-operative nutritional and anaesthetic management is therefore an important stage in the patient's care, to better understand the operative period and to minimise the risks of morbidity and mortality.

The aim of this article is to focus on preoperative anaesthetic and nutritional management in visceral surgery procedures.

Methods

We conducted a prospective study between 19 February and 10 April 2021. We included All patients who were going to undergo elective major digestive surgery were considered and selected during the pre-anaesthetic consultation. Patients lost to follow-up were excluded.
The patients included were those who had in their files, in addition to all the standard work-up; albumin values, in order to be able to calculate the nutritional risk index (NRI) as well as anthropometric data, notably weight and height for the calculation of the body mass index. The nutritional status of the patients was assessed according to BMI and NRI as well as on the assessment of whether they had lost weight or not. The decision to provide peri-operative nutrition was based on the BMI value. In addition to the search for relevant signs of preoperative undernutrition, the stratification of the global risk of undernutrition according to the recommendations of the SFAR (Société Française d'Anesthésie Réanimation) was done by means of nutritional grades.
Statistical analysis was performed using SPSS-20 software, data were compared in univariate by chi-test, Fisher's test and ANNOVA, a p-value <0.05 was considered statistically significant.

Results

Thirty-two patients scheduled for major digestive surgery were included in the study. Ten of them were excluded due to loss of sight, seven were excluded for refusal of care after initial hospitalisation and six for lack of data. In the end, nine predominantly male patients (sex ratio: 1.21) were included with a mean age of 49.9 years.

The average preoperative hospital stay was 8.7 days, in our series preoperative feeding was oral in all patients, most patients were ASA class 1 (83%) all our patients had a complete biologic workup (100%) nine patients had a cardiac echo (100%) eight patients had a chest x-ray (88.8%). 28.2% of the patients were undernourished with a Body Mass Index (BMI) of less than 18.5%, with 25% of the patients undernourished with a weight loss of more than 10%.

9.4% of patients were undernourished with an albumin level below 30g/l, moderate to severe undernutrition was observed in 28% of patients with a nutritional risk index (NRI) below 97.5.

Post-operatively 42.7% of our patients lost weight, among our operated patients 3.4% benefited from parenteral nutrition at a rate of 30 Kcal/Kg/d by oliclinomel and 96.6% recovered an oral nutrition.

The average length of hospital stay was 14.6 days, the rate of postoperative complications was almost similar in patients with a weight loss of 10% or more and those with a weight loss of less than 10%, we found that the overall complication rate was higher in patients with an albumin level of 30g/l or less and in patients with an IRN score of less than 97.5, and also for malnourished patients classified as grade 3 and 4.

In our series, we noticed a longer length of stay in hospital for malnourished patients.

Discussion

Pre-anaesthetic assessment

The aim of the preoperative assessment of a patient is twofold: on the one hand, to detect pathologies that could interfere with the operation and increase the risks, and on the other hand, to offer the patient optimal preparation and protection to reduce the operative risks (1).

Routine complementary examination, defined as an examination carried out without a precise clinical indication, is no longer practised. Indeed, numerous studies have shown that routine tests, even pathological ones, do not generally bring any change in anaesthetic and perioperative management (2,3).
The international literature recommends abandoning the systematic prescription of pre-interventional complementary examinations in favour of a limited, reasoned prescription based on clinical or anamnestic signs (4).

Many anaesthetic societies have their own recommendations for further investigations, usually based on the patient, their age, physical status and comorbidities (5) (Table 1).

Tests	Conditions	Tests	Conditions
ECG	• Maladie cardiovasculaire • Maladie respiratoire • Age avancé	Tests de coagulation	• Pathologie de coagulation • Insuffisance rénale • Insuffisance hépatique • Anticoagulation
Autre évaluation cardiaque	• Facteurs de risque cardiovasculaire		
Radiographie de thorax	• Tabagisme • BPCO • Infection respiratoire récente • Maladie cardiaque	Chimie sanguine	• Age avancé • Certains médicaments • Pathologie endocrinienne • Insuffisance rénale • Insuffisance hépatique
Fonctions pulmonaires/ gazométrie	• Asthme • BPCO • Scoliose avec fonction restrictive	Analyse d'urine	• Symptômes urinaires • Certaines opérations (par exemple: procédure urologique)
Hémoglobine	• Hépatopathie • Age avancé • Anémie connue • Pathologie de coagulation • Pathologie hématologique	Tests de grossesse	• Anamnèse de grossesse non claire, suggestive ou positive • Considérer chez chaque femme préménopausée comme possibilité

Table 1: Clinical conditions for considering further testing (6)

Definition and risk factors of undernutrition in carcinological surgery :

According to the French National Authority for Health, undernutrition reflects a mismatch between the body's protein and energy requirements, with tissue losses having deleterious consequences for the body (7).

Table 2 reports the different risk factors for undernutrition in patients with digestive cancer. According to European and French recommendations (8,9) According to the European and French recommendations established jointly by the French Society of Intensive Care Anaesthesia and the French Society of Clinical and Metabolic Nutrition (10).

Facteurs de risque liés au patient
• Age > 70 ans • Sepsis • Pathologies chroniques : diabète, insuffisance d'organe, pathologie neuromusculaire, obésité préexistante, troubles cognitifs, syndrome dépressif, VIH/Sida, Syndrome inflammatoire • Antécédent de chirurgie digestive majeure (grêle court, pancréatectomie, gastrectomie, chirurgie bariatrique)
Facteurs de risque liés à la maladie
• Symptômes persistants : dysphagie, nausées, vomissements, douleurs, diarrhées, dyspnée • Cancer du tractus digestif haut : œsophage, estomac, pancréas • Maladie localement avancée • Extension métastatique
Facteurs de risque liés au traitement
• Radiothérapie - Chimiothérapie • Polymédication > 5 • Corticothérapie

Table 2: Risk factors for undernutrition in patients with digestive cancers (11)

Screening and assessment of undernutrition :

In digestive oncology, severe undernutrition is associated with a poor prognosis and an increased risk of postoperative complications (12,13).

In oncological surgery, undernutrition can be defined as(14) :

- A BMI ≤ 18.5 or < 21 in those over 70.
- And/or a weight loss of at least 10% in 6 months.
- And/or an albumin level < 30 g/l regardless of CRP.

A nutritional grade in carcinological surgery (7) correlates surgical risk and preoperative nutritional status:

- Nutritional Grade 2 (NG2): non-denutrient patient and surgery with high risk of morbidity.
- Nutritional Grade 3 (NG3): undernourished patient and surgery without high risk of morbidity.
- Nutritional Grade 4 (NG4): malnourished patient and surgery at high risk of morbidity.
- Nutritional grade 1 (GN1) does not apply to cancer patients.

Pre-operative nutritional management

One of the keys to this management is the anticipation of the postoperative period with preparation for nutritional assistance via the programming of the approach (7).

Figure 1 summarises the preoperative nutritional management.

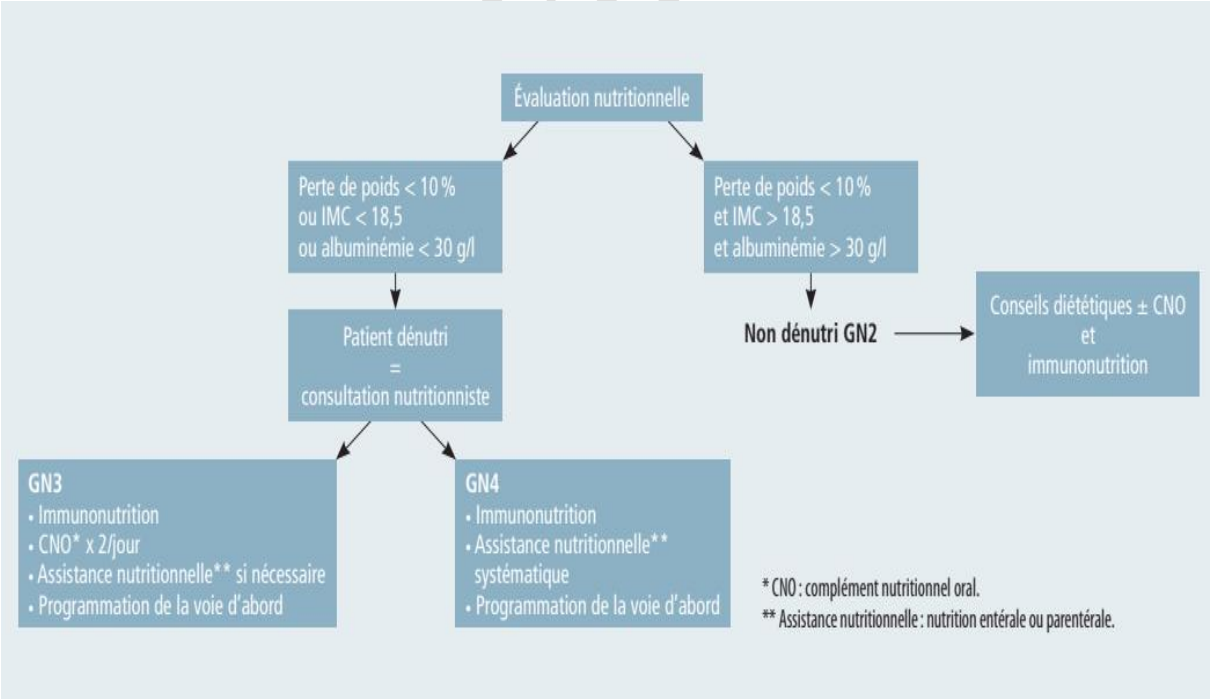

Figure 1: Preoperative management of patients undergoing scheduled digestive oncology surgery (7)

Immunoutition

It is a complete, hyperprotein, normoenergetic nutrient blend, supplemented with specific nutrients such as arginine, glutamine, micronutrients, unsaturated fatty acids, omega-3 or nucleotides, taurine, vitamins A, E, and C, beta-carotene and trace elements such as zinc and selenium, and can be administered either orally (OralImpact®) or enterally (Enteral Impact®) (7).
Immunonutrition allows for additional perioperative immune reinforcement in so-called "high-risk" surgeries in response to the surgical stress of the operation. In programmed oncological surgery, whatever the nutritional status, immunonutrition is recommended during the 5 to 7 preoperative days (15).

Recommendations of the French Society of Digestive Surgery (SFCD) (16):

Perioperative artificial nutrition

Patients who should not receive perioperative artificial nutrition:

In the perioperative period (2 weeks before and 2 weeks after surgery), standard artificial nutrition is unnecessary in patients who are not or only slightly malnourished (weight loss <10%) and who can resume a diet covering 60% of their needs within a week of surgery **(Grade A)** (16).

Patients requiring perioperative artificial nutrition:

Perioperative artificial nutrition is recommended for severely malnourished patients (weight loss ≥ 20%) undergoing major surgery, although the type of surgery alone is not an indication for artificial nutrition (Grade A). No unambiguous recommendation can be made for moderately malnourished patients (10-19% weight loss) (Grade B).
Post-operative nutrition is indicated in principle:

- in all patients who have received preoperative artificial nutrition (Grade A).
- in all patients who have not received preoperative artificial nutrition and are severely malnourished (Grade A).
- in patients who are unable to resume a diet covering 60% of their nutritional requirements within one week of surgery (Grade A), in any patient with an early postoperative complication responsible for hypermetabolism and prolonged fasting (Grade A)
- in other patients, no unambiguous attitude can be recommended (Grade B) (16)

Immunonutrition

One week of enteral immunonutrition is recommended pro-operatively in all patients undergoing major digestive surgery **(Grade A)**. It should be continued postoperatively in patients who were malnourished preoperatively:

- for one week if there are no complications
- for one week if there are no complications, or until oral feeding is resumed to provide at least 60% of nutritional requirements **(grade A)** (16).

Digestive suction

It is recommended that NG suctioning not be used routinely after elective vesicular or gastric surgery **(Grade A)**, nor after hepatectomy or main biliary tract surgery **(expert agreement)**.
After elective colorectal resection, it is recommended that NTS aspiration not be used **(Grade A)**. This recommendation appears to be extendable to small bowel surgery **(expert agreement)**.
No recommendation can be made for emergency bowel surgery. (16)

Early postoperative re-feeding

As the usefulness of fasting after elective colorectal surgery has not been demonstrated, early and progressive oral re-feeding on the day after surgery, provided it is immediately tolerated, is recommended **(Grade A**) (16)

Some practical applications

The recommendations for nutritional management according to the type of surgery are grouped in Table 3.

Type d'intervention	Surveillance pondérale (2 fois/an)	Bilan nutritionnel standard (2 fois/an)	Dosage Ca, Ph, Mg, Zn, Cu, Se (2 fois/an)	Dosage folates et vitamine B12 (2 fois/an)	Vitamines liposolubles (A, D, E) (2 fois/an)	Vitamines hydrosolubles (B1, B6, B8..) (2 fois/an)	Ostéodensitométrie (1 fois/an)	Impédancemétrie ± DEXA (1 fois/an)	Test respiratoire au Glucose (1 fois/an)
Œsophagectomie totale	x	x	x	x	*	x	x	x	**
Montage antireflux	x	x	*	*	*	*	*	*	**
Gastrectomie totale	x	x	x	x	x	x	x	x	x
Gastrectomie partielle distale	x	x	x	x	x	x	x	x	x
DPC	x	x	x	x	x	x	x	x	x
Résection jéjunale	x	x	x	*	*	*	*	*	**
Résection iléale courte	x	x	x	x	*	*	x	x	**
Résection iléale longue	x	x	x	x	x	x	x	x	**
Syndrome de grêle court	x	x	x	x	x	x	x	x	**
Colectomie	x	x	x	*	*	*	x	x	**
Fistule du grêle	x	x	x	x	x	x	x	x	**
Fistule du côlon	x	x	x	*	*	*	*	*	**
Entérostomie	x	x	x	x	x	x	x	x	**
Colostomie	x	x	x	*	*	*	x	x	**

x : bilan à effectuer de manière systématisée ; * : bilan à effectuer en cas de signes de dénutrition ; ** : bilan à effectuer suivant le tableau clinique). La fréquence mentionnée est à titre indicatif.

Table 3: Nutritional management protocol according to pathologies (17)

Conclusion

The management of patients in scheduled carcinological surgery must respond to the question of globality and multidisciplinarity due to the complexity of the interventions and postoperative complications secondary to any invasive procedure. It is necessary today for surgery to focus on screening, evaluation and anticipation, to prevent complications.

It is in this sense that the identification of patients at risk and their early anaesthetic and nutritional management take on their full meaning, in a dimension of global support for our patients.

Bibliography

1. Rosenthal R, Blanc C. Bilan préopératoire en chirurgie viscérale. Rev Medicale Suisse. :7.

2. Arrowsmith JE. Preoperative investigation of the surgical patient. surg oxf. 2005 Dec 1;23(12):447-8.

3. Bryson GL, Wyand A, Bragg PR. Les préoperatoires tests ne correspondent pas aux directives published and rarely modifies the line of conduct. Can J Anesth. 1 Mar 2006;53(3):236-41.

4. Bordes J, Savoie PH, Wade K, Bonnet S, Kaiser E. Systematic pre-interventional exams: analyze the results and potential implications of 201 patients in a country with limited resources. Ann Fr Anesth Reanimation. 2014 Sep 1;33:A360.

5. National Institute for clinical excellence preoperative test...: European Journal of Anaesthesiology | EJA [Internet]. [I quoted May 30, 2021]. Available from: https://journals.lww.com/ejanaesthesiology/Citation/2007/06001/National_Institute_for_clinical_excellence.33.aspx

6.NA. Practice Advisory for Preanesthesia Evaluation: A Report by the American Society of Anesthesiologists Task Force on Preanesthesia Evaluation. Anesthesiology. 2002 Feb 1;96(2):485-96.

7. Chrostek H, Flori N, Senesse P. Prize en charge nutritionnelle périopératoire en chirurgie digestive carcinologique. :6.

8. Weimann A, Braga M, Harsanyi L, Laviano A, Ljungqvist O, Soeters P, et al. ESPEN Guidelines on Enteral Nutrition: Surgery including organ transplantation. Clin Nutr Edinb Scotl. avr 2006;25(2):224-44.

9. Braga M, Ljungqvist O, Soeters P, Fearon K, Weimann A, Bozzetti F, et al. ESPEN Guidelines on Parenteral Nutrition: surgery. Clin Nutr Edinb Scotl. Aug 2009;28(4):378-86.

10.Chambrier C, Sztark F, Société Francophone de nutrition clinique et métabolisme (SFNEP), Société française d'anesthésie et réanimation (SFAR). French clinical guidelines on perioperative nutrition. Update of the 1994 consensus conference on perioperative artificial nutrition for elective surgery in adults. J Visc Surg. 2012 Oct;149(5):e325-336.

11. Benoist S, Brouquet A. Dépistage de la dénutrition. J Chir Viscerale. fevr 2015;152:3-7.

12. Alves A, Panis Y, Mathieu P, Mantion G, Kwiatkowski F, Slim K, et al. Postoperative mortality and morbidity in French patients undergoing colorectal surgery: results of a prospective multicenter study. Arch Surg Chic Ill 1960. mars 2005;140(3):278-83, discussion 284.

13. Veterans Affairs Total Parenteral Nutrition Cooperative Study Group. Perioperative total parenteral nutrition in surgical patients. N Engl J Med. 1991 August 22;325(8):525-32.

14. Hébuterne X, Lemarié E, Michallet M, de Montreuil CB, Schneider SM, Goldwasser F. Prevalence of malnutrition and current use of nutrition support in patients with cancer. JPEN J Parenter Enteral Nutr. fevr 2014;38(2):196-204.

15. Chambrier C, Sztark F. Recommendations de bonnes pratiques cliniques sur la nutrition périopératoire. Update 2010 of the 1994 consensus conference on the "Nutrition artificielle périopératoire en chirurgie programmée de l'adulte". J Chir Viscerale. 2012 Oct 1;149(5):369-80.

16. Hébuterne X. Nutrition périopératoire en chirurgie digestive: la preuve est faite - Perioperative nutrition in digestive surgery: now evidence-based. 2005;4.

17. Zeanandin G. Nutritional consequences of digestive surgery. Nutr Clin Metabolisme. 2012;9.