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Evaluation of the Nutritional Status of Pre-and Post-Operative Patients in the Visceral Surgery Department

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The normal nutritional state is a metabolic situation of balance between the needs and supplies of protein for energy, vitamins, minerals, trace elements and water. The physiopathology of undernutrition can be explained by 2 mechanisms: exogenous or endogenous. In visceral surgery, undernutrition is often linked to chronic and/or oncological diseases. The objective of our work was to evaluate the nutritional status of patients in preoperative care, in the visceral surgery ward, Wing III, at the Ibn Rochd University Hospital in Casablanca, and correlate it to morbidity in postoperative care. This is a prospective observational study spread over 6 months in patients who were going to be operated on. The pre-operative nutritional status of 136 patients was assessed. Our series was marked by a 61% female predominance. The average number of patients with risk factors for undernutrition was 42%. The nutritional risk index identified 30% of patients with low nutritional risk, 56% of patients with moderate risk and 14% of patients with major risk. The nutritional risk

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stratification had identified 14 patients with a nutritional grade of 3. The average length of stay after surgery varied according to the type of surgery. The risk of undernutrition was high, however one parameter was still insufficient for the diagnosis of undernutrition preoperatively. A combination of different parameters would be a more reliable method.

Keywords: Nutritional status; visceral surgery; undernutrition; BMI.

1. INTRODUCTION

Normal nutritional status is a metabolic situation of balance between the needs and intake of protein, energy, vitamins, minerals, trace elements and water. The prevalence of undernutrition in general surgery is 27% [1]. The incidence in digestive cancer can reach more than 50% and varies according to the location and stage of the disease [2]. The objective of our work was to evaluate the nutritional status of patients in preoperative and postoperative care in the visceral surgery department Wing III of the Ibn Rochd University Hospital in Casablanca and to correlate it with the length of stay in postoperative care. As well as to look for certain correlations between the different methods of diagnosis and the associations between the parameters studied (age, sex, type of surgical intervention, etc.).

2. PATIENTS AND METHODS

This work is a prospective observational study which consisted of evaluating the nutritional status of patients in pre and postoperative care in the visceral surgery department Wing III of the Ibn Rochd University Hospital of Casablanca, during a period of 6 months (from July 2016 to December 2016) involving 136 patients. We included patients whose age was over 18 years, both sexes combined. For each patient weight and BMI were measured and calculated. The preoperative dietary survey included daily macronutrient intakes (protein, carbohydrates, lipids), micronutrient intakes (vitamins, minerals and trace elements) and water intake. In the postoperative period, an intake including meal frequency, the nature of the diet, the date of return to the normal diet, the daily intake in kilocalories, proteins, carbohydrates, lipids, vitamins, trace elements, minerals and water intake was established. The length of hospital stay was calculated for each patient included in the study, as well as the time between admission and the operation.

The protocol for postoperative re-feeding was to start a strict liquid diet (saline + glucose serum) a few hours after the operation and to resume feeding after resumption of transit. The quantity and rate of flow differed depending on the diagnosis and surgical procedure.

Nutritional follow-up was carried out postoperatively in patients hospitalized on the ward. Thanks to a well conducted interview in search of digestive signs (such as nausea, diarrhea, constipation, vomiting, gastroesophageal reflux, etc.), cardiovascular signs (tachycardia, palpitations), neurological signs were also looked for (syncope, confusion, eructation) A score was evaluated for a dumping syndrome. The albumin dosage was carried out in all our patients.

3. RESULTS

In our study there was a clear predominance of females, with 83 females (61%) versus 53 males (39%) for a sex ratio of 0.63 males to females. The mean age of our patients was 51.7 years with extremes of 18 and 80 years. The average length of hospital stay was 10.6 days with extremes ranging from 4 to 37 days. The number of patients who were taking treatment with a carcinological aim (chemotherapy, radiotherapy) was 31 and 10 patients were undergoing corticosteroid therapy. Preoperatively the average weight was 57.92 kg with extremes ranging from 38 kg to 100 kg. The body mass index (BMI) of all the patients was on average 21.73 kg/m^2 with extremes ranging from 14.2 to 36.7 kg/m^2 and 41% of the patients were malnourished.

Albuminemia was less than 30 g/l in 12% of patients. The diet was hypocaloric (<25 Kcal/kg/day) in 53.4% of patients, hypo proteinic (<1 g/kg/day) in 52.3%, hypoglucidic (<2 g/kg/day) in 69.9% and hypolipidic (<0.7 g/kg/day) in 48.5%. Patients who had experienced weight loss >5% in 1 month and >10% in 6 months were 44.94% and 43.82%, respectively. The NRI (nutritionnal risk index) had identified 20% of cases with low nutritional risk, 36% moderate risk and 44% major risk patients. According to MNA (mini nutritionnal

assessement) 8 patients over 70 years old were at risk of malnutrition and 4 had a poor nutritional status.

Artificial parenteral diet was administered to 10 preoperative patients because of stenosing cancer or persistent symptoms making feeding almost impossible. Fourteen patients with nutritional grade 3 were identified and 6 patients with nutritional grade 4.

The average post-operative weight of the patients was 50.2 kg with extreme values ranging from 32 to 73 kg. Patients with a weight loss of more than 5% during one month and more than 10% during 6 months were 25.7% and 8.82% respectively. A BMI of less than 18.5 kg/m^2 calculated in 19.8%.

The average amount of the liquid diet (water, verbena) of the patients in our serie was 879 ml/patient/24h, but it differs according to the type of intervention, with an average of 1 day after the intervention and an average duration of 2.6 days before the switch to the pureed diet. The average quantity of the puréed diet (vegetable soup + fish, fruit compote) of the patients in our series was 775 ml/patient/24h with an average of 2.5 days after the operation and an average duration of 3.5 days before switching to the next diet.

The average amount of the solid diet (steamed vegetables, fish, meat, raw fruits...) of the patients in our series was 383 gr/patient/24h with an average of 6.6 days after the intervention and an average duration of 4.8 days before discharge.

The mean time to return to a normal diet was 11.3 days. Sixteen patients had been on an artificial diet (oliclinomel N4) by peripheral venous route at a mean of 11/24hrs/patient 1.5 days post-operatively and a mean time of 4.9 days before re-feeding. Postoperatively, 60% of our patients were malnourished with a pre- and postoperative weight reduction of -7.72 kg and a reduction in BMI from 21.73 to 18.4 kg/m^2. Six patients had presented a postoperative complication (2 postoperative peritonitis requiring surgical drainage, a retroperitoneal abscess, 2 surgical palsy infections and a disunion of the digestive anastomosis.

4. DISCUSSION

Normal nutritional status is a metabolic state of balance between needs and intakes [1]. Metabolic and immune functions and body composition are maintained in adults by a daily diet covering basic nutritional requirements. When there is an imbalance between requirements and intakes, this is referred to as malnutrition [2]. Moreover, undernutrition can be defined as a pathological state, which may be the result of a deficiency of absolute or relative intake compared to usual requirements or increased (hyper catabolic state, sepsis) [3,4]. It is responsible for an increased morbi-mortality [5,6]. Clinical situations at risk of undernutrition are: Cancer, Chronic diseases; Digestive pathologies, Surgery.

The incidence of undernutrition defined by a body mass index < 18.5 kg/m^2, a weight loss of more than 10% of usual weight over 6 months was high in patients with digestive tract cancer ranging from 60 to 67%. There are more than 70 methods of measuring nutritional status [7]. This multiplicity is explained by the difficulty of precisely defining the concept of undernutrition and by the absence of sufficiently sensitive and specific clinical and/or biological criteria. The average age in a study conducted in Europe by Muller et al. [8] was 49 years, close to that of our patients who were 51.7 years old. A male predominance was observed in the study by Denis and al [9]; however in our study, a female predominance was noted with a sex ratio of 0.63 M/F. Approximately half of the patients (57%) in our study had a decreased BMI, which is close to the data in the literature (Table 1).

The length of stay reported in the literature increases as albumin levels decrease [10]. The mean length of stay in our study was 10.5 days influenced by nutritional status, finding that the difference between the lengths of stay of malnourished and non malnourished patients was significant in all studies (P<0.01, Table 2).

In a review of the international literature over the past 20 years Norman et al. [10] identified studies of the prevalence of undernutrition in hospitals, which averaged 41.7% and weight loss was common in patients with cancer disease, ranging from 40 to 80% [11]. Indeed, the prevalence of undernutrition is not easy to specify depending on whether we are dealing with patients at the beginning of the disease's evolution or it would be around 10% or during treatment in hospital: it then varies from 20 to 80% depending on the location of the cancer.

Table 1. Prevalence rates of undernutrition according to diagnostic cut-offs for BMI from clinical studies analysed

Authors	Study population	Threshold for BMI	Prevalence of undernutrition
Clair hurlimann et al. [9]	400	<18.5 Kg/m ^{2}	46%
S. asnafi-farghang et al. [8]	30	<19 Kg/m ^{2}	17%
Kamel HK et al. [8]	300	<24 Kg/m ^{2}	63%
Our study	136	< 18.5 Kg/ m ^{2}	Preoperative: 41%. Postoperative: 57%.

Table 2. Average length of stay by nutritional status at admission to service

Author	Number of cases	Types of patients	Length of hospitalization (days)	
			Dénutris	Not malnourished
Reilly [6]	771	Medical-surgical	21,5	16.5
Shaw-stiffel [7]	245	Gastrointestinal surgery	23.5	16.5
Chima [6]	173	Medical	6	4
Our study	136	Digestive surgery	12.2	10.5

Chronic diseases like cancer can be complicated by wasting [12], undernutrition complicates 20-60% of COPD, 50% of heart failure [13], 40% of chronic kidney failure [14] and 30% of cirrhosis [15]. In our study, the diagnosis of undernutrition in patients with co-morbidities of associated chronic pathologies (IBD, colonic polyposis, diabetes, hypertension), 23% of these patients were undernourished postoperatively.

Major oncologic surgeries on the digestive tract are associated with a high risk of undernutrition of up to 60% for certain types of surgery, especially esophageal and pancreatic surgery, which expose mortality and morbidity rates of 10% and 5%, and 50% and 66%, respectively [16]. According to our results 40% of malnourished patients underwent oncology, gastric or pancreatic surgery. Radiotherapy and chemotherapy have a significant nutritional impact [17,18]. In our study, 65% of the patients who were malnourished before surgery had received radiotherapy and/or chemotherapy. Systemic corticosteroid therapy induces protein hypercatabolism following proteolysis, especially when it is long term [19]. In our study, 10 patients received long-term corticosteroid therapy and three of them were malnourished.

Hypo albuminemia is only one consequence of the severity of the patient's condition and therefore a good marker of the risk of morbidity and mortality that may be related to undernutrition [20]. In our study 12% of patients had hypoalbuminemia.

Today, it is widely recognized that the prognosis of undernutrition is linked to the decrease in protein reserves responsible for 50% of deaths in the event of protein depletion [21]. Recommendations for the nutritional management of patients are based on nutritional grades and include preoperative, immediate preoperative and postoperative care protocols [22].

5. CONCLUSION

In our study, pre and postoperative undernutrition is still high, leading to major complications often due to an imbalance in the nutritional supports administered to each patient as well as the precariousness or even absence of hospital nutrients such as ternary compounds or immuno-nutrients and trace elements by injectable and/or oral route.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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