Original

Perioperative nutritional management of patients undergoing laparotomy

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Abstract

Objectives: Lack of routine patient’s nutritional assessment and prescription of long fasting periods throughout the perioperative period are still widely prevalent despite the advances in surgical care. Therefore, the aim of this study was to assess nutritional routines in two surgical wards.

Methods: Adult patients undergoing laparotomy at two distinct units (gastrointestinal and gynecologic) in two public hospitals (one of them a university) were enrolled. Patients were divided in minor and major (groups A and B) procedures and were nutritionally assessed at admission. Daily diet intake and a 24 hour recall were performed. Patients rated the quality of the meals, as well as registered the reasons for not ingesting it fully.

Results: Patients in group B presented with poorer nutritional status. Group A patients resumed oral diets on the first post operative day and most of them received regular diets (85.5%). In group B, only 4.7% were allowed a regular diet on the first PO day, 7.0% received soft diets, 30.2% full liquid diets, 27.9% clear liquids and the remaining 50.2% were on NPO. Patients in this group had a slower progression of diets from liquid to regular solid meals, with 7% of them still on NPO on the fifth PO day. Contrarily to group B, patients in group A did not present with cumulative caloric and protein deficits throughout the postoperative period. Overall tolerance of the early diet was good.

Conclusion: Malnutrition is still high among major surgical patients. Early oral nutrition can be feasible and well tolerated with few side effects, when prescribed.


Introduction

Clinical management of surgical patients has improved significantly in recent years. However, some common practice attitudes such as lack of routine patient’s nutritional assessment and, prescription of long fasting periods throughout the perioperative period, especially in patients undergoing gastrointestinal tract operations, are still widely prevalent. In addition, when feeding is allowed, it is slowly progressed from clear liquids to regular diets. This practice has been justified by paradigms related to postoperative ileus, which is predominant in this period. Furthermore, the organic response to stress interferes with postoperative ileus and also

CUIDADOS NUTRICIONALES PERIOPERATORIOS EN PACIENTES SOMETIDOS A LAPAROTOMÍA

Resumen

Objetivos: La falta de la valoración nutricional rutinaria del paciente y la prescripción de largos periodos de ayuno durante el periodo perioratorio siguen siendo muy prevalentes a pesar de los avances en los cuidados quirúrgicos. Por lo tanto, el objetivo de este estudio fue evaluar las rutinas de valoración nutricional en dos guardias quirúrgicas.

Métodos: Se reclutaron pacientes adultos sometidos a laparotomía en dos unidades distintas (gastrointestinal y ginecológica) en dos hospitales públicos (uno de ellos universitario). Se les dividió en procedimientos menores y mayores (grupos A y B) y se les valoró nutricionalmente al ingreso. Se registró la ingesta diaria y un recuerdo de 24 horas. Los pacientes puntuaron la calidad de las comidas y también registraron los motivos para no ingerirlas por completo.

Resultados: Los pacientes del grupo B presentaron un peor estado nutricional. Los pacientes del grupo A reiniciaron la dieta oral en el primer día postoperatorio y, por lo general, recibieron dietas habituales (85,5%). En el grupo B, sólo al 4,7% se le permitió una dieta habitual en el primer día PO, el 7,0% recibió dietas blandas, el 30,2% dietas líquidas completas, el 27,9% líquidos suaves y al 30,2% se le mantuvo a dieta absoluta. Los pacientes de este grupo tuvieron una menor progresión de la dieta desde la dieta líquida a una dieta habitual de comidas sólidas, con un 7% que seguía a dieta absoluta en el 5° día PO. Al contrario que el grupo B, los pacientes del grupo A no mostraron deficiencias acumuladas calóricas o proteicas a lo largo del periodo postoperatorio. Globalmente, la tolerancia a la dieta precoz fue buena.

Conclusión: La malnutrición sigue siendo alta entre los pacientes con cirugías mayores. La nutrición oral precoz es factible e tolerarse mejor con escasos efectos colaterales cuando se prescribe.

decreases appetite. Even when patients are allowed to eat, they usually present with decreased food intake due to the stress hormones released throughout this phase which lead most of them to resume full oral intake only several weeks after the operation. Hence, surgeons have feared abdominal complications such as nausea, vomiting, distension and mainly, fistula that might be enhanced by eating. On the other hand, several studies have recently shown that multimodal approaches of surgical patients, which amongst several other attitudes include nutritional assessment, preoperative carbohydrate load, adequate pain control and early post-operative nutrition, reduce the organic response to trauma and also the infection rates, thus improving outcome. In addition, early postoperative oral or nasoenteric/ostomy administration of nutrients has been suggested to decrease ileus. The logic behind early feeding is that food in the gastrointestinal tract may stimulate a reflex that produces coordinated propulsive activity and elicits the secretion of gastrointestinal hormones, causing an overall positive effect on bowel motility.

The aim of the present study was to assess patient’s nutritional status, food intake when prescribed by the attending physician and its tolerance, in two distinct surgical settings. Furthermore, it was our goal to assess postoperative patient’s appetite, overall nutrient intake and factors associated to these aspects.

Material and methods

Adult patients undergoing laparotomy at two distinct units (gastrointestinal and gynecologic) in two public hospitals were enrolled in this observational study and assessed by a well trained team of nutrition experts. Pregnant women, patients undergoing gastropasty for morbid obesity and those on enteral and parenteral nutrition were excluded. Patients were classified as having undergone major or minor laparotomies according to the procedures performed. Therefore, in group A (minor procedures) there were patients submitted to incisional abdominal hernia repair and gynecologic operations and, in group B (major operations) those undergoing gastric, small and large bowel procedures, as well as liver and biliary tract operations.

All patients were nutritionally assessed, at hospital admission, by using Subjective Global Assessment and were classified as: well nourished, suspected or moderately malnourished and severe malnourished. In order to assess if food intake achieved nutritional requirements, these were calculated based on actual weight for non obese individuals and on ideal weight for obese, using 25 kcal/kg/day for calories and 1.2 g/kg/day of proteins.

Oral intake and patient’s acceptance of the meals were assessed by having the patient himself or any accompanying person register daily diet intake throughout the study period. In addition, a 24 hour recall performed by the dietitian responsible for data collecting, using a structured protocol, was also performed daily. Patient’s acceptance and rating of meal quality was based on a visual analog scale graded from one to 10, where one was the worst rating and 10 the best. Patients also justified the reason for not ingesting the whole meal by marking the following options: “bad taste”, “inadequate meal time”, “aversion to the food offered”, “lack of appetite”, “vomiting”, “pain” and/or “bloating”. Patients were followed until discharge and/or up to seven days postoperatively.

The caloric and protein intake were assessed by the software Diet Pro© (version 4.0) from the Department of Nutrition and Health, Federal University of Viçosa. Nutritional deficits are expressed as weekly results. Fischer test was used to compare groups in terms of age and sex, Mann-Whitney and the Kruskal Wallis were used for continuous variables and the Pearson correlation test was used to correlate length of hospital stay and nutritional deficits. A p < 0.05 was considered statistically significant.

The study was approved by Ethical Committee of the Federal University of Minas Gerais.

Results

Ninety eight patients were enrolled in this study, mean age of 46.6 ± 13.1 years (21 to 89 years), as presented in table 1. Gynecological operations were the most prevalent (45.9%) followed by colon-rectum procedures (28.6%), incisional hernias (10.2%), liver and biliary tract (10.2%) gastric and small bowel (5.1%). Patients in group B presented with poorer nutritional status as depicted in figures 1a and 1b.

Gynecologic patients, in general, resumed oral diets on the first post operative day and most of them received regular diets (85.5%), as shown in figure 2a and 2b. On the other hand, in group B, only 4.7% were allowed a regular diet on the first PO day, 7.0% received soft diets, 30.2% full liquid diets, 27.9% clear liquids and the remaining 30.2% were on NPO. In addition, patients in this group had a slower progression of diets from liquid to regular solid meals,
with 7% of them still on NPO on the fifth PO day. Therefore, patients in group A did not present with cumulative caloric and protein deficits throughout the postoperative period. On the other hand, those in group B presented with significantly increased deficits as seen in table II. The malnourished patients had higher nutritional deficits when compared to the well nourished. In addition, elderly patients and those with cancer (table III) also presented with higher deficits. There was significant correlation (r = 0.97 and 0.98, respectively, for calories and proteins, p < 0.05) between nutritional deficits and length of hospital stay.

Tolerance to diets was overall considered good. Nausea was referred by 2.6% of the patients, and 11.2% presented with vomiting, with no differences among the two groups. Appetite was decreased in the majority of the patients (63.8%) throughout the study period. The great majority of patients (65.9%) rated diets as good or very good and only 3% considered them as of low quality. Thus, the main reasons for not ingesting the adequate amount of food were lack of appetite in 63.8%, vomiting in 13.8%, bad taste (11.2%), nausea (6.0%), 2.6% referred food aversion and abdominal distension in 1.7%.

Table II
Cumulative weekly caloric and protein deficits according to the operation performed, throughout a seven day period. Belo Horizonte, 2008

<table>
<thead>
<tr>
<th>Operation</th>
<th>Caloric deficit (kcal)</th>
<th>Protein deficit (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gynecologic (n = 45)</td>
<td>63.2</td>
<td>11.0</td>
</tr>
<tr>
<td>Incisional hernias (n = 10)</td>
<td>180.5</td>
<td>18.1</td>
</tr>
<tr>
<td>Group B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colon-rectum (n = 28)</td>
<td>3,588.3*</td>
<td>179.2</td>
</tr>
<tr>
<td>Liver and biliary tree (n = 10)</td>
<td>3,038.0*</td>
<td>175.6*</td>
</tr>
<tr>
<td>Gastric and small bowel (n = 5)</td>
<td>3,005.4*</td>
<td>160.1*</td>
</tr>
</tbody>
</table>

* p ≤ 0.05.

Discussion

In the current study we have been able to show that there are certainly significant differences between patients submitted to minor and major abdominal procedures in terms of nutritional status and approach to postoperative feeding. While the majority of gynecology and hernia patients are well nourished, the same is not true for gastrointestinal disease patients with 40% malnutrition rate. In addition, minor laparotomy patients were allowed to eat early while those undergoing gastrointestinal procedures still lack such routine practice. Although the gastrointestinal unit (in a university hospital) where the study was performed has long ago abandoned the use of nasogastric tube and most patients undergoing colorectal procedures are allowed early oral feeding (data not shown), postoperative care of other surgical patients is still characterized by the use of the traditional practices. Still practiced in many countries, these procedures such as routine use of nasogastric tubes for postoperative ileus, delayed oral feedings and its sequential liberation (clear liquids to solid diets) after the resolution of “ileus” have not been currently supported by the light of evidence. Tradition surgical postoperative care recommends withholding postoperative feeding until flatus or stool have passed. This frequently happens around the fourth postoperative day. It is believed that early feeding might cause abdominal distension, nausea and vomiting. However, in our present study, we were able to show that most gynecology and some group B patients were able to eat regular food with good acceptance on the first PO day. Casto et al. defy the withholding of early nutrition by stating that this dates back for more than 100 years ago when the incidence of postoperative emesis was much higher because of older anesthetic agents. Some authors have been studying the impact of early oral or enteral feeding on postoperative recovery and these paradigms have been challenged. This leads to decreased patient discomfort, shorter hospital stay and therefore, decreases hospital costs. It was not the goal of the present study to assess the impact of feeding on morbidity, mortality and length of hospital stay.

However, we were able to see that those patients who were early fed were also discharged home earlier and, it seemed that this practice did not impact on morbidity and mortality (data not shown).

The question is: why should we wait for flatus or passage of stools to start feeding our patients in the postoperative period? Up to now, there have been two answers to justify this attitude. First, it is believed that one should wait for the transient impairment of bowel motility (postoperative ileus) to be restored to normal. Second, early feeding could increase the risk of an anastomotic leak, which is, nowadays, well known not to have a direct association. Healing of anastomosis and postoperative complications are directly affected by several factors such as patient’s previous nutritional status,\textsuperscript{15} use of immunosuppressive drugs like corticoids, local abdominal conditions translated as inflammation or the presence of neoplastic disease, adequate splanic flow and good surgical technique, among others.\textsuperscript{16} Therefore, it seems important to perform routine nutritional assessment of surgical patients, especially if they present with gastrointestinal diseases and have cancer. In the current study, malnutrition was high (39.5\%) in this subset of patients and it directly impacted on nutritional deficits throughout the study period, certainly worsening their nutritional status. It is known that early feeding improves wound healing, increases splanic flow, stimulates gut motility, decreases intestinal stasis and impacts on the incidence of morbidity and mortality.\textsuperscript{4,5} In a Brazilian prospective randomized study, Aguilar-Nascimento et al.\textsuperscript{17} verified no significant difference in the rate of anastomotic dehiscence in the early fed versus the conventional treated group.

Conventional postoperative management, which is still practiced in most centers, recommends fasting combined with administration of fluids until passage of

![Fig. 2.—A) Group A diet intake, according to the post-operative days. Belo Horizonte, 2008. B) Group B diet intake, according to the post-operative days. Belo Horizonte, 2008.](image-url)
flatus or stools and diet when allowed is progressively offered. There is lack of guidelines in order to rationalize postoperative feeding in the majority of the centers. For instance, in 78.5% of obstetric units in UK that were surveyed, the decision to start feeding after a caesarean section was made without any guideline.18 In the majority of colorectal units, personal preference of surgeons guides the period of starvation.19

The progressive liberation of nutrients, from clear liquids to solid diets has been another controversial issue among surgeons whom traditionally believe that this modality sequence should be respected. However, in a prospective randomized study from our department, Sanches et al.20 studied 165 patients undergoing digestive elective operations in whom oral diets were liberated as free diet or sequential diet (clear liquids to regular diet) after the passage of flatus. The authors did not find any difference in the incidence of surgical complications or intolerance to diets, between the two groups. Patients who received free solid diets ingested more calories than the group who received liquid diets (917.13 calories versus 467.94 calories, on the first day of feeding). Another study from Jeffery et al.21 comparing oral intake of solid food versus progression of clear liquids to solid diet after abdominal surgery, showed that there was similar incidence of complications in both groups (7.5% versus 8.1%). The authors advocate the use of the solid regime as the first option to be offered to patients since it is well tolerated, offers better palatability, might be easier to swallow and decreases the time till hospital discharge because surgeons do not have to wait for diet tolerance observation. In the current study, we have also observed that there was not such a defined routine on the progression of oral diets, especially in the gastrointestinal unit. However, most patients who were allowed to eat a normal diet did not present major side effects and the reason for not eating the complete meal was mainly lack of appetite (63.8% of the patients). This also points to the impact of the organic response to trauma on oral intake, an aspect that should be assessed in order to guarantee an artificial enteral route, especially in malnourished gastrointestinal patients.

As previously mentioned, the etiology of postoperative ileus is multifactorial. Alterations on autonomic nervous system, neurotransmitters, local inflammatory factors and inflammatory/metabolic responses, hormones, anesthesia, postoperative analgesia have been described as causal factors. Thus, a multimodal treatment approach should be used to treat or minimize the physiologic impairment of motility after major surgical procedures.8,22,23,25,35 Early feeding is one of these modalities that should be associated with epidural anesthesia, minimal invasive surgery, antinausea medications, early postoperative mobilization, pain control and patient psychological preparation, among others. Indeed, studies that did not associate early feeding with other approaches to reduce gut dismotility have not shown benefits on postoperative outcome.

The importance of nutrition in surgical patients is crucial and has been a matter of repeated randomized studies, meta-analysis, and reviews over the recent years. However, despite its relevance, malnutrition is still highly prevalent amongst surgical patients and attitudes both to diagnose and treat this condition are underused in many surgical centers, placing these patients at increased risk of postoperative complications, mortality and also higher medical costs. Routine nutritional assessment and early oral feeding are mostly feasible, well tolerated, inexpensive and related to better outcomes. Furthermore, certain groups of patients, especially those undergoing gastrointestinal procedures who are at increased risk of malnutrition might need enteral artificial routes in conjunction with oral intake. This should be discussed either preoperatively or during the operation, in order to guarantee the access to the gastrointestinal tract. The conjunct work of the nutrition therapy team and the surgical team undoubtedly contributes to improved patient care and better overall outcomes.

Table III
Nutritional status, age, gender and cancer as risk factors for nutritional deficits. Belo Horizonte, 2008

<table>
<thead>
<tr>
<th>Nutritional status</th>
<th>Caloric deficit (kcal)</th>
<th>Protein deficit (g)</th>
</tr>
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<tbody>
<tr>
<td>Well nourished</td>
<td>Group A: -54.6</td>
<td>Group B: 3,444.4*</td>
</tr>
<tr>
<td>Malnourished</td>
<td>Group A: -2.0</td>
<td>Group B: 1,584.0*</td>
</tr>
<tr>
<td>Age</td>
<td>Group A: 66.9</td>
<td>Group B: 3,352.1*</td>
</tr>
<tr>
<td>&lt; 60 years</td>
<td>Group A: 7.4</td>
<td>Group B: 18.2</td>
</tr>
<tr>
<td>&gt;= 60 years</td>
<td>Group A: 18.1</td>
<td>Group B: 170.4</td>
</tr>
<tr>
<td>Gender</td>
<td>Male: -89.8</td>
<td>Female: -51.6</td>
</tr>
<tr>
<td></td>
<td>Group A: 2,266.5*</td>
<td>Group B: 2,685.1</td>
</tr>
<tr>
<td>Cancer</td>
<td>Non cancer: -44.6</td>
<td>With cancer: -622.5</td>
</tr>
<tr>
<td></td>
<td>Group A: 2,119.9*</td>
<td>Group B: 3,321.0*</td>
</tr>
</tbody>
</table>

* p < 0.05.
+ p < 0.05.
References


