



Incorporating nutrition into quality improvement initiatives in elective surgery

Incorporación de la nutrición a las iniciativas de la calidad en cirugía electiva

Incorporando nutrição às iniciativas de melhoria da qualidade em cirurgia eletiva

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<https://doi.org/10.35454/rncm.v3n1.025>

It is estimated that every year over 300 million surgeries are performed around the world. The number of complications that occur postoperatively is unknown but may be as high as 10% in specific types of operations such as colorectal surgery surgical complications can be as high as 30%. Surgical complications significantly increase cost of care and tax healthcare system resources⁽¹⁾.

Multiple carefully performed clinical trials have demonstrated that specific interventions can prevent or ameliorate the incidence of complications. These are called “efficacy” studies as they are designed to determine a cause and effect between one intervention (e.g. antibiotic prophylaxis) and an effect (ideally beneficial) on clinical outcomes. Thus, for example, the use of an antibiotic just before starting surgery (cause) is associated with a decrease in the risk of infections (effect). The better the quality of the study the stronger the evidence of efficacy is determined. High quality studies are generally prospective, randomized and double blinded and the evidence generated from these types of studies is called level 1 evidence of clinical benefit.

Clinical practice should incorporate interventions where efficacy (a clinical benefit) has been determined while abandoning practices where no benefit or even harm has been observed. This is called evidence-based care. However, this is done inconsistently. As a result, surgical complications continue to occur. For example, inconsistent use of hand washing before entering a patient room is associated with a persistent increased

risk of infection despite clear evidence that handwashing does dramatically decrease the risk of infection⁽²⁾.

Despite clear evidence of efficacy many interventions, particularly those that appear to be simple, are not routinely incorporated into daily clinical practice. In fact, despite the obvious altruistic motivation of having patients achieve the best outcomes, there are significant barriers at implementing evidence-based initiatives aimed at improving care.

Initiatives aimed at helping clinicians incorporate evidence-based care into their practices are called quality (QI) improvement initiatives. Incorporation of initiatives aimed at improving the quality of a product was first applied in assembly lines and in the airline industry and are appropriately called quality improvement (QI) initiatives. Quality improvement initiatives provide a structured mechanism of practice change.

Value is defined as a mathematical formula with clinical outcomes in the numerator and cost of care in the denominator. The value of QI is thus determined by its effect on either clinical outcomes or cost or both. Since poor clinical outcomes are associated with increased cost, it is logical to expect that QI initiatives may increase value by both improving clinical outcomes while decreasing cost.

QI in surgery is considered an essential public health initiative. In part since information on outcomes is now instantly presented to the public in general, poor quality of care is considered unacceptable. In other words, societal values have changed dramatically from the idea of fate (“you -the patient-, were unlucky that you developed a postoperative infection”) to the concept of responsibility (“you -the surgeon-, were responsible for the development of a postoperative infection due to the poor quality

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of care”). As such surgical outcomes and the incidence of surgical complications of a given hospital or even a specific surgeon, are increasingly being made public.

Nutrition interventions as part of QI initiatives in surgery can be summarized in 4 categories; a) diagnosis of malnutrition, b) preoperative nutrition intervention, c) avoidance of preoperative fasting, and D) early oral intake postoperatively (Table 1). In more in detail review is described below for these different interventions:

Table 1. Quality improvement initiatives aimed to improve outcomes in patients undergoing surgery fall into the following categories.

a. Diagnosis of malnutrition
b. Preoperative nutrition intervention (>48 hours prior to surgery)
i. Oral nutrition supplementation to treat protein calorie malnutrition
ii. Preoperative parenteral nutrition
iii. Immunonutrition
c. Avoidance of preoperative fasting
Early oral intake postoperatively

DIAGNOSIS OF MALNUTRITION

Malnutrition is caused by many factors. Independent of these factors, malnutrition is a significant cause of poor clinical outcomes and increased cost. There are several forms of malnutrition and multiple different classifications. Commonly, malnutrition is caused by lack of food intake. It is difficult however, to malnourish a healthy individual if there is access to a food supply of adequate quality. Adequate food intake and medical nutrition interventions are available for most patients. Despite this, malnutrition is frighteningly frequent in the hospitalized patients around the world and may be observed in 30% or more of acutely ill individuals. Progression to malnutrition is unfortunately relentless in the presence of acute or chronic inflammation and in many illnesses. This occurs despite optimal nutrition therapy. Therefore, while diagnosing the presence of malnutrition, particularly before surgery is essential as a determinant of prognosis in the risk of complications, our capacity to successfully intervene is still limited. There is much more to be learned⁽³⁾.

A significant issue that further complicates our understanding of malnutrition is the presence of obesity. First seen in the first world countries in the 1970s, particularly in the United States, obesity is now a pandemic that has reached most countries. Prior to this pandemic,

patients that were ill developed both protein and calorie malnutrition. Traditional nutrition interventions aimed at preventing the accumulation of a caloric deficit while giving modest amounts of protein, at least in acutely/critically ill patients, failed to show any significant benefit. Therefore, interventions that maximize caloric intake while also giving protein appeared to be successful (see below). While the obese patients have plenty of energy stores, they may have significant loss of muscle mass and the protein malnourished. New therapies aimed at successfully diagnosing and treating protein malnutrition while mobilizing energy stores are just beginning to appear. More progress is necessary^(4,5).

PREOPERATIVE INTERVENTIONS (> 48 HOURS BEFORE SURGERY)

Patients that are scheduled elective for surgery may have the luxury of having enough time to successfully perform a nutritional intervention aimed at reducing the risk of complications in improving surgical outcomes. Preoperative interventions in this category fall into two distinct groups including preoperative parenteral nutrition, and Immunonutrition. The use of preoperative parenteral nutrition seven days prior to surgery has shown clear and objective benefit in prospective randomized patients reducing complications in the protein calorie malnourished patient. Paradoxically, preoperative parenteral nutrition may increase the risk of infections postoperative utilized in patients that are either not malnourished or mildly to moderately malnourished. Preoperative parenteral nutrition is costly, and difficult to implement. Therefore, it should be used selectively and under the supervision of a nutrition specialist.

Immunonutrition is the name given to a series of formulas, which supplement specific amino acids (generally arginine or glutamine), omega-3 fatty acids, and frequently nucleotides, all of which are added to an otherwise standard complete nutritional formula. Arginine based Immunonutrition (ABIN) has been one of the most rigorously studied nutrition interventions in different patient populations⁽⁶⁾. When used prior to elective surgery (5 to 7 days) and after surgery (5 to 10 days) ABIN consistently results in a decrease in complications, particularly infectious complications. Arginine based immunonutrition has been tested against standard oral nutritional supplements (iso-caloric iso-proteic diets) demonstrating a benefit beyond that of generic oral nutritional supplementation. Multiple surgical populations have been studied

including patients with head and neck cancer, those undergoing cardiac surgery, different types of gastrointestinal cancer including colon cancer, urologic and gynecologic surgeries amongst others. The results leave no room for doubt; ABIN should be a standard of care in any patient undergoing a major elective surgery where a high rate of complications is expected. While there are still gaps in knowledge for specific elective surgical populations, no study done in elective surgery patients has ever shown harm. This is not the case with other patient populations such as patients admitted to the ICU with septic shock or potential harm has been observed. Also, no clear benefit (probably due to logistical difficulties in administering ABIN) has been observed in nonelective surgical patients including trauma.

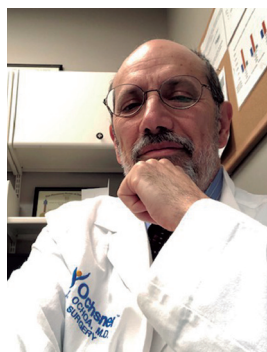
AVOIDANCE OF PREOPERATIVE FASTING

Traditionally, patients undergoing elective surgery are frequently left “*nil for Os* – NPO” for many hours at a time. However, preoperative fasting is neither necessary nor advisable. In particular, the provision of small amounts of glucose up to two hours prior to surgery and for the first 24 hours postoperatively is associated with a decrease in insulin resistance and better glucose control. Carbohydrate loading as this practice has been called, is now considered a standard of care in enhanced recovery after surgery protocols.

EARLY POSTOPERATIVE ORAL INTAKE

Like preoperative fasting there is little evidence that postoperative fasting is necessary. Evidence based care incorporating careful protocols to encourage early postoperative intake can shorten length of hospital stay, gastrointestinal motility and patient satisfaction. Gastrointestinal tolerance is enhanced by other evi-

dence-based practice including a decrease in the use of opioids and careful use of IV fluids.



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