

LESSER TIME OF PREOPERATIVE FASTING AND EARLY POSTOPERATIVE FEEDING ARE SAFE?

Menor tempo de jejum pré-operatório e alimentação precoce no pós-operatório são seguros?

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ABSTRACT – Introduction - Fasting in the night before elective surgery has been established to prevent pulmonary complications, vomiting, regurgitation and aspiration of gastric contents. The year of 2005 was developed the project ACERTO. It consists in a multidisciplinary team that aims to recover the surgical patient by administering two our six hours before surgery, a carbohydrate-rich beverage (12.5% dextrinomaltose). The multidisciplinary team consists of anesthesiologists, surgeons, nutritionists, nurses and physiotherapists. **Methods** – Literature review of preoperative fasting conducted during September and October of 2011 in Scielo and PubMed. **Conclusion** - Reducing the time of preoperative fasting with high carbohydrate solution until two hours before the operation as early feeding postoperatively, bring numerous benefits to the patient. The ACERTO project has shown good results and these new behaviors should be encouraged, thereby reducing the recovery time of the surgical patient.

HEADINGS - Preoperative care. Postoperative care. Nutritional therapy.

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RESUMO – Introdução - O jejum noturno praticado antes de operações eletivas foi instituído para prevenir complicações pulmonares, vômitos, regurgitação e aspiração do conteúdo gástrico. No ano de 2005 foi desenvolvido o projeto de Aceleração da Recuperação Total Pós-operatória, denominado ACERTO. O projeto é composto por uma equipe multidisciplinar que visa à recuperação do paciente cirúrgico administrando de duas a seis horas antes da operação uma bebida rica em carboidratos (12,5% de dextrinomaltose). A equipe multidisciplinar é composta por anestesistas, cirurgiões, nutricionistas, enfermeiros e fisioterapeutas. **Objetivo** - Frente aos novos métodos de controle no pré-operatório verificar a qual a necessidade de jejum antes de procedimentos cirúrgicos. **Métodos** - Revisão sobre jejum pré-operatório realizada nos meses de setembro e outubro de 2011, nos sites de busca Scielo e PubMed. Foram selecionados 24 artigos. **Conclusão** - Reduzir o tempo de jejum pré-operatório com solução rica em carboidratos até duas horas antes da operação, tal como alimentação precoce no pós-operatório, trazem inúmeros benefícios ao paciente. O projeto ACERTO tem demonstrado bons resultados e estas novas condutas devem ser encorajadas, diminuindo assim o tempo de recuperação do paciente cirúrgico.

INTRODUCTION

Worldwide approximately 234 million surgical procedures are done in one year. Despite widespread advances in medical care, surgery remains a common treatment option for effective and diversified range of diseases. It is often considered more viable option for elderly patients and those with comorbidities or advanced disease. The postoperative complications arising from major operations remain the principal cause of morbidity and mortality in surgical procedures¹⁵.

The preoperative fasting was instituted many years ago at the beginning of anesthetic practice to ensure gastric emptying, prevention of aspiration and vomiting^{8,18}, regurgitation, administration of various

drugs, to reduce gastric acidity and its volume¹⁶. The aspiration is uncommon today, but requires special care to prevent. Protocols on preoperative fasting suggest shorter fasting, especially for liquids, providing more comfort to patients and lower risk of hypoglycemia and dehydration, without increasing the incidence of perioperative pulmonary aspiration¹⁷.

The new evidence-based guidelines that have been published in recent years in countries like United States, Canada and Europe recommend decreased duration of preoperative fasting with clear liquids and beverages rich in carbohydrate until a few hours before elective surgery or other procedures that require anesthesia to improve quality in service, safety and health of the patient. They recommend that health professionals abandon the outdated policies of long periods of fasting by new evidence to guide preanesthetic practice¹⁴.

Another negative aspect of preoperative fasting that should be considered is that patients remain much longer established fasting, for various reasons such as delay in operations, transfer time or place of the operation^{7,8,13,18,21}. Based on this evidence and the studies carried out by groups such as Enhanced Recovery After Surgery - ERAS (European) and American Society of Anaesthesiologists - ASA (American) was the protocol implementation of Accelerated Postoperative Total Recovery, called ACERTO, where fasting time for solid was retained, but the patients have to take two hours before surgery a 200 ml beverage volume increased by 12% maltodextrin⁸.

The European protocol was created with the goal of alleviating the stress response of the operation and allowing quick recovery²⁴ during hospitalization²³. The European group allows clear liquids (water, tea and juices without waste) up to two hours before the procedure⁸. The ASA also includes in its protocol for clear fluids carbonated beverages and fruit juices without pulp. The toast is considered light meal, being allowed up to six hours before the operation. Foods like meats and consistent preparations require longer fasting¹⁸.

From the standpoint of metabolic causes, prolonged fasting reduces insulin levels, increase glucagon and increase insulin resistance, which can last for up to three weeks after the operation^{8,16,19}. Insulin resistance is a transient phenomenon resembles the metabolic state of diabetes mellitus type 2, or glucose uptake by cells is decreased due to inability of the transporter GLUT4 thereby causing a lower yield of glycogen^{13,21}. Simultaneously, gluconeogenesis is activated by increasing endogenous glucose production, leading to elevated blood glucose levels¹³.

Moreover, there is depletion of glycogen levels which intensifies the metabolic stress of the patient

postoperatively⁷. The organic response to stress is a physiological phenomenon where multiple stimuli reach the hypothalamus and stimulates the sympathetic nervous system and adrenal medulla to release substances that trigger the response, in order to maintain body homeostasis. These stimuli prolonged and intensive make the organic stress response exacerbated; moreover, the production of cytokines, particularly interleukin-1, interleukin-6 and tumor necrosis factor (TNF) triggered by tissue injury, cause important metabolic changes and is associated with increased peripheral resistance to insulin^{13,24}.

Therefore, objective of this review is to present new evidence about preoperative fasting in improving recovery of surgical patients.

METHODS

Review of the preoperative fasting during the months of September and October 2011, in PubMed and SciELO. Were selected 24 articles of the past ten years for the period 2001 to 2011 with the headings: carbohydrate, fasting preoperative, postoperative, ACERTO.

Preoperative alimentation

Studies comparing conventional preoperative fasting (nothing by mouth after midnight) with the fluid intake of two to three hours before preoperative procedure showed that the fluid intake is safe and does not interfere with the risk of aspiration, regurgitation and mortality⁸. Another case-control study with non-randomized adult patients undergoing elective surgical procedures found that reduced eating preoperatively allowing solids and liquids of 6 h and 2 h before anesthesia, respectively, found a significant reduction of symptoms when compared to fasting traditional midnight. Aspiration did not occur in either group²⁰.

Preoperative complications and well-being in adult patients (including regurgitation, aspiration and morbidity, thirst, hunger, pain, nausea, vomiting, anxiety) were analyzed in a paper with 38 randomized studies. Was found low morbidity, regurgitation or aspiration. There was no evidence that either the volume of gastric contents, pH of participants, differed significantly depending on whether the groups were allowed, fast or control. The fluids evaluated were water, coffee, fruit juice, and other drinks clear fluids (isotonic drink or carbohydrate). Participants who received a drink of water preoperatively had significantly lower volume of gastric contents than those with normal fasting regimen. Yet, few studies have investigated regurgitation, aspiration and morbidity in preoperative fasting of patients considered at higher risk during anesthesia^{10,15}.

Studies with children who ingested liquid and solids, concluded that eating without volume limitation can be safely allowed up to two hours or more before the operation. Was also observed a decrease of pH due to increased gastric duration of preoperative fasting. Anxiety is emotional stimulation which may increase the production of hydrochloric acid similarly to the cephalic phase of gastric secretion, which explains the increase in volume and decrease in the gastric pH after prolonged fasting. The increase in gastric pH of patients receiving liquid two to three hours before surgery may result from dilution of acid secretions and / or a decrease in production by decreased levels of anxiety and hunger²⁰. Similar to the previous study, now involving 2543 children, found only one case of regurgitation and aspiration. Children who ingest liquids were less thirsty and hungry, felt more comfortable and more behaved than those who were fasting¹¹.

Risk of aspiration associated with anesthesia were not identified in prospective studies and randomized performed in patients who ate high carbohydrate drink two hours before operation¹⁸.

Oliveira et.⁷ al in their study of 375 patients who underwent anesthesia and given a solution of 400 ml of 12.5% dextrinomaltose six hours before, and 200 ml two hours before found no regurgitation of gastric contents, but also any other complications related to any anesthetic complication, not resulting in increased risk.

Nonrandomized prospective study conducted in the United States from May 2008 to December 2009 with approximately 3179 patients who underwent 12,000 procedures with anesthesia, showed that patients who received solid foods (two hours) and liquids (15 minutes) before procedure, only 1.6% complained of nausea and 0.02% vomiting. No aspiration was registered¹⁶.

Brazilian prospective study with 308 patients comparing surgical outcomes before and after implementation of the conventional group demonstrated improvement in patient recovery in applying protocol³.

Cholecystectomy is one of the most commonly performed operations in the worldwide⁴. Patients submitted to it were divided into two groups: control and carbohydrate. The last group received carbohydrate drink two hours before the operation and had no anesthetic complication, had lower incidence of gastrointestinal complications and a day less in hospitalization⁵. In another randomized prospective clinical study with 60 patients who underwent elective cholecystectomy showed the same results⁷. On the other hand, when the protocol was not used, patients progressed without complication requiring longer hospitalization due to nausea, vomiting and unwilling to go home⁴.

The addition of whey protein to a carbohydrate

beverage not only reduces the inflammatory response, but also decreases insulin resistance. The whey protein has high degree of digestibility and rapid absorption in the small intestine. Perrone et.¹⁹ al observed in a randomized double-blind study with 17 cholecystectomized patients who ingested six to three hours before the operation a drink with 86% carbohydrate plus 14% whey protein, found reduced levels of insulin resistance between the group that received supplement and the placebo group (2.75 5.74 and $p=0.03$ respectively) and also reducing the inflammatory response. The placebo group showed the greatest change of insulin resistance in pre and postoperative periods, also more prone to hyperglycemia. There were no anesthetic complications. Double-blind study similar to the above with 15 patients undergoing elective hip operation ingesting carbohydrate-rich drink to 12.5%, found that insulin sensitivity decreased to 18% in the treatment group and only 43% in the placebo group and glucose concentrations increased in the placebo group in the postoperative period²².

Another study compared the conventional group with information from medical records of 5974 patients before and after project implementation. Observed overall reduction of one day of hospitalization, reduction of 1.5 times the surgical complications and re-operations, twice less chances of infection at the surgical site and decrease need of two blood transfusions to one⁹.

Operations on the colon and rectum in 53 patients were studied prospectively in two different time periods before and after implementation of the conventional group. The group of patients before ACERTO, passed the preoperative procedure that included mechanical bowel cleansing. The group after implantation received preoperative care (carbohydrate drink six and two hours before surgery) according to the protocol recommended by mechanical bowel cleansing. It was observed that the group ACERTO: 1) the time of preoperative fasting was twice smaller than the traditional; 2) feeding was introduced a day earlier; 3) received 50% less intravenous fluids; 4) the length of hospital was reduced to 4.5 days when compared to traditional. The traditional group had twice as many complications. The implementation of the protocol ACERTO raised the possibility of conducting operations without bowel cleansing⁵. Another study found similar results for 116 elderly patients who underwent elective abdominal operations².

Meta-analysis assessed rates of hospitalization, complications, readmission and mortality of 452 patients undergoing elective colorectal operations, which were divided into two groups, the enhanced recovery protocol (ERAS) and other conventional perioperative care. All recovery indicators significantly improved in the group. There was no

statistically significant difference in readmission and mortality¹⁴.

Postoperative alimentionation

Oral feeding postoperatively traditionally is suspended until the return of bowel function, as it is believed to result in severe vomiting, paralytic ileus, subsequent aspirative pneumonia, wound dehiscence and anastomotic leakage. The gastric emptying and small intestinal absorption are initiated on the first postoperative day; colon reactivation return only 48 hours after the operation; the stomach and the pancreas secrete one to two liters of liquids per day who are absorbed in the intestine. It can be said, then, that even the gastrointestinal tract not working something may be absorbed. The psychological aspect should also be considered, because early feeding improves the welfare of the patient and plays an important role in the recovery process after surgery. Cost reduction is another point to be considered, because patients who eat early tend to have less hospitalization time¹².

The Brazilian Medical Association and the Federal Council of Medicine recommended that the reintroduction of diet postoperatively should be performed early (12-24h) in most surgical procedures. Even for patients undergoing elective operations with partial resection of the stomach, small or large intestine, it is recommended the reintroduction of oral or enteral diet 12-24 h after operation²¹.

The postoperative recovery of patients undergoing digestive tract remains challenging for the surgeon. This authors studied prospectively 161 patients undergoing elective abdominal operations before and after the project ACERTO. The return of the diet gave up successfully on day 1 postoperatively. It also decreased the intravenous infusion of fluids, without negatively alter the surgical outcomes and improved global morbidity²³. The same occurred in other general operations and caesareans¹².

Randomized clinical trials evaluated the acceptance of early and late feed postoperatively in gynecological and abdominal operations; early feeding was defined as the intake of food and liquids during the first 24 hours, regardless of the presence or absence of signs that the return bowel function. The feed was introduced 24 hours later after the operation only after return signals of intestinal function. One of these studies with 195 patients related early feeding with increased nausea (1.79, 95% confidence interval). Two studies with 301 patients found no significant differences related to increased vomiting and early feeding. Some studies have even found a shorter hospital stay, faster return of bowel function, in this case, intestinal noise movement¹². Therefore, early feeding postoperatively in these conditions proved to be safe with reduced hospitalization time, but has increased

risk of nausea.

Re-alimentation on postoperative anastomosis is released only after the return of peristalsis^{1,6}. Thus, postoperative fasting tends to extend for a period of two to five days. This practice is based on the assumption that the bowel rest would be important to ensure healing of digestive anastomosis with less risk. But this concept has been questioned after the implementation of the protocol ACERTO⁶ which proves that early feeding in postoperative patients with anastomosis is safe and not associated with dehiscence and time resolution of ileus. According to the study of Aguillar¹, prospective, randomized trial involving 43 patients who were divided into two groups: early - oral feeding after 24 hours - and the conventional group, found that nearly 90% of patients tolerated oral diet in the first day and there was no difference in the two groups on the need of nasogastric tube and stop alimentionation. Another benefit related to early feeding is the comfort and relief of patients because they are receiving and tolerating oral diet soon. Still, early feeding after surgery is safe and promotes the healing of intestinal anastomosis^{1,4,8,9,17,18,21}.

Final considerations

With the implementation of ACERTO, more attention was paid to the subject "preoperative fasting" and thus more patients were benefited. Moreover, the project was able to show, through consistent evidence, that proper nutrition for surgical patients is fundamental to good clinical outcome, resulting in reduction of postoperative complications⁷. Today it is known that shorten preoperative fasting with high carbohydrate solution until two hours before surgery results beneficial⁸ as decreased insulin resistance, rapid trauma recovery, better well-being, less irritability, mainly in children¹⁷, lower incidence of vomiting, increased pH, better gastric emptying¹⁸ reducing the length of hospital stay and costs reduction^{7,9}.

Although ACERTO demonstrate good results, this new approach is not routine in most Brazilian hospitals. So, it is necessary to encourage multidisciplinary team to adjust themselves to the new protocols for preoperative fasting and postoperative feeding, providing more benefits to patients.

CONCLUSION

Reducing the time of preoperative fasting with high carbohydrate solution until two hours before the operation and early feeding postoperatively, bring numerous benefits to the patient. The ACERTO has shown good results and these new behaviors should be encouraged to reduce the recovery time of the surgical patient.

REFERENCE

1. Aguiar-Nascimento JE, Goelzer J. Alimentação precoce após anastomoses intestinais: riscos ou benefícios? *Revista Associação Médica Brasileira*. 2002; 48(4):348-352.
2. Aguiar-Nascimento JE, Bicudo-Salomão A, Caporossi C, Diniz BN. Benefícios clínicos após a implementação de um protocolo multimodal perioperatório em paciente idosos. *Arquivos de Gastroenterologia*. 2010; 47(3):178-83.
3. Aguiar-Nascimento JE, Bicudo-Salomão A, Caporossi C, Silva RM, Cardoso EA, Santos TP. Enhancing surgical recovery in Central-West Brazil: The ACERTO protocol results, e-SPEN, the European e-Journal of Clinical Nutrition and Metabolism. 2008.
4. Aguiar-Nascimento JE, Bicudo-Salomão A, Caporossi C, Silva RM, Cardoso EA, Santos TP. Volume de fluido intravenoso e alta hospitalar precoce em colecistectomia aberta. *Revista do Colégio Brasileiro de Cirurgiões*. 2007; 34(6).
5. Aguiar-Nascimento JE, Bicudo-Salomão A, Caporossi C, Silva RM, Cardoso EA, Santos TP, Diniz BN, Hartmann AA. A multimodal approach to colorectal surgery without mechanical bowel cleansing. *Revista do Colégio Brasileiro de Cirurgiões*. 2009; 36(3).
6. Aguiar-Nascimento JE, Bicudo-Salomão A, Caporossi C, Silva RM, Cardoso EA, Santos TP. Acerto pós-operatório: avaliação dos resultados da implantação de um protocolo multidisciplinar de cuidados peri-operatórios em cirurgia geral. *Revista do Colégio Brasileiro de Cirurgiões*. 2006 Mai-Jun; 33(2).
7. Aguiar-Nascimento JE, Dock-Nascimento DB, Faria MSM, Maria EV, Yonamine F, Silva MR, Adler T. Ingestão pré-operatória de carboidratos diminui a ocorrência de sintomas gastrointestinais pós-operatórios em pacientes submetidos à colecistectomia. *ABCD Arquivos Brasileiros de Cirurgia Digestiva*. 2007; 20(2):77-80.
8. Aguiar-Nascimento JE, Perrone F, Prado LIA. Jejum pré-operatório de 8 horas ou de 2 horas: o que revela a evidência? *Revista do Colégio Brasileiro de Cirurgiões*. 2009; 36(4).
9. Bicudo-Salomão A, et al. Impact of the acerto project in postoperative morbimortality in a university hospital. *Revista do Colégio Brasileiro de Cirurgiões*. 2011; 38(1).
10. Brady M, Kinn S, Stuart P. Preoperative fasting for adults to prevent perioperative complications. *Cochrane Database Syst Rev*. 2003; (4).
11. Brady MC, et al. Preoperative fasting for preventing perioperative complications in children. *Cochrane Database of Systematic Reviews*. 2009; Issue 4.
12. Charoenkwan K, Phillipson G, Vutyavanich T. Early versus delayed oral fluids and food for reducing complications after major abdominal gynaecologic surgery. *Cochrane Database of Systematic Reviews* 2007; Issue 4.
13. Correia MITD, Silva RG da. Paradigmas e evidências da nutrição peri-operatória. *Rev. Col. Bras. Cir.* 2005 nov. – dez.; 32(6).
14. Crenshaw JT. Preoperative fasting: will the evidence ever be put into practice? *Am J Nurs*. 2011 sep 15.
15. Gareth LA, Edwards M. Defining higher-risk surgery. *Curr Opin Crit Care*. 2010. 16: 339–346.
16. Manchikanti L, et al. Preoperative fasting before interventional techniques: is it necessary or evidence-based? *Pain Physician*. 2011 Sep-Oct; 14(5):459-67.
17. Moro ET. Prevenção da Aspiração Pulmonar do Conteúdo Gástrico. *Revista Brasileira de Anestesiologia*. 2004 mar. – abr.; 54(2).
18. Oliveira KGB, Balsan M, Oliveira SS. Aguiar-Nascimento JEA Abreviação do Jejum Pré-Operatório para Duas Horas com Carboidratos Aumenta o Risco Anestésico? *Revista Brasileira de Anestesiologia*. 2009 set-out; 59(5).
19. Perrone et al. Effects of preoperative feeding with a whey protein plus carbohydrate drink on the acute phase response and insulin resistance. A randomized trial. *Nutrition Journal*. 2011; 10:66.
20. Power S, Kavanagh DO, McConnell G, Cronin K, Corish C, Leonard M, Crean A, Feehan S, Eguare E, Neary P, Connolly J. Reducing preoperative fasting in elective adult surgical patients: a case-control study. *Ir J Med Sci*. 2011 Sep 30.
21. Sociedade Brasileira de Nutrição Parenteral e Enteral, Associação Brasileira de Nutrologia. *Terapia nutricional no perioperatório*. 2011 ago. 19.
22. Soop MJN, Myrenfors P, Thorell A, Ljungqvist O. Preoperative oral carbohydrate treatment attenuates immediate postoperative insulin resistance. *Am J Physiol Endocrinol Metab*. 2001; 280:576–583.
23. Varadhan KK, Lobo DN, Ljungqvist O. Enhanced recovery after surgery: the future of improving surgical care. *Crit Care Clin*. 2010 jul; 26(3):527-47.
24. Varadhan KK, Neal KR, Dejong CH, Fearon KC, Ljungqvist O, Lobo DN. The enhanced recovery after surgery (ERAS) pathway for patients undergoing major elective open colorectal surgery: a meta-analysis of randomized controlled trials. *Clin Nutr*. 2010 Oct; 29(5):689-90.