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SCIENTIFIC ARTICLE

Reduced fasting time improves comfort and satisfaction of elderly patients undergoing anesthesia for hip fracture



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KEYWORDS

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Abstract

Background and objectives: Patient's satisfaction is a standard indicator of care quality. The aim of this study was to evaluate whether a preoperative oral ingestion of 200 mL of a carbohydrate drink can improve comfort and satisfaction with anesthesia in elderly patients with hip fracture.

Method: Prospective randomized clinical trial conducted in a Brazilian public hospital, with patients ASA I–III undergoing surgery for hip fracture. The control group (NPO) received nothing by mouth after 9:00 p.m. the night before, while patients in the experimental group (CHO) received 200 mL of a carbohydrate drink 2–4 h before the operation. Patients' characteristics, subjective perceptions, thirst and hunger and satisfaction were determined in four steps. Mann–Whitney *U*-test and Fisher exact test were used for comparison of control and experimental groups. A *p*-value <0.05 was considered significant.

Results: A total of 100 patients were included in one of the two regimens of preoperative fasting. Fasting time decreased significantly in the study group. Patients drank 200 mL 2:59 h before surgery and showed no hunger ($p < 0.00$) and thirst on arrival to OR ($p < 0.00$), resulting in increased satisfaction with the perioperative anesthesia care ($p < 0.00$).

Conclusions: The satisfaction questionnaire for surgical patient could become a useful tool in assessing the quality of care. In conclusion, CHO significantly reduces preoperative discomfort and increases satisfaction with anesthesia care.

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PALAVRAS-CHAVE

Raqui-anestesia;
Jejum;
Satisfação

A diminuição do tempo de jejum melhora o conforto e satisfação com anestesia em pacientes idosos com fratura de quadril

Resumo

Justificativa e Objetivos: A satisfação do paciente é indicador padrão da qualidade da assistência prestada. O objetivo deste estudo foi avaliar se a ingestão de 200 mL oral pré-operatória de uma bebida de carboidratos pode melhorar o conforto e a satisfação com a anestesia no paciente idoso com fratura de quadril.

Método: Ensaio clínico prospectivo e randomizado realizado em hospital público de saúde brasileiro, pacientes estado físico ASA I-III submetidos à cirurgia de fratura de quadril. O grupo controle (NPO) não recebeu nada pela boca, após as 21 horas da noite anterior, enquanto que os pacientes no grupo experimental (CHO) receberam 200 mL de uma bebida de carboidratos de 2 a 4 horas antes da operação. Características dos pacientes, percepções subjetivas, presença de sede e fome e satisfação dos pacientes foi apurado em quatro etapas. Teste de Mann-Whitney U-test e exato de Fisher foram utilizados entre o grupo controle e o grupo experimental. Valor de $p < 0,05$ foi considerado significativo.

Resultados: Um total de 100 pacientes foram incluídos em um dos dois regimes de jejum pré-operatório. Tempo de jejum diminuiu significativamente no grupo de estudo. Pacientes beberam 200 mL 2:59 h antes da cirurgia e não apresentaram fome ($p < 0,00$) e sede na chegada à SO ($p < 0,00$), resultando em aumento da satisfação com o cuidado perioperatório anestesia ($p < 0,00$).

Conclusões: O questionário de satisfação do paciente cirúrgico poderia tornar-se um instrumento útil na avaliação da qualidade de atendimento. Em conclusão, CHO reduz significativamente o desconforto pré-operatório e satisfação com os cuidados da anestesia.

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Introduction

There is an increasing number of studies on patient satisfaction. Satisfaction is the judgment of the quality of patient care and one of the main objectives during any hospitalization.¹ It is also a contributing factor to the outcome, as satisfied patients are more likely to cooperate with the proposed treatment.² Comfort and satisfaction are relevant economic impact criteria during treatment.^{1,2}

Patient satisfaction is a widely used measure of the health care quality and has been associated with other outcome measures and behavioral intentions of the patient. In general, satisfaction seems to be higher in older patients¹ and those with a better global health perspective.³ Measurement and understanding of treatment satisfaction should also be present in elderly patients.

The standard practice of “nothing by mouth” has been applied for decades in patients undergoing elective surgeries. However, recent data indicate that a liberal fasting scheme does not increase the risk in these patients.^{4,5} A carbohydrate-rich drink (CHO) significantly reduces pre-operative discomfort without affecting gastric contents.⁶ Decreased fasting time was related to a lower incidence of nausea and vomiting in patients undergoing laparoscopic cholecystectomy.⁷ The patient satisfaction assessment has been used as a measurement of clinical trial outcomes,⁸ consultations,⁹ and workload.¹⁰ However, little is known about its benefit, particularly on anesthesia care satisfaction of patients who received a drink in the preoperative and postoperative periods.

Anxiety is a state of imminent danger, which involves a lot of tension and suffering and may cause increased heart rate, increased blood pressure, sweating, tremors, heavy breathing, and muscle tension.¹¹ It may be influenced by internal (personal) and external (environment) factors. The hospitalization process itself may bring anxiety to the patient. Depression is also a possible reaction in hospitalized patients. It is closely related to stress and anxiety before surgery.¹² Therefore, minimizing the factors that can cause anxiety is important to avoid physical and psychological health consequences.

The nutritional status increases the risk of post-operative complications and mortality in patients with hip fracture.¹³ In Brazil, the IBRANUTRI study found that, among patients admitted to hospitals of the Brazilian public health system (SUS), malnutrition was present in 48.1% and severe malnutrition in 12.5% of patients.¹⁴

The evaluation of medical treatments, services, and interventions is increasingly focusing on patient satisfaction. The elderly are the fastest growing segment of the population and are responsible for a large portion of the use of health care services. The aim of this prospective randomized clinical trial was to investigate – as part of the ACERTORPE (*Acelerando a Recuperação Total em Ortopedia* – Accelerating Total Recovery in Orthopaedics) protocol implementation – if the ingestion of a carbohydrate-rich drink before surgery could improve postoperative comfort and satisfaction with anesthesia in elderly patients with hip fracture.

Method

The protocol was approved by the Ethics Research Committee and registered in *Plataforma Brasil*. During pre-anesthetic visit, the study objective and procedures were explained in detail to each patient and family members, and all patients provided written informed consent. This is a case-control study. The significance level of 5% and 80% power was used. The hospital performs about 700 surgeries per month, 70% are orthopedic patients. Of those 70%, over 50% of patients undergo major orthopedic surgery (femur and knee) per month. The sample size calculation indicated 47 patients in each group. Three patients were included for safety, which amounted to a sample of 50 pairs.

One hundred consecutive patients of both sexes, ASA physical status I-III, with hip fracture, aged over 60 years, scheduled for surgical repair were included in the study. All inpatients were SUS patients and received spinal anesthesia.

Lipschitz classification¹³ was used to assess the elderly nutritional status. Inclusion criteria were patients with normal blood volume and those without pre-existing neurological disease, coagulation abnormalities, infection at the lumbar puncture site, agitation and/or delirium, not using indwelling catheters, with hemoglobin level >10g%, and not admitted to the ICU.

Before induction of anesthesia, the patient was routinely monitored (electrocardiogram, pulse oximetry, and noninvasive blood pressure); forearm vein was punctured with a 18G venous catheter. No additional fluid was intravenously administered before the operation in each group. Perioperative volume replacement was 4 mL kg⁻¹ of crystalloid and 500 mL 6% hydroxyethyl starch (130/0.4) in 0.9% sodium chloride (Voluven®) in both groups. Hypotension (decreased SBP <30%) was treated with intravenous etilefrine (2 mg) and bradycardia (HR < 50 bpm) with atropine (0.50 mg).

After sedation with intravenous ketamine (0.1 mg kg⁻¹) and midazolam (0.5–1 mg), skin cleaning with chlorhexidine and excess removal, spinal puncture was performed with the patient in the sitting position, in the midline of L2–L3 interspace using a 27 G Quincke needle. After the appearance of cerebrospinal fluid (CSF), 0.5% bupivacaine (10 mg) was administered at a rate of 1 mL 15 s⁻¹. Patients were immediately placed in a supine position for the start of surgery.

Postoperative analgesia was achieved by anterior (inguinal) or posterior lumbar plexus block (psoas compartment), with a 50 mm (inguinal) or 100 mm (psoas) needle (B. Braun) connected to a peripheral nerve stimulator (Stimuplex®, B. Braun Melsungen AG) prepared to release a 0.5 mA pulsed square wave with 2 Hz frequency, looking for the contraction of the quadriceps muscle. After the expected contraction, 40 mL of 0.25% bupivacaine were injected.

Control group received *nil per os* (NPO) after 9 o'clock the night before surgery. Experimental group (CHO) took 200 mL of 12.5% dextrinomaltose 2–4 h before surgery. To all patients, 200 mL of 12.5% dextrinomaltose was offered immediately after the motor blockade.

Patients' characteristics and subjective assessment of well-being were recorded four times: (1) after the anesthesiologist visit; (2) before surgery; (3) before discharge from the post-anesthesia recovery unit (PACU); and (4) on

the morning of the first postoperative day in the ward. All patients were asked to evaluate the following items: hunger, thirst, agitation, postoperative nausea and vomiting (PONV), satisfaction, and postoperative analgesia. All evaluations were classified as yes or no.

Statistical analysis

Mann-Whitney and Fisher's exact tests were used for statistical analyses. A *p*-value <0.05 was considered significant.

Results

A total of 100 elderly patients ASA physical status I-III scheduled for orthopedic hip surgery were included in this single center study (SUS hospital). Patients were randomly assigned to one of the two preoperative fasting regimens. All patients completed the trial, and all questionnaires were analyzed. No patient was withdrawn from the study.

The mean age of patients was 78 years and 70% were female. Patients in control group (*n* = 50) and experimental group (*n* = 50) were similar regarding age, weight, height, gender, and physical status (Table 1).

In nutritional assessment, 13 patients (13.4%) were underweight, 63 patients (60.9%) had normal weight, 23 patients (24.7%) were overweight, and only one patient (0.9%) was obese. There was no significant difference between groups (Table 2).

There was no significant difference between groups regarding any of the items evaluated in pre-anesthetic visit (Table 3).

In control group, 35 patients (70%) were hungry and 45 patients (90%) were thirsty on arrival to the operating room. In experimental group, no patient complained of hunger and only 2 patients (10%) reported being thirsty (Table 4). There was a significant difference between groups.

The evaluation of different times is shown in Table 5. Mean fasting time was of 13:30 h in control group and 2:59 h in experimental group, with significant difference. All surgeries were performed under spinal anesthesia, with a mean

Table 1 Patient characteristics (mean ± SD).

	NPO	CHO	<i>p</i>
Age (years)	78.16 ± 9.99	78.50 ± 10.50	0.83
Weight (kg)	62.66 ± 12.48	62.26 ± 11.82	0.82
Height (cm)	159.18 ± 11.18	157.24 ± 8.73	0.35
Sex: F/M	34/16	36/14	0.83 ^a
ASA: 1/2/3	2/40/8	3/41/6	0.57

^a Fisher's exact test.

Table 2 Nutritional status.

	NPO	CHO	<i>p</i>
Underweight	8	5	0.20
Normal weight	32	31	0.20
Overweight	9	14	0.20
Obesity	1	0	0.20

Table 3 Questionnaire results in pre-anesthetic visit.

	NPO Yes/No	CHO Yes/No	<i>p</i>
1. Were you satisfied with the anesthesiologist's visit before surgery?	50/0	50/0	^a
2. Was the anesthetic procedure fully explained?	50/0	50/0	^a
3. Was it explained that you were participating in a study protocol?	50/0	50/0	^a
4. Did the anesthesiologist mention preoperative fasting?	50/0	50/0	^a
5. Do you think it is important not to drink and eat before anesthesia?	29/21	26/24	0.69
6. Would you like to ingest a liquid before being taken to the OR?	50/0	50/0	^a
7. Would you mind being woken to ingest this liquid?	21/29	26/24	0.69

^a Not statistically evaluated because the variables are constant.

Table 4 Questionnaire results on arrival at the surgical theatre.

	NPO Yeas/No	CHO Yeas/No	<i>p</i>
1. Are you hungry?	35/15	0/50	0.00
2. Are you thirsty?	45/5	2/48	0.00

duration of 1:59 h, with no significant difference between groups. Dextrinomaltose was orally administered in the PACU (1:58 h, on average); there was no significant difference between groups. The length of PACU stay was 2:23 h, practically the same between groups. The duration of analgesia was 22 h, with no significant difference between groups. None of the patients in both groups experienced bradycardia. Four patients in control group and 2 patients in experimental group developed hypotension, which was corrected with a single dose of vasopressor, with no significant difference.

The effect of less thirst and hunger in the experimental group was detected before surgery. In contrast, there was no difference between the two groups in the PACU regarding the satisfaction of having taken dextrinomaltose, onset of nausea and vomiting, satisfaction of not being transferred to the ICU, and being without intravenous hydration (Table 6).

In the ward, the subjective assessment of hunger, thirst, nausea and vomiting, postoperative pain, and bladder catheterization was similar in both groups (Table 7).

Satisfaction with preoperative visit was comparable between groups. The satisfaction with the overall

anesthetic management, assessed before hospital discharge, was higher in the experimental group (90%) than in the control group (40%), with a significant difference.

Discussion

This study clearly confirms that the preoperative intake of 200 mL of a carbohydrate drink (12.5% dextrinomaltose) decreased hunger and thirst preoperatively, resulting in greater comfort and satisfaction with anesthesia in elderly patients undergoing surgical repair of hip fracture.

Hip fracture is a common injury and the leading cause of death among elderly patients, with significant rates of mortality at 30 days and one year.^{14–16} These patients represent a significant workload, not just for the operating department and surgical wards, but for the entire health system. Perioperative care is also becoming more complex, with an increasing number of patients taking several specific drugs for concomitant diseases. The anesthesiologist must take this into account when planning the anesthetic and analgesic techniques. All patients were operated under spinal anesthesia, and analgesia was performed with a lumbar plexus block, with a mean duration of 22 h.

Unlike multicenter study with patients from the Brazilian public health system,¹⁷ the incidence of well-nourished patients in this study was 60%. The classification used in this study showed a good correlation with mortality; it is easily applied,¹⁸ was suggested for elderly patients,¹⁹ and that is why it was used.

The questionnaire used for preoperative evaluation proved to be equal between the two groups. Remembering

Table 5 Fasting time, duration of surgery, length of PACU stay, dextrinomaltose administration time after surgery, and duration of analgesia (mean ± SD).

	NPO	CHO	<i>p</i>
Fasting time (h:min)	13:53 ± 2:05	2:59 ± 0:36	0.00
Duration of surgery (h:min)	2:00 ± 0:41	1:58 ± 0:32	0.82
Dextrinomaltose in PACU (h:min)	1:52 ± 0:42	2:03 ± 0:43	0.35
PACU stay time (h:min)	2:18 ± 0:41	2:29 ± 0:43	0.57
Duration of analgesia (h)	23 ± 3	21 ± 4	0.83

Table 6 Questionnaire results in PACU.

	NPO Yes/No	CHO Yes/No	<i>p</i>
1. Were you satisfied to have taken the juice still in the PACU?	50/0	50/0	^a
2. Did you get queasy when took the juice?	0/50	0/50	^a
3. Did you vomit after taking the juice?	0/50	0/50	^a
4. Are you pleased to go to the ward rather than to the ICU?	50/0	50/0	^a
5. Are you satisfied for being without intravenous hydration when leaving the PACU?	50/0	50/0	^a

^a Not statistically evaluated because the variables are constant.

Table 7 Questionnaire results on the ward.

	NPO Yes/No	CHO Yes/No	<i>p</i>
1. Did you eat normally in the late afternoon?	50/0	50/0	^a
2. Did you have nausea or vomiting?	3/47	2/48	1.00
3. Were you satisfied for having dinner in the ward with the family?	50/0	50/0	^a
4. Did you feel pain during the night?	7/43	4/46	0.53
5. Did you urinate normally?	50/0	50/0	^a
6. Were you satisfied with the entire treatment?	20/30	48/2	0.00

^a Not statistically evaluated because the variables are constant.

what they have been informed preoperatively about fasting, many patients said they prefer to follow the doctor's orders to avoid suspension of their surgeries.

In 2006, it was reported that the average time of fasting from all solids and liquids was 16 h, and adult patients presenting for elective surgery with this long time of fasting is common.²⁰ The fasting time in NPO group was slightly shorter, about 14 h compared to other study,²⁰ and 80% of patients reported feeling thirsty or hungry. However, the fasting time in experimental group was about 3 h, with only two reports of thirst, which resulted in greater satisfaction for patients. In a recent Cochrane systematic review involving 22 studies, it was found that there was no evidence that a shorter fasting time increased the risk of aspiration, regurgitation, or morbidity compared with a standard NPO regimen.²¹ Our results confirm that CHO intake (200 mL) did not increase morbidity compared with NPO.

Thirst and hunger are the most important factors for preoperative discomfort, followed by anxiety.²² In our study, the intake of 200 mL of a beverage with CHO before surgery not only reduced the preoperative thirst and hunger, but provided greater satisfaction to patients. The same CHO volume taken on the PACU did not provide the onset of nausea and vomiting, and also increased the satisfaction of all patients who went to the ward.

For this study, a standard carbohydrate beverage (12.5% dextrinomaltose) was selected to be orally administered preoperatively to the experimental group and to both groups in the PACU. This study was conducted with elderly patients with hip fracture, as they represent a group of patients in which the gastrointestinal tract is totally free. Because no patient had nausea and vomiting in the PACU, all patients were fed in the late afternoon of the surgery day and this provided an additional satisfaction for patients and families. Abbreviation of preoperative fasting with the administration

of CHO in coronary artery bypass grafting was safe and reduced both ICU and hospital stay times.²³ Even in high-risk patients (ASA III–IV) undergoing elective cardiac surgery, preoperative intake of up to 400 mL CHO appears to be safe, providing greater comfort for patients.²⁴

Psychological preparation of patients undergoing surgery decreased the length of hospital stay and reduced the need for postoperative analgesics.²⁵ Information provided by surgeons, anesthesiologists, and nurses on the surgical procedure, and better quality of postoperative analgesia reduce anxiety and improve recovery.^{25,26} All information provided to patients and families during the preanesthetic provided decrease in patient anxiety and allowed a faster recovery, with discharge conditions on the first day after surgery.

Feeling thirsty is a real discomfort and causes great suffering to patient.²⁷ Several studies have shown that thirst is intense and results in increased anxiety, dehydration, irritability, weakness, and despair.²⁸ In this study, there was a high incidence of thirst in the NPO group versus no patient in the experimental group.

The appropriate fluid replacement is obviously important when the normal intake is prohibited, taking an important role in optimizing the cardiovascular function during surgery. In both groups, patients received perioperative hydration with crystalloid and colloid, resulting in a low incidence of hypotension.

Satisfaction is defined as a pleasant sensation caused by the fulfillment of expectations.²⁹ Satisfaction is the result of psychological processes, which involves comparing the perceived performance of a specific treatment for the initial expectations of the patient.^{29,30} The main objective of this study was to develop a questionnaire to assess satisfaction with the preference for preoperative fasting in orthopedic surgery elderly patients. Most patients interviewed said that it is worth taking a liquid to decrease thirst and hunger.

Traditionally, direct and indirect measures were developed to assess health care from the perspective of health professionals. Patient satisfaction is one of the measures used, as shown in the increasing number of tools designed to assess satisfaction in recent years. Some authors go so far as to consider patient satisfaction as one of the primary outcomes of health care.³¹ Patient satisfaction questionnaires must, among other requirements, have some psychometric properties, especially if the goal is to generalize the information to the target population.³² The study involved the application of the questionnaire in four stages to patients with more than 60 years, which shows that satisfaction increased with the decrease in fasting time.

In a study of patients undergoing gynecologic laparoscopy, it was reported that the intake of CHO two hours before surgery decreased thirst before and after the operation, and that there was no difference regarding hunger.³³ In our study, CHO 200 mL decreased both hunger and thirst compared with the NPO group.

The role of the anesthesiologist has evolved greatly, since in addition to providing optimal surgical conditions, they want to minimize the pain right after surgery. The peripheral nerve block improved postoperative analgesia and reduced side effects of opioids,³⁴ thereby facilitating a fast recovery process. The mean duration of analgesia was 22 h, similar to other studies with the same type of surgery.³⁴ At the dose used, all patients had residual analgesia the next day, without any degree of motor block.

The surgical patient satisfaction questionnaire could become a useful tool for assessing the quality of care. In general, satisfaction seems to be higher in older patients.¹ For elderly patients at the hospital, a limited liquid oral regimen of 2–4 h before an operation can easily be implemented. It is only a matter of organization and administration. However, the anesthesiologists must first ensure the safety and comfort of the patients. In this sense, our data clearly show that the liberal use of CHO in elderly inpatients is an easy and practical way to increase patient comfort and satisfaction with anesthesia care.

Conflicts of interest

The authors declare no conflicts of interest.

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