A liberal preoperative fasting regimen improves patient comfort and satisfaction with anesthesia care in day-stay minor surgery

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ABSTRACT

Background. The aim of this study was to evaluate whether a single preoperative limited oral intake of a carbohydrate drink could improve perioperative patient comfort and satisfaction with anesthesia care in elective day-stay ophthalmologic surgery.

Methods. A single-center, prospective, randomized clinical trial was conducted in a university hospital. The study included ASA I-III patients undergoing ophthalmologic surgery. Patients undergoing both general anesthesia and local anesthesia were included in the study. The control group fasted in accordance to nil per os after midnight, while patients in the experimental group received 200 mL of a carbohydrate drink 2 h before the operation. Both groups were allowed to drink and eat until midnight ad libitum. Patient characteristics, subjective perceptions, taste of the drink, and satisfaction with anesthesia care were ascertained using a questionnaire administered three times: after the anesthesiologist’s visit, before surgery and before discharge from the ward to assess patient comfort. An analysis of variance and the Mann-Whitney U-test were used for statistical analysis.

Results. A total of 123 patients were included and 109 patients were randomly assigned to one of two preoperative fasting regimens. Patients drinking 200 mL 2 h before surgery were not as hungry (P<0.05), not as thirsty preoperatively (P<0.001) and not as thirsty after surgery (P<0.05), resulting in increased postoperative satisfaction with anesthesia care (P<0.05).

Conclusion. Standardized limited oral preoperative fluid intake increases patient comfort and satisfaction with anesthesia care and should be a part of modern day-stay ophthalmologic surgery.

Key words: Fasting - Anesthesia - Ambulatory surgical procedures.

The standard practice of a nil per os (NPO) preoperative fasting regimen has been applied for decades in patients undergoing elective surgical procedures. However, newer data indicate that a liberal fasting regimen does not increase the risk for patients. In this regard, several anesthesiological societies have revised the paradigm of NPO in the past few years. In 2004, the new guidelines for preoperative fasting were released by the German Society of Anesthesiology and Intensive Care Medicine (DGAI). Comfort and satisfaction both represent criteria of relevant economic impact, particularly for modern day-stay surgery and anesthesia policies. The expansion of day-surgery procedures requires high-quality anesthesia characterized by maximal safety, minimal side effects, and rapid discharge. Hausel et al. reported that preoperative oral intake of a carbohydrate-rich drink improved preoperative thirst, hunger, and anxiety in patients as compared with a group that fasted overnight. Moreover, patients developed less postoperative...
nausea and vomiting (PONV) after laparoscopic cholecystectomy after preoperative oral consumption of carbohydrates. However, less is actually known about the postoperative benefit, especially about satisfaction with anesthesia care for patients who were prescribed a liberal fasting regimen.

The aim of this single-center, prospective, randomized clinical trial was to investigate whether preoperative limited oral intake of a carbohydrate-rich drink 2 h before operation could improve perioperative patient comfort and satisfaction with anesthesia care in elective day-stay ophthalmologic surgery.

**Materials and methods**

The investigation was approved by the Research Ethics Committee at the University of Heidelberg. The purposes and procedures of the study were explained to each patient in detail before enrolment. All patients provided written informed consent. The study was conducted in accordance with Good Clinical Practice and the Declaration of Helsinki. Based on our own preliminary data of patient satisfaction, which was our primary outcome, we performed a sample size calculation assuming a power of 80% and P<0.05. Fifty-six patients in each group with a double sided design were required. We expected a drop-out rate of 10% due to incomplete questionnaires or retraction of the initial agreement.

ASA I-III consecutive adult patients scheduled for elective day-stay ophthalmologic surgery were included over 6 months in this single-center, prospective, randomized clinical trial. Patients who were eligible for intake of clear fluids preoperatively according to the guidelines issued by the DGAI were considered for inclusion. Consequently, strict exclusion criteria included nonelective surgery, pregnancy, and gastrointestinal obstruction. Patients with gastroesophageal reflux, diabetes mellitus, stomach hernia, adiposity, and those with potentially difficult airway management were not excluded but were asked to make their own decisions about participation.

The control group was treated with NPO after midnight. The experimental group took a single 200-mL carbohydrate drink orally (12.5 g/100 mL carbohydrate, 12% monosaccharides, 12% disaccharides, 76% polysaccharides, and 285 mosmol/kg; Nutricia Preop; Pfrimmer Nutricia GmbH, Germany) 2 h before surgery. All patients had to check into the hospital 2 h before surgery. Patients in the experimental group received a 200-mL pack of carbohydrate drink immediately from the day-stay management nurse.

Where possible, both general anesthesia and local anesthesia, including an anesthesiological standby, was offered to all patients during the surgical or anesthesiological procedures. All patients received their usual cardiac and antihypertensive medications. Premedication was standardized to midazolam (patients ≥60 years: 3.75 mg; patients <60 years: 7.5 mg) (B. Braun, Germany). Before induction of general or local anesthesia, routine monitoring (electrocardiogram [ECG], pulse oximetry, and noninvasive blood pressure measurement) was started and an intravenous line was placed. No additional fluids were given intravenously before the operation in either group. Intraoperatively, 4 mL/kg BW/h of crystalloids were applied intravenously in both groups. Local anesthesia was performed with Scandicain-Gel 2% (AstraZeneca, Germany) in combination with 0.3-0.5 mL Scandicain 1% (AstraZeneca, Germany) for intraocular injection. After preoxygenation, general anesthesia was induced with 2-3 mg/kg BW propofol (AstraZeneca, Germany) and 0.3-1 µg/kg BW remifentanil (GlaxoSmith Kline, Germany) before placing a laryngeal mask or inserting the endotracheal tube. Atracurium 0.3-0.5 mg/kg BW (GlaxoSmithKline, Germany) could be administered in cases of endotracheal intubation. General anesthesia was maintained with 0.1-0.2 mg/kg/min propofol and 0.2-0.5 µg/kg/min remifentanil. Before the end of the operation, 15 mg/kg BW metamizol (Aventis Pharma, Germany) was given to alleviate postoperative pain. Five minutes before the end of surgery, the administration of propofol and remifentanil was discontinued and sufficiently spontaneously breathing patients were extubated once they had opened their eyes.

Patients’ characteristics and their subjective assessment of well-being were recorded three times:
after the anesthesiologist’s visit, before intake of the premedication for surgical procedure and before discharge from the ward.

First, after the anesthesiologist’s visit, the following perceptions were queried: hunger, thirst, anesthesia, postoperative pain, and PONV. All perceptions were rated as very strong, strong, moderate, or none. Additionally, all patients were asked to assess their satisfaction with the anesthesiological premedication, rated as very satisfied, quite satisfied, less satisfied, or not satisfied.

The second survey was conducted before intake of the premedication. Patients were asked to assess the following items: agitation, anxiety, pain, hunger, thirst, agitation, and preoperative waiting. These perceptions were graded again as very strong, strong, moderate, or none. Additionally, before surgery, the patients in the experimental group were asked to assess the taste of the drink as very good, quite good, not very good, or bad.

The last questionnaire was administered on the ward before discharge from the hospital. All patients were asked to assess hoarseness of voice, hunger, thirst, problems with breathing, shivering, problems concentrating, pain, and PONV. The scale again ranged from very strong, strong, moderate, to none. The postoperative satisfaction with anesthesia was quantified as very satisfied, quite satisfied, less satisfied, or not satisfied.

The data regarding complaints and pre- and postoperative perceptions were converted to a numerical scale of 1 (none), 2 (moderate), 3 (strong), and 4 (very strong). Finally, the evaluation of the premedication visit and anesthesia care was converted to 1 (not satisfied), 2 (less satisfied), 3 (quite satisfied), and 4 (very satisfied).

Statistical analysis

For statistical analyses, analysis of variance was performed. The Mann-Whitney U-test was used for testing between the experimental group and the control group. A value of P<0.05 was considered significant.

Results

A total of 123 ASA I-III consecutive adult patients scheduled for elective day-stay ophthalmologic surgery were included in this single-center, prospective, randomized clinical trial (Figure 1). Thus, 109 patients were randomly assigned to one of two preoperative fasting regimens according to an even and uneven date of operation. All 109 patients completed the trial, and all questionnaires were analyzed. A total of 14 patients were not randomized by their own choice or because of a different preferred operating time.

The patients in the experimental (n=55) and control (n=54) groups were similar in terms of age (P<0.98), gender (P<0.92), nicotine consumption (P<0.73), and type of anesthesia care (local or general anesthesia) (P<0.62) (Figure 1). Sixty-eight operations (62.4%) were performed under local anesthesia, and 41 were under general anesthesia (28.5%) (Table I). All operations were cataract surgery, with a mean duration of 24±13 min. None of the operations had to be rescheduled because of delayed intake of the drink. No patient was withdrawn from the study.
The subjective assessments of hunger, thirst, anesthesia, postoperative pain, and PONV were similar in the two groups. However, patients in the experimental group were preoperatively not as hungry and clearly not as thirsty compared with patients who stopped eating and drinking at midnight (Figure 2). Other preoperative perceptions such as anxiety, pain, agitation, or the length of preoperative waiting did not differ between the two groups.

The effect of less thirst in the experimental group could also be detected after surgery (Figure 3). In contrast, no difference between the two groups was found postoperatively when patients were asked about hunger. Individual factors of well-being such as postoperative hoarseness, problems with breathing, shivering, problems concentrating, pain, or PONV did not differ between the two groups (Figure 3).

Twenty patients (36.4%) in the experimental group judged the taste of the carbohydrate preoperative drink to be very good, and 22 (40%) quite good, while only 11 (20%) and 2 (3.6%) judged it to be not very good and bad, respectively. Sixteen patients would have preferred something else (29.1%). In detail, 11 patients (20%) wanted to drink coffee, 1 (1.8%) tea, and 2 (3.6%) water instead of the drink. Two patients wished to eat something preoperatively (3.6%).

The satisfaction with the premedication was comparable between the groups. Indeed, the satisfaction with anesthesia care assessed before discharge from the hospital was higher in the experimental group (1.1±0.35) compared with the control group (1.4±0.57) (Figure 4).

### Table 1.—Patient characteristics. No differences between the Liberal and Standard group were found in age, gender, smoking, general and local anesthesia.

<table>
<thead>
<tr>
<th></th>
<th>Group Standard</th>
<th>Group Liberal</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (y)</td>
<td>63.9±16.6</td>
<td>61.7±20.4</td>
<td>NS</td>
</tr>
<tr>
<td>Gender (M/F)</td>
<td>28/26</td>
<td>28/27</td>
<td>NS</td>
</tr>
<tr>
<td>Smoker (yes/no)</td>
<td>8/46</td>
<td>6/49</td>
<td>NS</td>
</tr>
<tr>
<td>General anesthesia</td>
<td>20</td>
<td>21</td>
<td>NS</td>
</tr>
<tr>
<td>LMA</td>
<td>18</td>
<td>19</td>
<td>NS</td>
</tr>
<tr>
<td>Tracheal tube</td>
<td>2</td>
<td>2</td>
<td>NS</td>
</tr>
<tr>
<td>Local anesthesia</td>
<td>34</td>
<td>34</td>
<td>NS</td>
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</tbody>
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Age values are expressed as mean±SD. P<0.05. LMA: laryngeal mask.

### Discussion and conclusions

This study shows clearly that the preoperative oral intake of 200 mL of a standard carbohydrate drink decreased preoperative thirst and hunger, resulting in increased comfort and satisfaction with anesthesia care in day-stay surgery patients.

Although in 1999, Pearse et al. demonstrated that the mean length of fasting for solids of >15 h and for fluids of >12 h is common in adult patients presenting for elective surgery, Steeds et al. reported 2 years later that in Great Britain, fluids were not restricted in about 55% of the patients undergoing ophthalmologic surgery under local anesthesia, 10% were allowed to drink up to 1-3 h before the surgical procedure, and 35% had to stop drinking 4-6 h before operation. A Cochrane analysis revealed that there was no evidence to suggest a shortened fluid fast results in an increased risk of aspiration, regurgitation or related morbidity compared with the standard NPO regimen.

Clinicians should be encouraged to appraise this evidence for themselves and when necessary, adjust any remaining standard fasting policies for patients that are not considered ‘at-risk’ during anesthesia. A group of surgeons has reviewed the recent Cochrane analysis on preoperative fasting in adults and suggested that, despite these data, NPO...
remains standard practice in most institutions in North America. Nevertheless, the revised national guidelines have provided an opportunity to verify the impact of preoperative fluid intake on patient comfort and satisfaction. However, according to our internal clinical guidelines, patients requiring either general or local anesthesia should fast before a surgical procedure to ensure that no increased risk of aspiration is present in case of a potential switch from local to general anesthesia.

For our study, we selected a standard carbohydrate drink for preoperative oral fluid administration. Several studies have concluded that the preoperative consumption of carbohydrate-containing fluids is safe. Hausel et al. reported that, in 166 patients undergoing elective abdominal surgery, drinking 400 mL of clear fluid 2 h before premedication reduced preoperative discomfort and did not cause any adverse effects or gastric acidity compared with overnight fasting. In this study, more than 3 in every 4 patients who took a standard carbohydrate drink judged the taste as at least “quite good”. In our study, only 29% would have preferred something else to drink, favoring coffee (20%). This indicates that the acceptance of the drink in our study was very high. Obviously, additional information is required for different patients and for different fluids. Regardless of individual preferences, it would be more effective to instruct each patient to consume a standard and limited drink. Our study was conducted in the ophthalmologic day-stay unit because these patients represent typical day-surgery procedures requiring anesthesia. Even in high-risk ASA III-IV patients undergoing elective cardiac surgery, the preoperative oral intake of up to 400 mL of carbohydrates seemed to be safe and added comfort for the patients.

There is no generally established method of evaluating discomfort in patients. The variables taken in this study should reflect the different aspects of subjective considerations of comfort and satisfaction with anesthesia. The visual analogue scale (VAS) is a generally accepted method of testing such variables. In our study, patients received only a local pharmacological treatment of one or both eyes for an ophthalmologic examination and for pre-existing impaired vision.
Therefore, the use of a VAS was not reasonable. Because the questionnaire was simple, with each variable requiring one of four responses that were converted to a numerical scale for statistical analysis, it was possible for the nurse or physician or a person accompanying the patients to assist with its administration.

Thirst is the most important factor for preoperative discomfort, followed by anxiety and hunger. In our study, the single preoperative drink of 200 mL not only reduced preoperative thirst and hunger, but it also reduced postoperative thirst, and in the end, patients given the drink were more satisfied with their anesthesia care. The short surgical procedure in our study with limited intraoperative intravenous fluid administration did not reduce the potential pre-existing deficiency of water, with resulting thirst after operation.

Furthermore, dehydration is a relevant factor in the etiology of PONV. In our study, no difference between the two groups could be established for PONV. Although the association between ophthalmologic surgery and PONV is well known, not all types of surgery lead to a high incidence of PONV. In a study by van den Berg et al., the incidence and severity of PONV was directly proportional to the degree of extraocular muscle manipulation. The lowest incidence of PONV (1.6-5.7%) was found in intraocular surgery (e.g. closed vitrectomy or cataract extraction), which normally does not directly involve extraocular muscle movement. Therefore, the number of patients required to detect a difference was too small in this study. It is notable in our study that the only difference observed was in hunger and thirst. None of the other discomfort variables, such as preoperative waiting, pain, PONV, or problems with breathing or concentrating, had an effect on the satisfaction with anesthesia care postoperatively. These findings suggest that a liberal fluid regimen is important for patient comfort and that it is a simple means to improve patient satisfaction with anesthesia care.

Recently, in a study of 42 patients undergoing elective laparoscopic gynecologic surgery, Ernhofer et al. demonstrated that the oral intake of carbohydrates 2 h before surgical procedure decreased thirst before and after operation and that there were no differences between the fluid and NPO regimens in terms of patient hunger.

Despite the busy schedules in our clinics due to day-stay ophthalmologic operations, no procedure was delayed or canceled due to preoperative fluid intake. A large prospective trial with more than 5,420 outpatients demonstrated that unlimited clear fluids up to 2-3 h prior to surgery did not cause any more canceled or delayed operations than the NPO regimen. For in-hospital patients, a limited oral fluid regimen up to 2 h before an operation can easily be implemented. It is only a matter of organization and administration. Nevertheless, detailed patient information is needed to avoid delays in operations with late oral fluid consumption that might increase the risk of pulmonary aspiration.

A limitation of this study is that it was performed in a single university institution and, therefore, may not be applicable to other institutions. However, the exclusion criteria were very liberal, which would increase the generalizability of our findings. The absence of statistically significant differences between the two regimens in postoperative hunger may be due to the relatively small study sample size rather than a lack of effect of the preoperative drink.

The history of outpatient anesthesia is characterized by many trends and economic considerations. Nevertheless, first and foremost, anesthesiologists must ensure the safety and comfort of the patients. In this regard, our data clearly show that in day-stay patients, the liberal use of clear fluids is an easy and practical way to increase patient comfort and satisfaction with anesthesia care and probably an advantage in positioning a day-stay surgery unit among competing clinics.

References


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