

# The effects of oral fluid intake an hour before cesarean section on regurgitation incidence

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## ABSTRACT

**Background:** The fear of aspiration of gastric contents and its life-threatening disadvantages in patients have encouraged many medical practitioners to follow conservative policies for clear fluid/liquid and solid intake from midnight to the time of surgery. These policies have been pursued more severely in case of pregnant women, leading the physicians to follow “nil per os” policy. The aim of this study was to determine and compare the incidence of regurgitation in two groups of pregnant women during general anesthesia for cesarean section, with standard fasting policy and taking clear fluid an hour prior to the induction of anesthesia.

**Materials and Methods:** This clinical trial was conducted for a period of 21 months in Nik-Nafs Maternity Hospital of Rafsanjan. The pregnant women who were candidates for elective cesarean section were registered for the study. All women fasted from midnight, and then were randomly assigned to one of the two groups. Those in the case group received 150 ml of clear liquid containing 10% carbohydrate about an hour before the induction of anesthesia. The occurrence of regurgitation was assessed by inserting the turnsole paper into the pharynx. Finally, the data of 411 cases were analyzed by descriptive methods.

**Results:** There was one case of regurgitation (0.69%) in the control group and one case (0.36%) in the case group, and no case of aspiration.

**Conclusions:** There was no evidence to suggest that taking clear fluids about 1 hr before cesarean section will increase the risk of regurgitation. It confirms the safety of following more flexible fasting policies preoperatively, in addition to oral fluid intake, in case of parturients.

**Key words:** Elective cesarean section, oral fluid intake, regurgitation

## INTRODUCTION

The life-threatening situations related to the aspiration of stomach contents have led most physicians, especially anesthesiologists, to plan conservative inflexible fasting policies before surgery. In these policies, patients are suggested not to take anything orally edible and/or drinkable, one night before the operation.<sup>[1]</sup> However, the prevalence of aspiration pneumonia in pregnant women is several folds higher than in others (0.11% in

cesarean cases).<sup>[2]</sup> So, policies that are more restricted have been planned for these patients. Gradually, the order of preoperative fasting before cesarean expanded to the parturients, and in some hospitals resulted in “NPO” law for all parturients. However, the process of labor is energy consuming, requiring as much energy as for the sport of athletics and, thus, necessitates a carbohydrate-enriched diet. If carbohydrate deficiency occurs throughout the labor, it will lead to ketoacidosis and, therefore, is dangerous for both fetus and mother.<sup>[3]</sup> On the other hand, liquid deficiency can cause poor uteroplacental blood circulation, which can lead to prolonged labor and oxytocin requirement.<sup>[4]</sup> The main reason for these restricted policies toward oral liquid intake during labor is the possibility of urgent need for cesarean section.<sup>[5]</sup> In 1994, Gibs and Gaiton showed that the minimum safe time for oral liquid intake preoperatively was 2 h in case of elective cesarean section.<sup>[6]</sup> In recent years, several researchers have emphasized that although oral intake of clear liquid is safe 2 h prior to elective surgeries,<sup>[7]</sup> still there is a doubt on parturients who may need urgent cesarean section at any moment.<sup>[8]</sup> Therefore, this study was designed to decrease the period of oral intake of clear liquids to less than 2 h preoperatively in elective

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cesarean section and evaluate the effects of this protocol on the occurrence of regurgitation and the incidence of respiratory aspiration.

## MATERIALS AND METHODS

This clinical trial was conducted in Rafsanjan Nik-Nafs Maternity Hospital from December 2004 to September 2006. The target population of our study consisted of all the pregnant women who referred to the hospital for elective cesarean section. All the patients with a history of diabetes, hyperlipidemia, stomach surgery, hyperemesis gravidarum, regurgitation before pregnancy, hypertension during surgery, and breaking the standard fasting were excluded from this study. Informed consent forms were signed by the patients. The project was approved by the ethical committee of Rafsanjan University of Medical Sciences. Almost two-thirds of the subjects were randomly assigned to the case group and one-third to the control group.

We tried our best to explain the aim of the study to the case group. In this study, 150 ml of boiled water containing 10% traditional sugar plum was orally given to the women 1 h preoperatively, whilst the control group received nothing.

Data were collected by a two-part questionnaire. The first part of the questionnaire contained demographic information, the quality of fasting, and whether the patients were assigned to the case or control group. The second part, which was filled in the operation room, encompassed information about induction of anesthesia, the used medications, and regurgitation occurrence. To evaluate regurgitation during anesthesia, a piece of turnsole paper was inserted at the end of the pharynx, and in case of color change toward acidic pH, the regurgitation was reported as positive.<sup>[9-12]</sup>

In a period of 21 months, 3000 individuals enrolled in the study, of whom about 2000 were in the case group. But due to the application of local anesthesia instead of general anesthesia, we could only analyze 411 cases by descriptive statistical methods using SPSS software version 12.

## RESULTS

In this study, the mean age of the participants was  $27.8 \pm 5.3$  years, and the mean numbers of their gravid and para were  $2.1 \pm 1.1$  and  $1.01 \pm 0.9$ , respectively. The mean of gestational age was  $39.2 \pm 2.8$  weeks. The main indications of cesarean section were: a) repeated cesarean section (56.4%), b) selective cesarean section (2.6%), and c) other reasons (41%). The mean period of the last oral intake prior to surgery was  $12.97 \pm 1.9$  hrs and the last oral intake was solid food in all of women.

The final sample size was 411; 64.9% constituted the case group and 35.1% formed the control group. In the case group, the mean time between anesthesia establishment and preoperative oral liquid intake was  $74.5 \pm 31.9$  min. A dose of 10 mg prophylactic metoclopramide was used in 402 cases (99.3%) and only 3 cases had not received metoclopramide. The mean of applied doses of Nesdonal, Ketamine, and relaxant was  $369 \pm 71$  mg,  $37.3 \pm 9$  mg, and  $37.8 \pm 6$  mg, respectively, and in all women, Atracurium was used as the relaxant.

Only two cases (0.48%) of regurgitation were observed (one in each group). The woman in the control group was fasting for 12 hrs 30 min before surgery, whereas the woman in the case group had been fasting for 15 hrs, 45 min before surgery, receiving oral liquid 45 min prior to surgery. There was no case of aspiration in the target population of the study.

## DISCUSSION

In the present study, the prevalence of regurgitation was very low in both case and control groups, which supports the hypothesis that receiving oral liquids 1 h preoperatively has no increasing effect on the rate of regurgitation during anesthesia.

In a systematic review, Brady *et al.* reported the results of 38 studies that compared standard fasting and taking oral liquid 1.5-3 h preoperatively. There was no evidence of increased rate of aspiration and regurgitation related to shortened fasting period preoperatively.<sup>[13]</sup> In another systematic review, Stuart *et al.* stated that only in a few trials, there was increased rate of aspiration/regurgitation related to oral fluid intake preoperatively. They concluded that there was no evidence to suggest that taking clear fluid up to 2 h before the induction of anesthesia had any influence on patients' gastric content volume or pH.<sup>[14]</sup> Anecdotal reports from the University Hospital of the West India (UHWI) suggested that preoperative shortened fasting regimens not only had not resulted in increased aspiration, mortality, or morbidity rate, but also decreased preoperative anxiety, irritability, thirst, and hunger.<sup>[1]</sup>

Brady *et al.* carried out a systematic review on the studies that evaluated different fasting policies and their impact on preoperative complications and patient well-being in 2545 children. There was only one case of aspiration/regurgitation in children who were permitted taking fluid up to 2 h preoperatively. The gastric volume and gastric pH value did not differ in the two groups.<sup>[15]</sup> Some other studies revealed that taking clear fluids 2 h preoperatively did not result in increased gastric volume and gastric pH value in patients.<sup>[16,17]</sup>

In the present study, patients had consumed solid foods in their last meal and then were fasting for about 13 h, while recently, more flexible policies are followed that allow patients to get fluids up to 2 h preoperatively.<sup>[18]</sup> Results of a survey on operated patients showed that they were fasting on fluids  $10 \pm 5$  h and on solid foods  $15 \pm 4$  h preoperatively, and only 10% were informed of the new flexible policies regarding preoperative fasting regimens.<sup>[19]</sup> In another descriptive research on 51 postpartum women, the mean fasting time before cesarean section was 11 and 13 h on fluids and solid foods, respectively. Seventy percent of women were suggested to fast from midnight. Researchers suggested that nurses should be aware of appropriate fasting regimen and guide pregnant women.<sup>[20]</sup>

It was also mentioned by Best *et al.* that it is necessary to counsel the patients regarding their appropriate time for fasting preoperatively and the perfect time for beginning oral intake also.<sup>[21]</sup> In 1999, the American Society of Anesthesiologists (ASA) recommended more liberal guidelines regarding the fasting period preoperatively;<sup>[22]</sup> however, in many countries around the world, anesthesiologists and surgeons follow their old protocol: "fasting from midnight."<sup>[23-25]</sup>

Using fluids containing carbohydrates, 2 h before surgery, changes the patients' metabolism from fasting to fed, and hence, decreases insulin resistance after surgery,<sup>[26]</sup> which in turn causes decreased preoperative hunger, thirst, and anxiety.<sup>[27-29]</sup>

Fortunately, in the present study, we did not observe any case of aspiration. We also have not observed any case of Mendelson's syndrome in 20,000 cases of cesarean section during 13 years in Rafsanjan Nik-Nafs Maternity Hospital. It is considerable compared to reports from European countries, which show an aspiration prevalence of 0.1% in pregnant women during surgery. This perhaps could be related to the different nutritional habits, more use of herbal diet, larger stomach, or race; however, it can contribute to safety of more flexible fasting preoperative policies, especially with clear fluids.

Also, based on the results of this study, we can probably conclude that preoperative oral intake of clear fluids in a parturient is safe, and in case of any need for urgent cesarean, the risks of aspiration and regurgitation will not increase.

## CONCLUSION

There was no evidence to suggest that taking clear fluids about 1 hr before cesarean section will increase the risk of regurgitation. It confirms the safety of following more

flexible fasting policies preoperatively, in addition to oral fluid intake, in case of parturients.

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