

## ORIGINAL RESEARCH

### **Traditional Prolonged Fasting: It's Need of Time to Change the Practice - A Prospective Observational Study**

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#### **ABSTRACT**

**Aspiration of gastric content during anesthesia and its life-threatening consequences in form of aspiration pneumonia and respiratory failure is a rare but still catastrophic complication of anesthesia. Keeping patients' nil per oral (NPO) from midnight has been followed as a standard practice worldwide for a long time. Various anesthesia society has modified their fasting recommendations time by time but still, traditional midnight NPO practice is followed in many non-institutional hospitals in India. The present study was conducted to assess that does clear liquid intake up to 2 hr. before surgery improves perioperative patient comfort and is it safe to practice in elective surgeries.**

**Methodology:** A observational prospective study was conducted among patients who were posted for elective surgeries under general anesthesia. Patients who were having a higher risk of aspiration including obesity, pregnancy, emergency surgeries, diabetes, difficult airways, and were not willing to participate in the study were excluded from the study. The patients were divided into 2 groups (Group1- that followed the instruction of taking clear liquids up to 2 hrs prior to surgery and group 2- not followed the instruction and followed traditional fasting).

**Data collection and analysis:** Patients were assessed with a questionnaire, which included perception of thirst, hunger, anxiety, and weakness as a measure of subjective comfort. The proportion was calculated for categorical variables and mean and Standard deviation were calculated for continuous variables. T-test for continuous variables and Chi-square test for categorical variables were used to compare the data between the two groups. The level of significance was kept at 0.05 level.

**Results:** Perioperative comparison of both the groups showed no statistically significant difference in Mean FBS, Events of aspiration, post-op pain, PONV, pre-op hunger, and pre-op weakness between the two groups. Statistically, a significant difference was found in satisfaction level, pre-op thirst, and pre-op anxiety levels in both groups.

**Conclusion: Liberal preoperative fasting in form of allowing clear liquid up to 2 hr. before surgery is safe to practice.**

**Key Words: Anaesthesia, Aspiration, Satisfaction, Perception.**

## **INTRODUCTION**

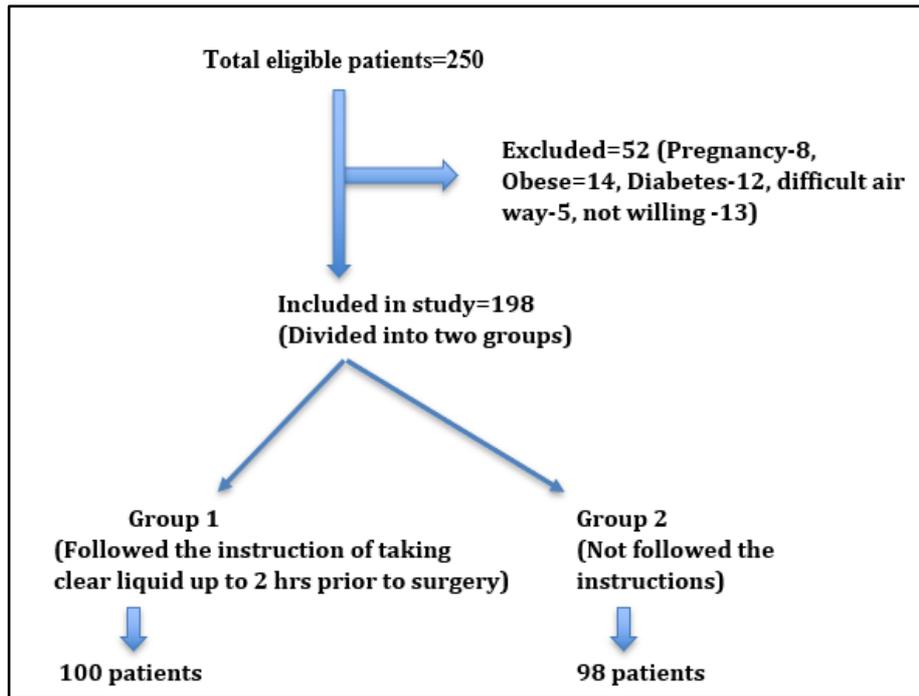
Aspiration of gastric content during anesthesia and its life-threatening consequences in form of aspiration pneumonia and respiratory failure is a rare but still catastrophic complication of anesthesia, which has enforced proper fasting guidelines.<sup>1</sup> Keeping patients nil per oral (NPO) from midnight has been followed as a standard practice worldwide for a long time. Over a period of evolving safer drugs and better perioperative anesthesia care incidents of aspiration-related complication has decreased significantly<sup>2</sup> and various anesthesia society has modified their fasting recommendations time by time but still, traditional midnight NPO practice is followed in many non-institutional hospitals in India.<sup>3</sup> Midnight fasting reduces gastric Ph. and volume, which therefore helps in preventing aspiration-related complications. On the other hand, prolonged fasting has been associated with patient discomfort in form of thirst, hunger, and anxiety, and in certain patients, it can lead to dehydration, hypoglycemia, and hypotension.<sup>4</sup> Whenever a scheduled procedure occurs in later hours of the day significantly excessive fasting may result in severe detrimental effects. Despite the approval of intake of clear liquid 2 hr. before surgery, most practitioners in India are still deferring it to avoid the life-threatening consequence of aspiration which results in excessive and avoidable prolonged fasting. In the era of daycare surgery, it has become more important that patients must feel comfortable and satisfied before being discharged having minimal side effects.<sup>5</sup> The aim of this study was to assess that does clear liquid intake up to 2 hr. before surgery improves perioperative patient comfort and is it safe to practice in elective surgeries.

## **OBJECTIVES**

1. To estimate the incidence of aspiration related events among study participants
2. To assess the patient's comfort in the perioperative period

## **METHODOLOGY**

This was a single centric, prospective observational study conducted in the Dept. of Anesthesiology, Medical College, Bhilwara which is a newly established medical college in Rajasthan, India. Patients who were posted for elective surgeries under general anesthesia during the study period were included in the study. Patients who were having a higher risk of aspiration including obesity, pregnancy, emergency surgeries, diabetes, difficult airways, and were not willing to participate in the study were excluded from the study.



**Fig1: Flow chart of patient enrollment:**

After obtaining institutional ethical committee approval 198 ASA 1&2 patients were enrolled in the study as per the flow chart (Fig-1)

All patients were instructed about fasting guidelines as per the American Society of anesthesia on preoperative visits and instructed to take clear liquid up to 2 hr. before surgeries. Patients were asked about fasting status on the day of surgery and then group allocation was done. Those patients who have taken clear liquid till 2 hr. before surgery as per instruction were allocated group 1 while those who were NPO from midnight despite preoperative instruction were allocated group 2. The person who was involved in group allocation was kept out from the rest of the observation and data reporting. The purpose of the study was explained to each participant and patients who agreed to participate were further included in the study after written consent.

Patient characteristics were noted during PAC (Age, sex, weight, type of surgery, educational status, ASA status). Patients were then assessed with a questionnaire, which included perception of thirst, hunger, anxiety, and weakness as a measure of subjective comfort. The baseline of these parameters was noted during PAC visit and the same questionnaire was used preoperatively on the day of surgery. The test-retest reliability of the score in the PAC was evaluated by using repeated determinations 10 min apart in the same individual. Hunger, thirst, and weakness were accessed on a scale of 1-10. A score of 0-1 as none, 2-3 as mild, 4-7 as moderate, and 8-10 as extreme was defined. Anxiety was scored on a self-rating anxiety scale containing 100 points in total. A score of 0-10 was graded as none, 10-40 as mild, 40-80 as moderate, and >80 as having extreme anxiety. Postoperatively perception of pain was measured with VAS scoring on a scale of 1 to 10. A score of 0-1 as none, 2-3 as mild, 4-7 as moderate, and 8-10 as extreme was defined. Postoperative nausea and vomiting (PONV) were defined as per no of the episode during 2 hr. stay and 0-1 as mild, 2-3 as moderate, and >3 episode was defined as severe. Overall satisfaction was also accessed on a 0-10 scale and measured as extreme (9-10), moderate (5-8), mild (2-4), and none (0-1). As discomfort of the patient can't be definitely measured because it is related to subjective variability above method is considered to cover different aspects of subjective considerations of comfort and

satisfaction with anesthesia. The patients did not have access to their previous results when scoring. The nurses administering the questionnaire scores were blinded to group allocation. Preoperative blood sugar was also recorded. Vital parameters including heart rate (HR), blood pressure (BP), and SpO<sub>2</sub> were recorded in the preoperative area. Balanced general anesthesia was given to all patients. Patients were administered crystalloid loading at 10 mL/kg/h from induction of anesthesia until starting the surgical procedure, and 5 mL/kg/h during surgery. In addition, crystalloid boluses would be administered at approximately 3 times the estimated blood loss. Glucose-containing fluids were avoided unless warranted. After induction of anesthesia drop of BP > 20% of the baseline was defined as an event of hypotension. In that case, fluid therapy was first utilized, if needed, ephedrine and/or phenylephrine were then intravenously administered. Induction was done with IV fentanyl and propofol after the administration of glycopyrrolate, midazolam, and dexamethasone. Atracurium was given to facilitate endotracheal intubation, and GA was maintained with isoflurane and nitrous oxide in oxygen. Injondansetron 0.1 mg/kg and inj paracetamol 1 gm IV was given before extubation to counter PONV and post-op pain. 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, an event of regurgitation was reported as positive.

## DATA ANALYSIS

The collected data were entered into MS Excel and analyzed using Epi-info-7.1 software. Data were analyzed and arranged in tabulated form. The proportion was calculated for categorical variables and mean and Standard deviation were calculated for continuous variables. T-test for continuous variables and Chi-square test for categorical variables were used to compare the data between the two groups. The level of significance was kept at 0.05 level.

## RESULTS

Out of 198 patients; 100 were in group 1 (followed the instruction of taking clear liquids up to 2 hrs prior to the surgery) and 98 were in group 2 (not followed the instructions). The demographic characteristics of both groups were compared and found comparable. (Table 1)

**Table 1: Comparison of the demographic characteristics in both the groups**

Parameter		Group 1	Group 2	P value
Age	Mean ±SD	28±5.8	29 ± 6.2	0.243
Sex	Male (n)	63	58	0.686
	Female (n)	37	40	
Wt. (kg)	Mean ±SD	63±4.8	64 ±5.2	0.161
ASA	1	79	73	0.560
	2	21	25	
Surgery	Hernia	30	31	0.969
	ENT surgery	22	19	
	Breast surgery	15	15	
	Cholecystectomy	24	26	
	Laparotomy	9	7	
Educational status	Uneducated	9	10	0.849
	Secondary	54	49	
	Above secondary	37	39	

Baseline subjective comfort parameters like hunger, thirst, weakness, and anxiety (taken at the time of PAC) were also compared in both the groups, and no statistically significant difference was found. (Table 2).

**Table 2: Baseline subjective comfort parameter comparison in groups**

Parameter		Group 1	Group 2	P value
<b>Hunger</b>	<b>None</b>	73	69	0.821
	<b>Mild</b>	22	25	
	<b>Moderate</b>	5	4	
	<b>Extreme</b>	0	0	
<b>Thirst</b>	<b>None</b>	69	70	0.911
	<b>Mild</b>	24	21	
	<b>Moderate</b>	7	7	
	<b>Extreme</b>	0	0	
<b>Weakness</b>	<b>None</b>	92	89	0.965
	<b>Mild</b>	8	9	
	<b>Moderate</b>	0	0	
	<b>Extreme</b>	0	0	
<b>Self rating anxiety scale</b>	<b>None</b>	42	39	0.753
	<b>Mild</b>	41	45	
	<b>Moderate</b>	17	14	
	<b>Extreme</b>	0	0	

Perioperative comparison of both the groups showed no statistically significant difference in Mean FBS, Events of aspiration, post-op pain, PONV, pre-op hunger, and pre-op weakness between the two groups. Post Induction hypotension was more in the group that did not follow the instruction of taking clear fluids up to 2 hrs prior to surgery but the difference between the 2 groups was not statistically significant (Table 3). Statistically, a significant difference was found in satisfaction level, pre-op thirst, and pre-op anxiety levels in both groups. (Table 3).

**Table 3: Perioperative comparison of data in groups**

Parameter		Group 1	Group 2	P-value
<b>FBS</b>	<b>Mean <math>\pm</math>SD</b>	110 $\pm$ 13.2	112 $\pm$ 9.8	0.228
<b>Event of aspiration</b>	<b>Yes</b>	2	3	0.982
	<b>No</b>	98	95	
<b>Post induction hypotension</b>	<b>Yes</b>	11	21	0.072
	<b>No</b>	89	77	
<b>Post-op pain</b>	<b>None</b>	56	53	0.963
	<b>Mild</b>	41	42	
	<b>Moderate</b>	3	3	
	<b>Extreme</b>	0	0	
<b>PONV</b>	<b>Mild</b>	93	90	0.968
	<b>Moderate</b>	7	8	
	<b>Extreme</b>	0	0	
<b>Satisfaction</b>	<b>None</b>	0	0	0.002*
	<b>Mild</b>	7	13	
	<b>Moderate</b>	20	37	
	<b>Extreme</b>	73	48	
<b>Preoperative hunger</b>	<b>None</b>	65	62	0.765
	<b>Mild</b>	28	31	
	<b>Moderate</b>	7	5	
	<b>Extreme</b>	0	0	
<b>Preoperative thirst</b>	<b>None</b>	60	38	0.015*
	<b>Mild</b>	30	41	

	<b>Moderate</b>	10	16	
	<b>Extreme</b>	0	3	
<b>Preoperative weakness</b>	<b>None</b>	90	86	0.782
	<b>Mild</b>	10	12	
	<b>Moderate</b>	0	0	
	<b>Extreme</b>	0	0	
<b>Preoperative anxiety (SAS)</b>	<b>None</b>	30	19	0.055*
	<b>Mild</b>	52	45	
	<b>Moderate</b>	18	30	
	<b>Extreme</b>	0	4	

Patients felt more satisfied in the group which followed the instruction of taking clear liquids up to 2 hrs prior to surgery and pre-op thirst was more among those who did not follow the instructions. Three patients in this group felt extreme thirst. Pre-op anxiety levels were also significantly high in the group which did not follow the instructions of clear fluid intake and followed traditional fasting prior to the surgery.

## DISCUSSION

Our study results showed that those patients who were kept NPO from midnight experienced more anxiety, and thirst, in the preoperative as well as postoperative period. The incidence of post-induction hypotension was more in patients who were kept NPO from midnight. Those patients who were taking clear liquid up to 2 hr. before surgery had no evidence of increased risk of aspiration or aspiration-related complications. Overall satisfaction of patients from surgery was more in patients who were taking clear liquid up to 2hr before surgery.

Preoperative fasting has been a standard practice followed for a long time to reduce gastric volume and acidity to prevent aspiration and associated life-threatening complications.<sup>6</sup> Over a period of time with the support of evidence-based medicine this practice has changed from traditional midnight fasting to allowing clear liquid 2 hr. before surgeries. Various studies have found that prolonged fasting has a detrimental effect in form of distress, fatigue, restlessness, dehydration, electrolyte imbalances, and hypoglycemia.<sup>7-9</sup> In addition, hunger stimulates gastric acid secretion, which in turn increases the risk of pulmonary aspiration of gastric contents.<sup>10</sup>

Even recent studies have evidence in support to allow carbonated drinks up to 2 hr. before surgery. Many anesthesia societies have adopted their guidelines as per recent evidence.<sup>11,12</sup> This being the case, studies demonstrate that, in clinical settings traditional longer overnight fasting rather than evidence-based shorter preoperative fasting periods still persist in many centers.<sup>13-15</sup> Karadağ and Pekintişeri determined that health personnel have a tendency to recommend that adult patients begin fasting at midnight, regardless of their scheduled surgical time.<sup>16</sup> Even in the present study group, 2 patients didn't follow PAC instruction of fasting it may be due to the traditional belief of midnight fasting among patients, surgeons and nursing staff or lack of awareness regarding recent updates in guidelines.

In the present study different aspects of subjective feelings of discomfort including thirst, hunger, weakness, nausea, and satisfaction were used, as there is no established method for a broader evaluation of perioperative discomfort. These variables were a common reflection of clinical experience of common patient complaints perioperatively. Thirst and anxiety are the main determiner of preoperative discomfort.<sup>17</sup> Bopp et al. determined that thirst affected patients the most, followed by anxiety.<sup>18</sup>

Our study result showed that anxiety and thirst were significantly higher in those patients who were fasting overnight in the preoperative period although this finding was not seen in the postoperative period. Many previous studies have also shown that consuming liquid before surgery significantly reduces thirst and anxiety.<sup>19,20</sup> Gebremedhn and Nagaratnam

found that 49% of patients experienced slight to severe thirst because of prolonged fasting from fluid and 37.2% from food.<sup>21</sup> Also those patients who have to be operated on at a later hour of the day had more prolonged fasting leading to more detrimental effect as suggested. So, allowing clear liquid in the preoperative area as per the schedule of surgery may be more beneficial in these patients. New formulas of preoperative drinks containing either amino acids (glutamine) or peptides have been studied and found to be safe in terms of gastric emptying<sup>22,23</sup> and seem to have a beneficial effect with regard to perioperative thirst, hunger, anxiety.<sup>24</sup>

In this study, no effect on the feeling of hunger in the perioperative period was seen with clear liquid. Many studies have shown that taking a carbonated drink up to 2 hr. before surgery is safe to be practiced so further allowing it may show a positive effect on hunger itself. So further study with allowing carbonated drinks or peptide and amino acid formulated drinks may be done to assess its effect on the feeling of hunger preoperatively.

In our study, we found no evidence of aspiration or related events in any patient in both groups. This is a well-established fact that aspiration-related events are very rare nowadays in elective surgery as fasting guidelines are implemented and anesthesia practice and monitoring have improved over a period due to better drugs and equipment availability and improved monitoring. Most of the time prolonged fasting practice seems to be practiced due to fear of aspiration and its consequences. Recent studies have proven that however, the risk and consequences for fluid aspiration are very low, and the benefits of a more liberal approach might outweigh the strict adherence to midnight fasting.<sup>25,26</sup> It has been also found that liquid aspiration occurs as a normal phenomenon during normal sleep and it doesn't cause any harm.<sup>27</sup> Recent studies have shown that liquid juice can pass through the stomach within an hour as suggested by magnetic resonance imaging.<sup>28</sup> Anderson et al<sup>29</sup> found that shortened fasting times may improve the perioperative experience for parents and children with a low risk of aspiration. These findings are in accordance with a number of previous studies showing that intake of clear fluids up to two hours before elective surgery does not adversely affect gastric contents.<sup>30,31</sup>

In our study incidents of post-induction hypotension were significantly higher in patients who were having prolonged fasting. Previously conducted various studies also found similar results. Meisner et al.<sup>32</sup> We compared 6- and 12-hour fasting periods and found that post-induction hypotension was significantly higher in patients in 12 hr. fasting group. Similarly, Tekgul et al<sup>33</sup> found that MAP values were significantly lower after induction of anesthesia in those patients who were posted at later hours of the day as compared to morning cases, increased fasting due to surgery at later hours seemed to be contributed to this. Dennhardt et al<sup>34</sup> found similar results in a study conducted on pediatric patients. While many other studies showed preoperative fasting was not associated with post-induction hypotension.<sup>35,36</sup>

Our study didn't find any significant difference in fasting blood sugar in both groups. Pouran hajian<sup>37</sup> et al conducted a similar type of study and found that fasting blood sugar was comparable irrespective of fasting duration. Various previous studies have shown that prolonged fasting is associated with low blood glucose concentration.<sup>38</sup> We found no significant difference among both groups regarding incidents of PONV. Although previous studies have shown incidents of PONV were significantly lower in patients who were allowed carbonated drink preoperatively.<sup>39</sup> Our study group was only allowed clear liquid and that may be a factor we didn't find such a correlation in our study. We found no significant difference in post-op pain in both groups. Mohsen et al also found similar results in a study conducted in orthopedic surgery.<sup>40</sup> We found in our study that patient satisfaction during the perioperative period was significantly higher in patients who were allowed clear liquid. Finding related to less thirst and anxiety may contribute to it, as

found in a study conducted by Neslihan et al also found that those patients who were less fasted experienced greater satisfaction levels.<sup>39</sup>

## CONCLUSION

Liberal preoperative fasting in form of allowing clear liquid up to 2 hr. before surgery is safe to practice as it is part of the international guideline. Most of the centers are still following traditional overnight iatrogenic fasting, which is no longer recommended. It is the right time to reconsider fasting practice in an elective surgical patient in a developing health center like ours. With the availability of current evidence, a proper implementation needs to be done with a team approach which requires proper patient counseling about the purpose and duration of fasting and quality improvement in form of education of the team involved in perioperative patient care about recent changes in fasting guideline.

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