

A cross sectional, observational study to evaluate the surgeons' knowledge and perspective on preoperative fasting guidelines in a tertiary care teaching hospital in Southern India

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Abstract

Background and Aims: The preoperative fasting orders given by the Anesthesiologists as per ASA and Enhanced Recovery After Surgery protocol, are often modified by the surgeons, for practical convenience, which can end up with patients being starved for prolonged periods of time. Hence, this study was conducted among various specialty surgical colleagues, to evaluate the knowledge and their perspective regarding patients' preoperative fasting guidelines.

Material and Methods: A validated questionnaire was distributed to 68 surgeons belonging to various surgical specialties, which included consultants and postgraduate residents. The surgeons were grouped as surgeons operating only on children, only on adults, and on adults and children (mixed). Data were summarized using the mean (SD)/median for continuous variables and categorical data were expressed as frequency and percentage. The difference in knowledge score, among the surgeons of three groups, was analyzed using ANOVA, with Bonferroni as post hoc.

Results: This study shows an overall decrease in knowledge (score of 6.13 ± 1.74) about preoperative fasting guidelines among surgeons. We found that the level of knowledge about preoperative fasting guidelines and complications was higher among surgeons who operate only on children (score of 7.05) as compared to surgeons operating only on adults (score 5.5) and adults and children (mixed) (score 6.1), which was statistically significant ($P = 0.013$). We found no difference in knowledge level based on designation and gender. All the surgeons uniformly had the perspective that patients have to be kept fasting preoperatively.

Conclusion: Preoperative fasting orders for all surgical patients, especially for vulnerable patients such as children and geriatrics, should be administered by the anesthesiologist or surgeon who is familiar with fasting guidelines. We intend to raise the awareness of fasting guidelines of surgical colleagues by putting up placards and posters in the wards.

Keywords: Fasting guidelines, pediatric surgeons, preoperative fasting, surgeon's awareness, surgeon's perspectives

Introduction

Adequate and appropriate period of fasting prior to anesthesia is required to prevent complications that can result from fasting for shorter or longer periods than recommended. Inadequate fasting can lead to pulmonary aspiration^[1] causing intraoperative hypoxia, requirement of prolonged ventilation, and ICU care. Prolonged fasting on

the other hand can cause hypoglycemia, dehydration, and hypovolemia, at the time of induction of anesthesia, especially in children and elderly patients.^[2] In addition, there could be anxiety, restlessness, and irritability to children, patients, and guardians.^[3] In view of this, various anesthesia societies have given guidelines, which advocate clear fluids up to 2 h prior to surgery to avoid preoperative patients being starved for longer periods of time.^[4-7] There is literature

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evidence to demonstrate that the risk of aspiration following liberalized fasting is similar to strict nil per oral (NPO) from midnight.^[8]

In our institute, patients are evaluated in the Pre-anaesthesia Clinic (PAC) up to 1 week prior to the surgery date. The preoperative orders written by the anesthesiologist in the PAC is generalized to “nil per oral for solids 6 h prior to surgery, and 2 h for clear fluids preoperatively” since the exact timing for the surgical procedure is not known at that point. As there might be changes or unexpected cancellations in the final operation list, the fasting orders for the individual patient is finalized by the surgeon after the patient has been admitted in the ward.

The Enhanced Recovery After Surgery (ERAS) protocol inspired by Danish Professor of Surgery Henry Kehlet has been instituted at the surgical preoperative wards at our hospital for the past 5 years. As per the ERAS protocol, a clear, carbohydrate-rich beverage may be ingested 2 h before surgery. Although a large body of evidence shows that the ERAS protocol is associated with shorter recovery times, shortened hospital stays, and reduced hospital costs, the implementation of the protocol has been slow, owing to various reasons: resistance to a change of traditional surgical doctrine, compliance to all aspects of the protocol is practically cumbersome to adhere, lack of awareness about various fasting guidelines for different types of food and of differing gastric emptying times,^[9,10] and ignorance of patients and involvement of various groups of healthcare workers in the perioperative period who need to be motivated to follow the protocol in its entirety.

At our hospital, we wished to study the adherence to preoperative fasting guidelines as per ERAS protocol and discuss reasons for the disparity in their practical implementation. Hence, at first, we conducted an audit (unpublished data) to know the duration of fasting for patients prior to surgery. We found that the mean fasting duration for solids was 10.5 h, and for clear liquids, it was 6.3 h. However, when we conducted the same audit among pediatric patients, we found that the mean fasting duration was 6.5 h for solids and 3 h for clear fluids. The fasting orders for all these patients have been written by the Anesthesiologists as per ASA guidelines, but later on modified by the surgeons on the day prior to surgery. So, as a next step, we intend to study the baseline knowledge of the surgeons in regard to preoperative fasting guidelines, problems of inadequate fasting, and their perspectives regarding fasting guidelines. We hypothesize that adequate knowledge and awareness will lead to better implementation of fasting orders written by Anesthesiologists.

Material and Methods

This prospective, observational study was conducted in a tertiary care, 2400 bedded teaching hospital in Southern India, with the approval of Institutional Review Board (IRB) and Ethics committee (IRB no 11820, dated 30-01-2019). For the development of a reliable validated questionnaire, a systematic stepwise approach was made in consultation with a biostatistician, a senior anesthesiologist, a senior surgeon, and a senior nurse. A questionnaire consisting of 15 questions about fasting guidelines, addressing various domains including duration of fasting for various foods in different age groups, problems of inappropriate fasting, and practical issues faced in implementing the orders, was drafted and was validated by a team of five experts in the field to obtain content validity. The experts were asked to grade the relevance of each question on a scale from 1 to 4 (a 4-point scale was used to avoid any neutral remarks). The average content validity index (CVI) was calculated, and it was 0.92 and scale level CVI of 0.67.^[11] As a next step, the final version of questionnaire was pilot tested in a group of 30 anesthesiologists, to get the knowledge scores before administering to the surgeons. The validated questionnaire [Figure 1] was then handed over to the surgeons of various specialties manually after explaining the reason and basis of the study. The willingness to answer the questionnaire was considered as informed consent.

Eligibility criteria

All surgeons from various specialties, belonging to different designations, i.e., postgraduates, assistant professors, associate professors, and professors, were enrolled and included in the study. Interns were not included in the study.

The surgeons were grouped as follows: 1. Surgeons operating only on children—pediatric general surgery, pediatric orthopedics, and pediatric ENT. 2. Surgeons operating only on adults—general surgery, obstetrics and gynecology, and adult orthopedics. 3. Adults and children (mixed)—surgeons operating on pediatrics and adults that included plastic surgery and urology. This questionnaire was answered by 64 surgeons of different specialties. The questionnaire had 15 questions—ten knowledge based and five based on surgeon’s perspective. Each question in the knowledge section was given one mark with no negative marking for any of the questions. Depending on the score, the grading was done as 1–4 Bad, 5–7 Average, and 8–10 as Good for knowledge.

Our primary objective was to study the awareness and knowledge of patients’ preoperative fasting guidelines among surgeons and their perspectives regarding preoperative fasting.

A Cross-sectional, Observational study to evaluate the Surgeons perspective on Pre operative fasting guidelines.

QUESTIONNAIRE

Your Area of speciality _____

Age _____ Gender- M/F _____

Present designation- Postgraduate/ Consultant with <5 yrs of experience/ Consultant with more than 5 yrs experience. _____

What age group of patients do you deal with- Paediatrics / Adults / Both adults and children _____

Please encircle the most appropriate answer.

- The following are clear fluids, except
 - Black coffee
 - Green tea
 - Coconut water
 - Mango juice
- When can a three month old child last have breast milk before surgery?
 - 2 hours
 - 4 hours
 - 6 hours
 - 8 hours
- What is the problem of under-fasting(less than 6 hours)?
 - Hunger
 - Dehydration
 - Pulmonary aspiration
 - Anxiety
- Should the time after the last meal be the same for a four month and a four year old child? Yes/No _____
- What are the complications of over fasting at induction?
 - Hypovolemia
 - Hypoglycemia
 - Hypotension
 - All.
- What are the complications of inadequate fasting at induction?
 - Increased need for ventilator support
 - Increased hypoxia
 - Pulmonary aspiration
 - All.
- When can a one year old child last have cow's milk before surgery?
 - 2 hours
 - 4 hours
 - 6 hours
 - 8 hours.
- For a 65 year old diabetic for the last 30 years, scheduled for the elective Chole- cystectomy ,the fasting orders for solids should be
 - 4 h
 - 6h
 - 8h
 - 12h
- For a 40 year old man, who underwent Whipple's procedure, presently on Resource NG feeds in SICU and posted for Emergency Fasciotomy Right forearm,
 - NG feeds should be continued till theatre.
 - NG feeds should be stopped 6hrs prior.
 - No NG feeds for 24 hours prior to surgery.
 - No NG feeds for 4 hours prior to surgery
- A two year old child with history of choking two days ago while eating peanuts, posted for bronchoscopy under anaesthesia. He presently is stable but had last glass of milk three hours back and crying of hunger.
 - Will you proceed with procedure immediately after emptying stomach contents?
 - Start IV fluids and wait for three more hours
 - cancel the procedure and let the child eat
 - proceed immediately with RSI(Rapid Sequence Intubation)

Questions on Surgeons Perspective on preoperative fasting

- In your perspective, should a patient be kept fasting for elective surgery?
 - Yes
 - No
- In your opinion, who should give the fasting orders?
 - Nurse
 - Surgeon
 - Anaesthetist
 - Mother of the child
- Compared to general anaesthesia, fasting prior to regional anaesthesia should be
 - Longer
 - Same
 - Shorter
 - No fasting
- What are the reasons for keeping patients uniformly fasting from 12 mid night?
 - To avoid cancellation
 - Inadequate knowledge about over fasting
 - Non availability of clear fasting guidelines from anaesthetists
 - all
- In your perspective, for a patient on NG feeds posted for surgery, the duration of fasting should be
 - same as patients on oral feeds
 - shorter than patients on oral feeds
 - longer than patients on oral feeds
 - fasting does not matter as NG is in place

Figure 1: Questionnaire used for the study. There are ten questions to assess surgeon’s knowledge and five questions to address their perspectives regarding preoperative fasting

Our secondary objectives were to see the difference in knowledge levels among the surgeons belonging to different surgical specialties and different designations.

Sample size calculation

The reported awareness of preoperative fasting guidelines among Anesthesiologists is 80% in our institute. To detect a similar awareness among surgeons, with 10% precision and 95% CI, a sample size of 64 is required. The formula used is $n = 4pq/d^2$, $P = 80%$, $q = 20%$, and $d = 10%$. We had recruited 68 surgeons for our study.

Statistical analysis

Data were summarized as mean and standard deviation (SD) for continuous variables and categorical variables were reported by using number and percentage. To find out an association between two categorical variables, Chi-square test or Fisher’s exact test was used. An independent *t*-test was used for two group mean comparisons. For more than two group mean comparisons, ANOVA test was reported. For content validity, the item-level CVI (I-CVI) was reported. A *P* value of < 0.05 was considered as statistically significant. All the analyses were done by using STATA version 15.

Results

A total of 68 surgeons were recruited for the study. The demographic details of the participant surgeons are listed in

Table 1. There were 24 female surgeons and 44 male surgeons. Of the 68 participants, 20 of them operated only on pediatric patients, 25 of them only on adult patients, and 23 operated on both adult and children. There were 22 postgraduates, 24 consultants with less than 5 years of experience, and 22 consultants with more than 5 years of experience.

This study shows an overall decrease in knowledge (score of 6.13 ± 1.74) about preoperative fasting guidelines among surgeons. This was compared with 30 Anesthesiologists from our department including the postgraduates, who had a mean score of 8.5 ± 0.5 . We found that the knowledge level about the preoperative fasting was similar between both the sexes. The years of experience of the surgeon did not have an impact on the knowledge scores because the scores were similar in surgeons who had more or less than 5 years of experience.

We assessed each group depending on the age group of patients they operate upon, i.e., pediatric, adult, or both adult and children (mixed). We found that the level of knowledge of preoperative fasting guidelines and complications was higher among surgeons who operate only on children (7.15), as compared to surgeons operating only on adults (5.52) and both children and adults (mixed) (5.91) [Figure 2]. This difference was statistically significant ($P = 0.004$) [Table 2].

The questionnaire had few questions related to fasting orders in children. Both the questions, 2 and 7, which were related

to fasting orders for breast milk and cow’s milk, respectively, were answered better by surgeons operating only on children. For question 2, 80% of the surgeons operating on children answered correctly as compared to 32% of surgeons operating on adult patients and 52.2% of surgeons operating on mixed group of patients ($P = 0.006$). Likewise, for question 7, 85% of surgeons operating on children, 36% of surgeons operating on adults, and 52.2% surgeons operating on adults and children (mixed) answered correctly ($P = 0.004$).

The questionnaire had five questions addressing the surgeon’s perspectives on preoperative fasting guidelines. All the surgeons uniformly agreed to the question that patients should be kept fasting for elective surgery but only 51.47% of them felt that fasting hours for regional and general anesthesia should be the same. For the question about whom should administer fasting orders, 56 out of 68 (82.3%) surgeons felt that Anesthesiologist should give fasting orders, 12 (17.6%) felt that surgeons should give fasting orders, but none of the surgeons felt nurses should give orders. There have been various reasons quoted by the surgeons as to why patients are kept fasting uniformly from 12

midnight, in spite of fasting orders being available. These have been summarized in Table 3.

Discussion

Improper implementation of preoperative fasting orders can be due to lack of awareness about fasting guidelines among medical personnel involved in the perioperative care of patients that include nursing staff, surgeons, or anesthesiologists. Many studies have been done to assess awareness of fasting guidelines among patients, nurses, and anesthesiologists, but to our knowledge, this is the first study conducted to evaluate the surgeons’ knowledge and perspectives about preoperative fasting guidelines.

Allowing clear fluids/carbohydrate-rich beverage up to 2 h prior to surgery has become the standard of care across the

Table 1: Demographic variables of all the surgeons recruited in the study

Variables	n (%) Mean±SD
Age	36.97±7.87
Gender	
Female	24 (35.29)
Male	44 (64.71)
Area Specification	
Paediatrics	20 (29.41)
Adults	25 (36.76)
Both	23 (33.82)
Designation	
PG	22 (32.35)
<5 years consultant	24 (35.29)
>5 years consultant	22 (32.35)

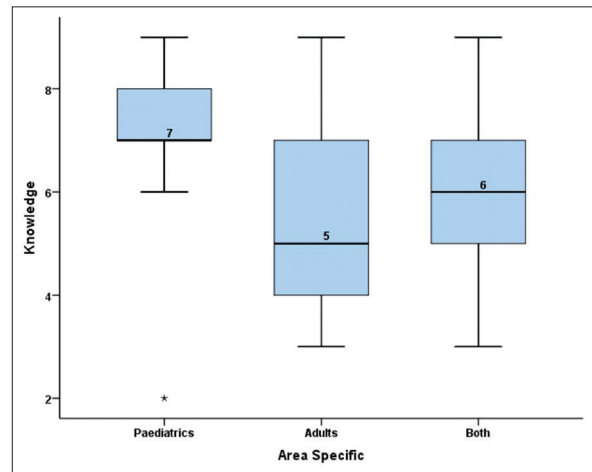


Figure 2: The above box plot shows the knowledge scores of surgeons grouped according to the patients they operate on. The x-axis shows the study participants divided into three groups—operating on only children, adults, and mixed patients. Y-axis shows knowledge scores. The surgeons operating on only pediatrics have higher knowledge scores compared to surgeons operating on adults and both

Table 2: Comparison of knowledge score of surgeons depending on their area of work

Questions	Proportion of surgeons with correct answers (n=68)	Pediatrics (n=20) n (%) Mean±SD	Adults (n=25) n (%) Mean±SD	Adults and children (n=23) n (%) Mean±SD	P
Q1	61 (89.71)	18 (90.0)	21 (84.0)	22 (95.7)	
Q2	36 (52.94)	16 (80.0)	8 (32.0)	12 (52.2)	
Q3	63 (92.65)	18 (90.0)	24 (96.0)	21 (91.3)	
Q4	50 (73.53)	13 (65.0)	20 (80.0)	17 (73.9)	
Q5	56 (82.35)	18 (90.0)	17 (68.0)	21 (91.3)	
Q6	31 (45.59)	12 (60.0)	10 (40.0)	9 (39.1)	
Q7	38 (55.88)	17 (85.0)	9 (36.0)	12 (52.2)	
Q8	12 (17.65)	4 (20.0)	5 (20.0)	3 (13.0)	
Q9	43 (63.24)	17 (85.0)	14 (56.0)	12 (52.2)	
Q10	27 (39.71)	10 (50.0)	10 (40.0)	7 (30.4)	
Overall knowledge score	6.13±1.74	7.15±1.53	5.52±1.66	5.91±1.65	0.004

The knowledge score was calculated for first ten questions and compared with surgeons grouped as per the patients they operate on; only children, only adults, and adults and children

Table 3: Reasons given by the surgeons for keeping patient uniformly fasting from 12 midnight

Reason	Number of doctors (n=68)	Percentage
To avoid cancelation	23	33
Inadequate knowledge about fasting	6	7
Nonavailability of clear fasting guidelines	14	21
All the above	25	39

globe and strict overnight starvation is no longer followed. The preoperative fasting policies and practices have changed after the publication of new fasting guidelines by various anesthesia societies.^[12,13] ERAS protocols^[14] are multimodal perioperative care pathways aimed at achieving early recovery after surgery by maintaining preoperative organ function and reducing profound stress response after surgery. The implementation of ERAS protocols is slow because they present a challenge to traditional surgical doctrine. When adequate knowledge is not present regarding preoperative fasting guidelines and the problems related to inadequate fasting, patients are kept fasting for longer periods of time. Gunawardhana *et al.*^[15] conducted a cross-sectional study, to know the knowledge, attitudes, and practice of preoperative fasting guidelines in the National Hospital of Sri Lanka. Data were obtained from patients, junior anesthetists, and nurses of surgical wards. This study showed an awareness of 70% among healthcare workers with junior anesthetists demonstrating satisfactory level of knowledge while nurses had below satisfactory level of knowledge. Patients undergo fasting for unnecessarily long periods, mainly due to inadequate knowledge and poor attitude among ward staff. In our clinical practice, we find that anesthesiologists administer appropriate fasting orders in PAC, and it gets changed when the patient gets admitted in the surgical floors by our surgical colleagues. The staff nurses tend to follow the surgeon's orders, which results in patients being kept fasting for a longer period.

We found the overall knowledge scores to be low among surgeons and it was similar among surgeons of various designations. We found that the level of knowledge regarding preoperative fasting guidelines was significantly higher among surgeons operating only on children as compared to surgeons operating on adult patients. This is desirable in clinical practice since children and geriatric patients are considered as vulnerable population, and it is better for the fasting orders to be given by the anesthesiologist or surgeon who is familiar with fasting guidelines.

One of the reasons why patients are kept NPO for longer periods of time is to avoid cancelations and to accommodate last-minute changes in the operation list. Salman^[16] conducted a survey to examine anesthesiologist administered preoperative

fasting routine for adults undergoing elective surgery. The study showed that most of anesthesiologists were aware of new preoperative fasting guidelines. However, they were still practicing strict preoperative NPO orders from midnight, as they had concerns regarding patient safety and felt that the daily schedule would be affected. This was reflected in our study as well where 33% of surgeons felt that patients are kept strict NPO from midnight to avoid last-minute cancelations. In a study conducted by Murphy and colleagues,^[17] where they analyzed the effects of following liberal fasting guidelines on operating room utilization, there was no increase in cancelations or delays in surgical procedures due to inadequate preoperative fasting.

In a recent nationwide survey conducted by Panjari *et al.*,^[18] it has been shown that the tendency of ward nursing staff to follow surgeon's instructions than anesthesiologists and poor knowledge of surgeons regarding importance of fasting guidelines were some of the barriers in implementing fasting orders preoperatively. We believe that better awareness among surgeons would lead to more stringent implementation of fasting orders as they spend more time in the ward with patients. The required standard is that all doctors and nurses looking after patients should know the preoperative fasting guidelines. An audit conducted by Arun *et al.*^[19] in tertiary care hospital concluded that education of ward nurses and better coordination among the anesthesiologists, surgeons, and nurses can greatly reduce unnecessary preoperative starvation in children. Changing a clinical practice is complex and it must be done with evidence-based recommendations.^[20] Our fasting guidelines are in accordance with ERAS guidelines. A multidisciplinary consensus review done by Wainwright *et al.*,^[21] summarizes the literature and proposes recommendations for perioperative care of patients undergoing THR and TKR operations with ERAS guidelines. The ERAS society recommends continual review of clinical practices as a component of ongoing quality improvement in healthcare. Regular audits to assess the adherence to recommended practice helps in the process of continuous quality improvement, especially in areas where compliance is low.

As a follow-up to this study, we intend to raise the awareness of fasting guidelines among surgeons by putting up placards and posters in the wards, sending reminder mails, which would lead to better implementation of fasting orders and thus promote better care for patients in the perioperative period.

Limitations

We have not assessed the knowledge level of nurses and patients about fasting guidelines prior to surgery. Since nurses are also a part of the healthcare team taking care of patients in

the perioperative period, knowledge and awareness about the preoperative fasting guidelines are crucial for them.

Conclusion

To conclude, our study has demonstrated that the knowledge levels regarding preoperative fasting guidelines is low among Surgeons which results in modification of NPO orders administered by the Anesthesiologists. Among the surgeons belonging to various specialties, surgeons who operate only on children scored higher and the difference was significant. Concerns about everyday workflow and last-minute cancellations due to inadequate fasting, might explain the adherence to the traditional fasting policies. Therefore, increasing the awareness of fasting guidelines among surgeons will aid in better implementation of fasting orders given by Anesthesiologists and improve perioperative outcomes for the patient. Preoperative fasting orders for all surgical patients, especially vulnerable patients such as children and geriatrics, should be administered by the Anesthesiologist or Surgeon who is familiar with fasting guidelines.

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Conflicts of interest

There are no conflicts of interest.

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