Shortened Preoperative Fasting Time to Allow Oral Rehydration Solution Clear Liquid up to Two Hours before Elective Major Surgery in Adults

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ABSTRACT

Objective: To generate evidence of feasibility to allow clear liquid 2 hours before elective surgery.

Study Design: Cross-sectional observational study.

Place and Duration of Study: The Department of Surgery, Patan Hospital, Patan Academy of Health Sciences, Nepal, from October to December 2016.

Methodology: One hundred consecutive adult elective major surgery patients of American Society of Anesthesiologist criteria 1 or 2 were enrolled. The protocol was discussed with patients, nurses, anesthetists and surgeons to allow 500 ml clear liquid (ORS) up to 0600 hours on the day of surgery to maintain minimum of 2 hours (h) nil per os (NPO) before surgery. Compliance, discomfort, nausea and vomiting were observed. Institutional review committee approved the study. Microsoft excel was used for descriptive analysis.

Results: All 100 patients completed the protocol of shortened fasting time. Two patients had incomplete records and were excluded from analysis. Among the 98 patients analysed, age was 48 ±12.38 years with 74 females (75.51% of 98). There were 68 gastrointestinal, 20 urosurgery and 10 others surgeries. There was no discomfort, nausea or vomiting reported due to ORS 2-h before elective surgery.

Conclusion: Preoperative clear liquid up to 2-h before elective surgery in adults is feasible and safe in our set-up to shorten the fasting time.

Key Words: Clear liquid, Major elective surgery, Nil per os (NPO), Oral rehydration solution (ORS), Preoperative NPO, Shortened fasting time.

INTRODUCTION

Preoperative fasting was advocated by Mendelson in 1946 to prevent aspiration.1 Malt in 1986 questioned the midnight nil per os (NPO) practice allowing water 3 hours (h) before surgery.2 Fasting guideline was modified by Anesthesiologist Societies of America in 1999 and 2011,3 to allow clear fluids water, fruit juices without pulp, clear tea, black coffee. Similar fasting guidelines were introduced by societies in Europe,4,5 and Scandinavia,6 etc. to allow free oral intake of clear liquid up to 2-h before elective surgery.

In Asia, midnight NPO is the norm. A nationwide study from Japan found 9-h median fasting.7 Audit of 152 ASA-I elective non-obstetric surgery patients at a tertiary care teaching hospital in India reported mean fasting of more than 12-h for clear fluid and 14-h for solid,8 despite other Indian researchers,9 having questioned the midnight NPO practice. Sri Lankan study also reports fasting of 13-h for solids and 12-h for liquids.10 Shortened fasting guideline is yet to become a reality in Asia. Reports are limited in the Asian region on protocol and practice of enhanced recovery after surgery (ERAS) and fast tract surgery (FTS).11-13 ERAS is a multidimensional approach of care during perioperative period to achieve early recovery, maintain optimum organ function, reduce stress and discomfort to the patients. ERAS protocol includes, but is not limited to counseling, nutrition, analgesics, and anesthetic regimens and early mobilisation.

Shortened fasting allowing oral clear liquid improves subjective well-being of patients by decreased thirst, nausea, vomiting, anxiety; and carbohydrate clear fluid decreases insulin sensitivity and metabolic response to surgical trauma.14-18 The ‘oral rehydration solution (ORS) with glucose and electrolyte is easily available, inexpensive and safe to shorten the preoperative fasting time.19,20 At our tertiary care university teaching hospital, midnight NPO is routine, like most other institutions. In this study, the aim was to generate local evidence for acceptance, compliance, and feasibility of shortened preoperative fasting to allow clear liquid in elective surgery patients as a component of ERAS protocol.

METHODOLOGY

This cross-sectional observation was conducted in the Unit Two, Department of Surgery, Patan Hospital, Patan Academy of Health Sciences (PAHS), Nepal, from
October to December 2016 with the intention to include 100 consecutive adult patients, age above 14 years, admitted for elective surgeries. Patients were counselled about preoperative fasting by the admitting surgeon in the Outpatient Department (OPD) before admission. Informed consent was obtained in the OPD at the time of admission during routine patient counselling for surgery. Admitting surgeon wrote the NPO instruction in 'Dr's order sheet' for nurses in the patient chart. The hospital policies require all mentally capable adult patients, 14 years or above as per hospital policy to provide consent themselves. The consent is further counter-signed by patient family member and the doctor who obtain the consent. Patients were advised not to take food by mouth after 2100 hours before surgery. They were advised to take ORS, a glucose and electrolyte containing clear fluid till 0600 hours to ensure 2-h of NPO before first list of surgery at 0800 hours.

The protocol of shortened fasting time was discussed in the morning department conference, attended by surgeons and students. This was further briefed to the anesthetist and surgery ward nurses about the change in midnight NPO. Written notice was posted in surgery ward so that all nurses and doctors were familiar with these changes in preoperative fasting time. Nurses were requested to obtain a sachet of ORS (locally popular as 'Jeevan Jal') from the hospital pharmacy and dissolve in a liter of bottled clean water. Nurses instructed and ensured that patients consumed 500 ml of ORS between 2100 hour and 0600 hour before surgery.

All elective surgery patients of American Society of Anesthesiologist (ASA) criteria 1 or 2 were included. Patients who did not give consent, with known diabetes mellitus, ASA 3 or more, gastro-intestinal obstruction, pregnant, were excluded. The study was approved from the Institutional Review Committee of PAHS. Other perioperative protocols remained the same as per Hospital policies for the particular surgeries.

Data were collected as per predesigned proforma together with the consent, mentioning change in preoperative NPO for the study and surgery, and were kept in patient's chart during the admission in the OPD and later re-checked by ward nurses in the surgery department.

Two coauthors (SM and RG) were in-charge to oversee that the proforma was completed daily for each patient fulfilling the inclusion criteria. Proforma included: study variables of patient age, gender, ASA grade, types of surgery and anesthesia. Other variables specific to changes in NPO were recorded by nurses for patients' compliance to drink ORS and complain of nausea, bloating, vomiting before shifted to operation theatre. Anesthetists recorded vomiting or aspiration during induction of anesthesia. In-hospital mortality was recorded. Microsoft excel was used for descriptive analysis as percentage, mean and standard deviation (SD).

### RESULTS

There were total of 98 patients' records for final analysis (out of 100, data were incomplete in two thus were excluded). Youngest patient was 15 and oldest 65 years of age; mean being 48 ±12.38 years. Female were 74 (75.51% of 98). Type of surgical procedure is given in Table I. All 98 patients completed the planned protocol to drink 500 ml ORS before 0600 hours on the day of surgery to maintain at least 2-h NPO before surgery. In the surgery department, there was no discomfort reported by patients after ORS ingestion before going to operation theater. In the operation theatre, the incidence of vomiting or aspiration during induction of anesthesia was nil. There was no in-hospital mortality in this series.

### DISCUSSION

All 98 patients out of 100 (two had incomplete data thus were excluded from analysis) completed the planned ingestion of ORS safely without discomfort, before and during induction of anesthesia. There was no recorded incidence of bloating, nausea, and vomiting after ingestion of 500 ml of ORS between 2100 and 0600 hours before the elective surgery. Similarly, there was no remarkable nausea, vomiting during the induction of anesthesia in those patients who were encouraged and allowed ORS until 2-h before surgery as part of ERAS to change the existing protocol of routine midnight NPO. This finding adds local evidence to the confidence of the nursing staff, surgeons, anesthetists and patients that there is no increased risk of nausea, vomiting; and we
can safely allow clear liquid at least until 2-h before elective major surgery in healthy patients of ASA-1 and ASA-2 without diabetic.

ORS was used as oral clear fluid to standardise the study. The compliance from health professionals and patients in this study was good and all patients completed the protocol to ingest 500 ml of ORS during 2100 and 0600 hours before the day of elective surgery. The Japanese multicenter randomised trial, including six hospitals and 300 patients (150 in each group), reported that patients safely consumed one liter ORS containing balanced glucose and electrolytes from 2100 hours till 2-h before surgery. They concluded that compared to the patients who fasted from 2100 hours, gastric fluid volume immediately after anesthesia induction was similar, 14 ml in ORS vs. 23 ml in fasting group (p=0.30), and ORS group reported less thirst and hunger before surgery (p=0.001, and 0.01). They concluded ORS to be safe and feasible until 2-h before surgery and physicians should use this practice to maintain the body fluid and electrolytes to improve the patient's comfort. Other studies have also reported ORS as safe and effective alternative to shorten preoperative fasting time and replace water, electrolytes and body fluid with reduced thirst, hunger, anxiety, and shortened hospital stay.

In western countries, most protocols have hospital stay and cost as endpoints; but in Asian societies, social acceptance by patients and their families play important role. Satisfaction of family members is major consideration, because they are the one who take care of patients during hospital admission and also after the discharge. The main objective of present study was to observe the acceptance of change in midnight NPO to allowing ORS till 2-h before elective surgeries. All other protocols of surgery remained same as per existing hospital policies. In this study, complete ERAS protocol was not analysed, rather the objective was to reproduce the safe introduction of already practised preoperative NPO in most of the western countries, to allow clear liquid until 2-h before elective surgery.

Cultural and social acceptance and hospital care in Asian countries are different. Besides hospital stay and cost, the team dynamics, patient satisfaction, reduced workload of nurses play important role in modification of clinical practices, like 'modified-ERAS'. Evidence-based practice and local modification of internationally accepted guidelines are a continuous process of good clinical practice. In developing countries like Nepal, the cost of hospital stay constitutes only 2-5% of total costs of surgeries. For example, the average total cost, admission to discharge, for laparoscopic cholecystectomy is approximately $250. And, one day hospital stay in general ward is $2.5 including doctor's visit and nursing care. Out of pocket payment is the norm. This is likely the scenario in the public hospitals in developing countries. Simply thinking in line to 'reduce hospital stay', do not have same value of 'cost reduction' like in developed economy. Patients tend to stay in hospital longer due to lack of support system of transportation, community nurses and general practitioner. We need to continuously upgrade our clinical practices for the benefit of patients. Modification of ERAS protocol for local adaptation is feasible without compromising safety. For example, in line with the concept of evidence-based medical practice and ERAS, in case of cholecystectomy, routine antibiotic prophylaxis are not given in low risk laparoscopic surgeries and allow clear liquid and stop IV fluid four hours after laparoscopic cholecystectomy. Similarly, with aim to change the 'routine' clinical practice, and extension of ERAS, we have now stopped 'routine hospital visit after day case inguinal hernia surgery in children' to decrease the unnecessary discomfort to the children and parents and to add to the benefit of the day case surgery.

In the present study, the gastric fluid or postoperative blood glucose was not monitored just for research purpose to add extra cost to the patients. The safety of ORS has been well documented by Japanese researchers to shorten fasting time. Taniguchi et al. reported successful results of preoperative to shorten fasting time, fluid management, increased patient satisfaction and improved nursing services as modification of ERAS protocol in their ESSENSE (essential strategy for early normalisation after surgery with patient's excellent satisfaction) project. They further argued that ORS was good substitute for high cost commercial glutamine drink. There have been studies in Asian population on use of commercially available carbohydrate drinks containing glutamine to decrease insulin resistance and improve glucose metabolism. The gap between clinical practice and evidenced-based guidelines depends on many factors. The organisational, financial, cultural as well as perception of patients and health workers all need to be taken in to consideration to modify clinical practices for the benefit of patients.

The clinical implication based on locally generated evidence is obvious than protocol generated in Western advanced countries. After successful observation of present study, the authors have now changed their practice in surgery department to allow clear liquid (water, black tea with sugar, ORS) till 0600 hours to maintain 2-h NPO before the first list of the day. It still needs to be worked out as how to decrease the fasting time for cases later in the day. The successful observation of change in midnight NPO practice to allow oral clear liquid in the form of ORS, can be further modified with other 'clear liquid' until 2-h before elective surgery.

This is likely...
surgery to shorten fasting time in line with the internationally accepted guidelines and evidence-based medicine.

**CONCLUSION**

Preoperative clear liquid, oral rehydration solution (ORS), up to 2-h before elective surgery in adults is feasible and safe to decrease the fasting time in line with international guidelines.

**REFERENCES**