

Pre-operative fasting guidelines: An update

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Introduction:

Pre-operative fasting aims to reduce residual gastric volume and acidity prior to surgery or other non-surgical procedures requiring general anaesthesia, regional anaesthesia or intravenous sedation. This helps to prevent regurgitation and aspiration of gastric contents. Majority of serious cases of pulmonary aspiration occurs in emergency cases particularly trauma, obstetrics, abdominal surgery and pain. Patients with history of symptomatic gastro-esophageal reflux, hiatus hernia, morbid obesity, difficult airway are at increased risk of regurgitation and aspiration of gastric contents. Increased fasting time leads to decreased injury if aspiration occurs¹. Clinical studies show the incidence of pulmonary aspiration is 1 in 10000².

However prolonged periods of fasting is unnecessary and may cause thirst, dehydration, biochemical imbalance, hypoglycaemia especially in children. There is also a tendency for gastric volume to increase after a prolonged period of fasting.

Historical Background:

The present books on anaesthesia did not mention about fasting. In 1883, the famous surgeon Lister recommended that there should be no solid matter in the stomach, but that patient should drink clear liquid about 2 hours before surgery³. For the next 80 years until the 1960's most textbooks recommended a 6 hour fast for solids and 2-3 hours for clear liquids.

During the 1960's in North America the pre-operative orders 'nothing by mouth after midnight' was applied to solid as well as liquid. Concern about the risk of pulmonary aspiration was fuelled by Roberts and Shirley's 1974 statement⁴, those patients with 25 ml (in adults) of gastric contents with pH<2.5 are at high risk of pulmonary aspiration. Raidoo et al⁵ have demonstrated that >50ml of gastric contents (in adults) is required to produce pneumonitis.

In 1983, Miller et al reported no difference in gastric fluid volume or pH in patients who were 'nothing by mouth after midnight' and those who had tea and toast 2-4 hours before surgery⁶. Fasting guidelines at Foothills Medical Centre in Calgary were changed in 1988. Since then, 'nothing by mouth after midnight' has applied only to solids and clear liquids are encouraged until 3 hours before the scheduled time of surgery or 2 hours before the actual time of surgery.

Gastric emptying:

The human stomach can accommodate upto 1 litre before intragastric pressure increases⁷. After an overnight fast the volume of gastric contents averages 25-30 ml and varies from 0 to >100 ml. Minimum volume of gastric fluid required to overcome the lower esophageal sphincter (main barrier) varies from 500ml to >1200 ml. Normally peristaltic waves sweep from cardia to pylorus at a rate of 3 per minute. The rate of gastric emptying is proportional to the volume of gastric contents with 1-3% of total gastric contents reaching the duodenum per minute⁸. Carbohydrates empty faster than protein and fat is the slowest. Clear liquids (like water, diluting juice, carbonated beverages, black tea or coffee) empty exponentially, 90% within 1 hour and virtually all within 2 hours. The pylorus prevents passage of particles more than 2mm, so digestible solids must be broken down to particles < 2 mm before they reach small bowel. Milk tea or coffee made with milk is treated as solid because with gastric juice it curdles (becomes semi solid) in the stomach. Delayed gastric emptying may occur in pyloric obstruction, gastro esophageal reflux, disorders of gastric motility and diabetic gastroparesis. All emergency cases especially trauma and women in labour should be assumed to have delayed gastric emptying. Gastric emptying is normal in three trimesters of pregnancy and beyond 18 hours post partum, but is delayed in the first 2 hours post

partum⁹. Drugs like opioids can cause marked delay in gastric emptying especially in women in labour. Less rigid fasting guidelines will be followed in women in labour who are not expected to require operative treatment¹⁰.

Development of Fasting Guidelines:

The minimum fasting time prior to surgery have long been debated. The first proposition came from British Anaesthetists stating that patients should be nothing by mouth from midnight. However, since then the American Society of Anaesthesiologists (ASA) followed by the Association of Anaesthetists of Great Britain and Ireland recommended new fasting guidelines for the minimum fast prior to surgery¹. This was based upon evidence by Canadian anaesthesiologists who found that drinking clear fluids 2 hours prior to surgery decreased pulmonary aspiration compared to those nil by mouth since midnight¹¹. The following are the recommended guidelines for nil by mouth prior to surgery¹².

Table-I

Age	Solid	Clear Liquid
<6 months	4 hours	2 hours
6-36months	6 hours	3 hours
>36 months (including adults)	8 hours	3 hours

Table-II

American Society of Anaesthesiologists Fasting Guidelines

Ingested	Material Minimum Fast (to all ages)
Clear liquid	2 hours
Breast milk	4 hours
Infant formula	6 hours
Non human milk	6 hours
Light meal	6 hours

The guidelines recommend no routine use of gastro intestinal stimulants, gastric acid secretion blockers or oral antacids.

Application of the Fasting Guidelines:

Patients for a morning list should eat nothing for 6 hours before surgery. Realistically, most patients do not usually eat after midnight. Patients for an afternoon list should have a light breakfast (like a slice of white toast with jam, honey but no butter) at least 6 hours prior to the start of the list.

Prescribed medication especially premedication can be taken within 2 hours prior to surgery with a small drink of water (<30ml).

Patients with diabetes mellitus presenting for surgery will be managed by established regimes for fasting, fluid and insulin and blood sugar monitoring. All patients should be encouraged to drink clear fluid up to 2 hours prior to the start of the list unless it is contra indicated due to the type of surgery. If a patient has been fasted for fluids for more than 6 hours, consideration should be given to start maintenance intravenous fluid in the ward. Whenever possible, children should be scheduled at the start of the list and in age order (i.e. youngest first).

Patients requiring regional anaesthesia should follow the fasting guidelines as for general anaesthesia, as these cases may need to be converted to general anaesthesia or need intravenous sedation.

Some non-surgical procedures (like radiological and endoscopic procedures, endovascular procedures, DC cardio version and ECT) requiring general/regional anaesthesia or intravenous sedation, fasting guidelines apply as for surgical procedure.

For patients requiring local anaesthesia only –no fasting required. Patient should eat a normal diet. In patients with delayed gastric emptying steps should be taken to increase gastric pH and reduce gastric volume preoperatively. Fasting guidelines as for surgical procedure.

Fast guidelines may need to be overridden in order to expedite surgery in emergency cases. Anaesthetists are able to take steps to prevent regurgitation/aspiration e.g. rapid sequence induction of anaesthesia, use of pro-kinetic drugs.

Conclusion:

The purpose of fasting guidelines for healthy patients undergoing elective surgery is to minimize the volume of gastric contents while avoiding unnecessary thirst and dehydration. So, the order

'nothing by mouth after midnight' should be applied to solids for patients scheduled for surgery early in the morning. Clear fluid should be allowed up to 2 hours before the actual time of surgery. For patients with delayed gastric emptying, to minimize gastric acid secretion, proton-pump inhibitor or H₂ receptor blocker may be advisable.

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