# PRE-OPERATIVE FASTING GUIDELINES

<table>
<thead>
<tr>
<th>Department</th>
<th>Anesthesia Department</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject</td>
<td>PRE-OPERATIVE FASTING GUIDELINES</td>
</tr>
</tbody>
</table>
| Prepared by:   | - Dr. Salah N. El-Tallawy  
                 | - Dr. Osama A. Ibrahim |
PRE-OPERATIVE FASTING GUIDELINES

Introduction:
- Anesthesia-related pulmonary aspiration leading to respiratory failure (Aspiration Pneumonitis) has been described in both elective and emergency surgical patients.
- Fluid ingestion in healthy, elective patients might increase aspiration risk by increase in residual gastric volume, decrease in pH, and decrease in esophageal sphincter tone.
- With the hope of reducing the risk of this complication, rigid fasting routines before surgery have been enforced. However, the scientific basis for these rigid fasting routines in elective patients has been challenged and found to be nonexistent.
- These clinical guidelines aim to give an update on preoperative fasting and gastric content as a risk factor of pulmonary aspiration. These guidelines also apply to patients undergoing non-surgical procedures requiring general anesthesia, regional anesthesia or sedation. However, in addition to the guidelines on minimal fasting periods, guidelines on maximum fasting periods have been included, in an attempt to reduce prolonged fasting.

Objectives:
The practice of pre-operative fasting aims to minimize residual gastric volume and acidity prior to surgery or other procedures. This helps to prevent regurgitation, inhalation and aspiration of gastric contents which may otherwise occur during general anesthesia, regional anesthesia or intravenous sedation.

Physiological background:

Gastric empty:

Delayed gastric emptying:
It is found in numerous situations, and may be divided by etiology into:

Alterations in normal physiology e.g.
- Pregnancy: pregnant females seem to have a normal gastric emptying rate, except for the first trimester, where a hormonal cause for slowing has been suggested
- Labor: gastric emptying will be slowed down and stay slow for at least 2 h afterwards.

Disease state e.g.
- Some systemic diseases are known to slow down the gastric emptying: among them most notably diabetes mellitus. Diabetes does affect gastric emptying much more for solids than for fluids.
- Local gastrointestinal stasis (tumor or obstruction) may have the same effect.
- Functional dyspepsia is associated with a delay in gastric emptying.
- Obese patients seem to have a similar gastric emptying to non-obese patients, and pre-operative fluid intake does not increase gastric content.
**Intake of external agents, either drugs or substances for abuse:**
- Pain and opioids are well-known reasons for delayed gastric emptying.
- Smoking: gastric emptying times for solids are delayed in smokers, but not with nicotine patch use.
- Recreational abuse of cannabinoids and high doses of alcohol also inhibit gastric emptying.
- Metoclopramide may improve gastric emptying in these patients but cannot assure emptying of the stomach content.

**Anesthetic factors**
- **Airway problems:**
  Airway managements frequently precipitate pulmonary aspiration. Air blown into the stomach, bucking and coughing due to light anesthesia may all cause gastro-oesophageal reflux episodes. Obese patients, gastro-oesophageal reflux disease and patients with difficult airways are particular prone to pulmonary aspirations, independent of their gastric content.

- **GIT effects of opioids:**
  Opioids decrease GIT motility, and patients receiving parenteral opioid therapy preoperatively are more likely to have "full stomachs" regardless of their "NPO" status. Opioids alter lower esophageal sphincter activity, resulting in sphincter relaxation. Gastric emptying is delayed by opioids with an increase in gastric pH. Also, opioids administered neuraxially reduce gastrointestinal motility.

**General Guidelines for “Preoperative Fasting”**

**Evidence based guidelines for pre-operative fasting**
- Clinically controlled studies and meta-analysis have concluded that in otherwise healthy adults scheduled for elective surgery, oral intake of water and other clear fluids (tea, coffee, soda water, apple and pulp-free orange juice) up to 2 h before induction of anesthesia does not increase gastric fluid volume or acidity.
- The present scientific evidence allows a Level 1 recommendation for more liberal fasting routines for clear fluids. Based on the new data, most national anesthesiology societies now recommend no more than 2-h fasting for clear fluids in elective patients, both adults and children (> 1 year) and including pregnant women not in labor. Importantly, this does not apply to milk, any other fat-containing fluids, or solids.
- The fasting period after intake of solids should not be less than 6 h.
- Chewing gum and tobacco use both increase gastric content, but to what extent the increase is of any clinical significance is very uncertain.

**Minimum Fasting for Clear Fluids:**
Clear fluids include: clear fluids (defined as fluids through which newsprint might be read) e.g. Water, diluting juice, black tea and black coffee.

Milk (non-human) and milk-containing drinks curdle (become semi-solid) in the stomach and should be considered as solids.

Non-clear fresh fruit juices containing pulp (e.g. fresh orange juice) should be avoided.

Clear jellies without fruit pieces leave no residue in the stomach and may be considered as clear fluids. These may be particularly of use in pediatric practice.

Fizzy drinks are probably as safe as still drinks as long as they contain no pulp. Some published guidelines advise against treating them as clear fluids but this is not supported by clinical evidence.

Patients may drink clear fluids up to 2 hours prior to the start of the list. Furthermore, all patients should be encouraged to take a drink of clear fluid 2 hours before the list begins, unless there is a surgical contra-indication.

Minimum Fasting for Solids:
- Solids and milk-containing drinks should not be consumed within 6 hours of the beginning of the operating list.
- Patients should eat normally on the day before surgery and avoid large or fatty meals. Fat and dietary fiber tends to remain in the stomach for longer than other foods.
- Chewing gum does not increase gastric volume significantly but should be avoided as it may be swallowed inadvertently. This also applies to boiled sweets.
- Patients for a morning list should eat nothing for six hours before surgery. Realistically, most patients will not usually eat after midnight and this is a convenient cut-off point. Children often do not eat after 6pm and a light snack at bedtime should be advised.

Pre-operative fasting vs. oral nutrition
- All patients should be encouraged to drink clear fluids up to 2 hours prior to the start of the list (i.e. 6 a.m. for morning lists and 10 mid-day for afternoon lists) unless this is contraindicated by the type of surgery.
- If a patient has been fasted for fluids for more than six hours, ward staff should contact theatres or the anesthetist to ask if it would be acceptable for the patient to have a drink. If not, consideration should be given to starting intravenous fluids on the ward. Maintenance fluids should normally contain dextrose, especially in smaller children, who have an increased risk of becoming hypoglycemic if fasted.
- In some cases, a longer fast may be necessary e.g. bowel preparation for gastrointestinal surgery. Great care should be taken to ensure that adequate fluid replacement be given orally or intravenously to prevent dehydration.

Prescribed Medications and Premedication: *(Table 1)*
- Prescribed medications, especially pre-medication can be taken within the 2 hours prior to surgery with a small drink of water (<30 ml).
- Up to 150 ml of water together with oral medication up to 1 h before induction of anesthesia is perfectly safe in adults.
Based on the prolonged gastric emptying seen with the use of opiates, it is reasonable to stop fluid intake 1 h before the use of opiate premedication.

Some medications may be omitted prior to surgery as a result of other protocols e.g. ACE inhibitors, warfarin and oral hypoglycaemic agents.

**Timing of lists and all-day lists:**

*Whenever possible, children should be scheduled at the start of lists and in age order (i.e. youngest first) as they are less able to tolerate prolonged fasting times. Some lists may have scheduled early or late starts. This should be taken into consideration when giving information to patients. All-day lists often present timing problems. If it is possible to predict which patients are to be operated on in the afternoon, they should be encouraged to drink clear fluids up to 2 hours prior to the start of the list.*

**Guidelines for “Preoperative Fasting” in Special Situations**

**Emergency surgery:**

- Fasting guidelines may need to be overridden in order to expedite surgery in urgent or emergency cases. Anesthetists are able to take further steps to prevent regurgitation/aspiration e.g. rapid sequence induction of anesthesia, use of antacids and pro-kinetic agents. If it is possible to delay surgery, the same guidelines should be followed i.e. 6 hours for solids, two hours for clear fluids. However, it should be borne in mind that trauma, pain, fear and alcohol intoxication may greatly prolong gastric emptying.
- Prolonged periods without fluid administration should be avoided. Maintenance IV fluids containing glucose should be administered to all patients not receiving fluids for more than 6 hours.

**Non-surgical procedures requiring anesthesia:**

Some non-surgical procedures require general/regional anesthesia or intravenous sedation. Examples include radiological procedures, endoscopic procedures, endovascular procedures, DC cardio version and ECT. Fasting guidelines apply as for surgical procedures.

**Regional anesthesia:**

- **Patients requiring Regional Anesthesia only:**
  Fasting guidelines apply as for General Anesthesia. There is a higher than average likelihood that these cases may need to be converted to general anesthesia or require intravenous sedation.

- **Procedures requiring Local Anesthesia only without sedation:**
  No fasting required – patients should eat a normal diet.

**Conscious sedation (Intravenous Sedatives):**

- An increasing number of surgical procedures are done with ‘light, conscious or deep sedation’ in various combinations with or without local and regional
anaesthesia. Sedation and analgesics tend to impair airway reflexes in proportion to the degree of sedation/analgesia achieved.

- The American Society of Anesthesiologists recommends that patients undergoing sedation/analgesia for elective procedures should have the same restrictions as patients undergoing general anaesthesia. These guidelines are arbitrary and based upon consensus opinion.
- In emergency situations, the potential for pulmonary aspiration of gastric contents must be considered. The pulmonary aspiration during emergency department procedural sedation and analgesia had not been reported in medical literature. Therefore, there is little evidence to support specific fasting periods.
- Oral sedation e.g. Lorazepam given prior to the procedure usually does not necessitate preoperative fasting if general or regional anesthesia are not planned.

**Ophthalmic Regional Anesthesia:**

- Fifty per cent of the respondents felt that fasting was not necessary and mentioned hypoglycaemia, faint, thirst, nausea, headache, and dizziness as complications to prolonged starvation.
- No case of pulmonary aspiration in 30,000 patients undergoing cataract surgery done under regional anaesthesia.
- In general, no sedation is required (only 1% needed sedation). They have allowed breakfast before the procedure.
- Still, they cautioned against heavy sedation and conversion of regional block into general anaesthesia. Most eye surgery can be done with local anaesthesia only. It looks like pre-operative fasting ensures very little extra patient safety, and at the expense of patient comfort.
- Post-operative emesis which is detrimental after ophthalmic surgery might be reduced by shorter pre-operative fast. It seems like the key points are to make the ophthalmologists aware of the potential danger of heavy sedation and non-fasting and to make local guidelines that take into account the type of surgery, type of local and regional anaesthesia, the need for sedation and the possibility of having to convert a failed regional anaesthetic to a general one.

**Pediatrics:**

- One should be aware of the fact that there is a rather large variation in the composition of formula food between different regions/countries.
- The ‘2-4-6 rule’ for children denotes intervals of 2 h for fluids, 4 h for breast milk and 6 h for formula milk/solids. Sweets and lollipops are regarded as solid food. So babies should have their last feed 4 hours prior to surgery. Formula milk should be treated as non-human milk and the fasting period after a formula feed should be 6 hours.
- Most paediatric anaesthesiologists now use the same 2-h limit for clear fluids as in adults, and recommend 4- to 6-h fasting after breast- and formula milk with the lower limit applied in children less than 6 months.
**Obstetric patients:**

Women going into labor have very prolonged gastric emptying times and have an increased incidence of pulmonary aspirations compared with other patient groups. Despite this fact, most maternity wards encourage oral intake during labor. This may sound counter-productive for us as anesthesiologists, but to obstetricians, midwives and the women themselves, the small risk of an emergency Caesarean-section under general anesthesia may not be a valid argument to impose unphysiological starvation during a natural process with a large need for calories.

A trade-off that midwives and obstetricians may accept is to allow fluids but no solids during labor. Anesthesiologists are not in the position to decide the fasting guidelines for women in labor.

**Aspiration Prevention in Obstetric patients:**

It is recognized that in laboring patients the timing of delivery is uncertain; therefore, compliance with a predetermined fasting period before nonelective surgical procedures is not always possible.

**i. For clear liquids:**

There is insufficient published evidence to draw conclusions about the relationship between fasting times for clear liquids and the risk of emesis/reflux or pulmonary aspiration during labor. The oral intake of modest amounts of clear liquids may be allowed for uncomplicated laboring patients, this improves maternal comfort and satisfaction.

**Recommendations:** The uncomplicated patient undergoing elective cesarean delivery may have modest amounts of clear liquids up to 2 h before induction of anesthesia. However, patients with additional risk factors for aspiration (e.g., morbid obesity, diabetes, difficult airway) or patients at increased risk for operative delivery (e.g., nonreassuring fetal heart rate pattern) may have further restrictions of oral intake, determined on a case-by-case basis.

**ii. For solids,**

The consultants and ASA members both strongly agree that the oral intake of solids during labor increases maternal complications.

**Recommendations.** Solid foods should be avoided in laboring patients. The patient undergoing elective surgery (e.g., scheduled cesarean delivery or postpartum tubal ligation) should undergo a fasting period for solids of 6–8 h depending on the type of food ingested (e.g., fat content).

**iii. Antacids, H2 Receptor Antagonists, and Metoclopramide:**

Published evidence supports the efficacy of preoperative nonparticulate antacids (e.g., sodium citrate, sodium bicarbonate) in decreasing gastric acidity and maternal complications during the peripartum period. The literature suggests that H2 receptor antagonists are effective in decreasing gastric acidity in obstetric patients and supports the efficacy of metoclopramide in reducing peripartum nausea and vomiting.

**Recommendations.** Before surgical procedures (i.e., cesarean delivery, postpartum tubal ligation), practitioners should consider the timely administration of nonparticulate antacids, H2 receptor antagonists, and/or metoclopramide for aspiration prophylaxis.
**Obesity:**
Morbid obesity increased the incidence gastroesophageal (GE) reflux, hiatus hernia, increased abdominal pressure which leads to severe risk of aspiration. After 8 hour fast 85 – 90% of morbidly obese patients have gastric volumes > 25 ml, Gastric pH < 2.5, both increase the risk for aspiration pneumonitis

Aspiration prophylaxis:
- Consider H₂ antagonist
- Metoclopramide
- Avoid unnecessary respiratory depressants.
- Dosing of histamine-2-blockers in morbidly obese patients should be based on either the usual recommended daily doses or IBW if using weight-based dosing.
- A rapid sequence induction with cricoid pressure can be used to prevent aspiration of passively regurgitated gastric contents.

**Obesity & Obstetric patients**
- Obesity has been identified as a significant risk factor for anesthesia related maternal mortality. Both anatomical and hormonal changes increase the incidence and severity of gastric reflux in pregnant women.
- Hiatus hernia is more common in obese patients and obesity itself increases the risk of aspiration under anesthesia. When pregnancy is associated with obesity, the likelihood of regurgitation and aspiration substantially increases.
- The gastric volume in obese parturients was five times greater than in controls. Gastro-oesophageal reflux and diabetes mellitus are the most commonly seen disorders. Any previous laboratory investigations such as fasting blood glucose concentration and liver function tests should be noted.
- Though aggressive prophylaxis against acid aspiration is advocated for all obese mothers undergoing Caesarean section, there is a lack of conclusive evidence for starvation policies and prophylaxis during labor. Current evidence suggests avoiding solids and semisolids once a woman is in active labor or requests analgesia. Sodium citrate and ranitidine remain the most commonly used drugs for acid aspiration prophylaxis.

**Diabetes mellitus:**
- Diabetes and other medical conditions do affect gastric emptying much more for solids than for fluids. Probably, a 2-h fasting period for clear fluids is also enough in patients with systemic diseases.
- Diabetic patients presenting for surgery or other non-operative procedures requiring an anesthetic should be given advice on fasting and consequent management of their diabetes in accordance with trust guidelines which is covered by established regimes for fasting, administration of fluids and insulin, and blood sugar monitoring.
- Guidelines for fasting times are similar and patients should adhere to their usual diet outside the period of the peri-operative fast, whenever possible. More studies, however, are needed before a scientific validated answer can be given.
**GI diseases:**

Patients with a history of symptomatic gastro-esophageal reflux, hiatus hernia and morbid obesity may be at increased risk of regurgitation and aspiration of gastric contents under General Anesthesia or IV Sedation. In these cases, steps should be taken to raise gastric pH and reduce gastric volume preoperatively using antacids, H2 antagonists or proton-pump inhibitors. Ranitidine can be prescribed preoperatively; (150 mg) is prescribed on the night before surgery and on the morning of surgery. Patients scheduled for Regional Anesthesia alone require similar precautions due to the possible requirement for i.v. sedations or conversion to general anesthesia during surgery.

**Antacids**

- Sodium citrate is a nonparticulate antacid that rapidly increases gastric fluid pH. It is commonly used in obstetric and emergency situations because it reduces the consequences of aspiration of gastric contents in high-risk patients.
- Disadvantages of its use include the potential for emesis because of its unpleasant taste, a variable duration of effect, and decreased efficacy when compared with H2 receptor antagonists.

**Gastrokinetic Agents**

- Metoclopramide, a dopamine antagonist, reduces gastric volume by stimulating gastric emptying without altering pH. The use of effective doses of metoclopramide in combination with an H2 receptor blocking drug has been advocated to decrease postoperative emesis and further reduce the potential risk for aspiration pneumonitis.

**Serotonin Antagonists**

- Ondansetron, granisetron, dolasetron, and tropisetron are all highly selective 5-HT3 receptor antagonists that lack the sedative, dysphoric, or extrapyramidal effects of other commonly used antiemetics. Ondansetron blocks both central and peripheral 5-HT3 receptors and is effective in preventing emesis after ambulatory surgery. It has also been shown to be effective in the treatment of established postoperative emesis in both adults and children.
Table 1: Preoperative medication instruction guidelines:

<table>
<thead>
<tr>
<th>Category</th>
<th>Instruction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antihypertensive medications</td>
<td>Continue on the day of the operation or procedure</td>
</tr>
<tr>
<td>Diuretics</td>
<td>Continue on the day of the operation or procedure</td>
</tr>
<tr>
<td>Cardiac medications (e.g., digoxin)</td>
<td>Continue on the day of the procedure</td>
</tr>
<tr>
<td>Antidepressant, antianxiety, and psychiatric medications</td>
<td>Continue on the same day.</td>
</tr>
<tr>
<td>Thyroid medications</td>
<td>Continue on the day of the operation or procedure</td>
</tr>
<tr>
<td>Birth control pills</td>
<td>Continue on the same day (unless it is contraindicated for certain procedures)</td>
</tr>
<tr>
<td>Eye drops</td>
<td>Continue on the day of the operation or procedure</td>
</tr>
<tr>
<td>Heartburn or reflux (e.g., Prilosec, Zantac)</td>
<td>Continue on the same day</td>
</tr>
<tr>
<td>Narcotic pain medications</td>
<td>Continue on the day of the operation or procedure</td>
</tr>
<tr>
<td>Antiseizure medications</td>
<td>Continue on the day of the operation or procedure</td>
</tr>
<tr>
<td>Asthma medications</td>
<td>Continue on the day of the operation or procedure</td>
</tr>
<tr>
<td>Steroids (oral and inhaled)</td>
<td>Continue on the day of the operation or procedure</td>
</tr>
<tr>
<td>Statins (e.g., Zocor, Lipitor)</td>
<td>Continue on the day of the operation or procedure</td>
</tr>
<tr>
<td>Aspirin</td>
<td>Usually continue; discontinue 7 days before plastic and eye surgery.</td>
</tr>
<tr>
<td>COX-2 inhibitors</td>
<td>Continue on the day of the procedure unless the surgeon specifies</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>Usually continue; discontinue 48 hr before plastic and eye surgery.</td>
</tr>
<tr>
<td>Vitamins, iron, Premarin</td>
<td>Discontinue on the day of the operation or procedure</td>
</tr>
<tr>
<td>Topical medications -</td>
<td>Discontinue on the day of the procedure</td>
</tr>
<tr>
<td>Oral hypoglycemic drugs</td>
<td>Discontinue on the day of the procedure</td>
</tr>
<tr>
<td>Viagra, Levitra, Cialis or similar drugs</td>
<td>Discontinue 36 hr before surgery</td>
</tr>
<tr>
<td>Warfarin</td>
<td>Discontinue 4 days before surgery except</td>
</tr>
<tr>
<td>Plavix (clopidogrel)</td>
<td>Discontinue 7 days before surgery except for vascular patients</td>
</tr>
<tr>
<td>Herbals and nonvitamin supplements</td>
<td>Discontinue 7 days before surgery</td>
</tr>
<tr>
<td>MAOIs</td>
<td>Patients taking these antidepressant medications need an anesthesia</td>
</tr>
<tr>
<td></td>
<td>consultation before surgery (preferably 3 wk before surgery)</td>
</tr>
</tbody>
</table>
Table 2: Summary of the guidelines for pre-operative fasting.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Patients (adults as well as children) may drink clear fluids including a specially designed beverage for oral carbohydrate nutrition up to 2 h prior to general or regional anesthesia is safe and improves subjective well-being.</td>
</tr>
<tr>
<td>2.</td>
<td>Patient should not take solid food 6 h prior to induction of anesthesia</td>
</tr>
<tr>
<td>3.</td>
<td>Breast-feeding should be stopped 4 h prior to induction of anesthesia, (the same applies to formula milk, “Scand. Guidelines”).</td>
</tr>
<tr>
<td>4.</td>
<td>Adults may drink up to 150 ml of water with pre-operative oral medication up to 1 h before induction of anesthesia, and children up to 75 ml.</td>
</tr>
<tr>
<td>5.</td>
<td>Use of chewing gum and any form of tobacco should be discouraged during the last 2 h prior to induction of anesthesia</td>
</tr>
<tr>
<td>6.</td>
<td>These guidelines also apply to elective Caesarean sections. Clear fluids are defined as non-particulate fluids without fat, for example, water, clear fruit juice, tea or coffee.</td>
</tr>
<tr>
<td>7.</td>
<td>Both cow's milk and powdered milk are treated as solid food.</td>
</tr>
<tr>
<td>8.</td>
<td>Patients with known or suspected delay in gastric emptying (diabetes mellitus, upper gastrointestinal pathology and symptoms) should be assessed on an individual basis.</td>
</tr>
<tr>
<td>9.</td>
<td>Fasting in emergency patients cannot secure gastric emptying and should not delay surgical interventions.</td>
</tr>
<tr>
<td>10.</td>
<td>Ingestion of this antacids and gastrokinetic drugs are necessary when administered in emergency CS and outpatient settings.</td>
</tr>
<tr>
<td>11.</td>
<td>Overall, the choice of anesthetic technique and airway management seems to be as important as adherence to any fasting guidelines when it comes to reducing the chance of pulmonary aspiration.</td>
</tr>
</tbody>
</table>
REFERENCES:

2. Pre-operative assessment, the role of the anaesthetist. Association of Anaesthetists of Great Britain and Ireland November 2001
3. Preoperative fasting for adults to prevent perioperative complications. The Cochrane Database of Systematic Reviews 2003, Issue 4

Web links

2. Practice guidelines for preoperative fasting a report by the American Society of Anesthesiologists task force on preoperative fasting. www.asahq.org/publications And Services/NPO_pdf