HOSPITAL GUIDELINE

NPO GUIDELINE

(< 25 years age)

Children's MINNESOTA

Aim: To provide guidance for NPO times for nutrition and medications.

NUTRITION + MEDICATION, DAY-OF OR BEFORE SURGERY

Food and liquids (Note 1):

- Within 2 hours of surgery: Stop clear liquids
- Within 4 hours of surgery: Stop breast milk
- Within 6 hours of surgery: Stop milk products, formula, or fortified breast milk
- Within 8 hours of surgery: Stop thickened formula and solid foods

Medications to continue on morning of surgery (convert to IV if applicable/available)

- Cardiovascular medications (unless exception below – All CV/cardiac cath/EP patients should verify with cardiology specific medication plan around time of procedure) **(Note 2 – Page 2)**
  - Continued medications include: Anti-arrythmics, Clonidine (consider patch), pulmonary vasodilators (sildenafil, bosentan)
  - Exceptions – CV meds to stop (Page 2: Diuretics, ACE Inhibitors, ARBs, Calcium Channel Blockers)
- Anti-reflux medications (e.g., Omeprazole, Famotidine)
- Seizure and anti-Parkinson's medications
- Psychiatric medications
  - Benzodiazepines (risk of withdrawal when abruptly stopped perioperatively; may reduce anesthetic need)
  - Antipsychotics (decreased seizure threshold, risk of Neuroleptic Malignant Syndrome)
  - Antidepressants (Continue due to risk of antidepressant withdrawal symptoms)
- Bronchodilators
- Oral contraceptives (may continue unless stopped for DVT prevention)
- Corticosteroids or immunosuppressants (consider stress dose steroids if on equivalent of > 5 mg/day in 6 months prior to surgery, may discuss with Endo)
- Rheumatologic agents
- Levothyroxine (Synthroid)
- HIV medications
- Pain medications (acetaminophen or opiates may be given; hold NSAIDs)

EXCLUSION GUIDELINES

Patients **excluded** from this guideline:

Emergency procedures whereby waiting until appropriate NPO time may have a negative clinical impact. To be determined by discussion between surgery and anesthetic teams for appropriate anesthesia plan.

NOTE 1:

The anesthesia provider should use their clinical judgment to decide the appropriate NPO time. In cases of concern, the anesthesia provider and surgery team will discuss the final decision about appropriateness of NPO time depending on items consumed and urgency of surgery.

Clear liquid (2 hours) examples:

Water, fruit juice (that you can see through, without pulp), Gatorade, Pedialyte, carbonated beverages (i.e., Sprite, Coke, Mello Yello), popsicles (without fruit pieces, dairy, or fudge), Jello (without fruit or vegetables), plain tea or coffee without creamer

Formula (6 hours) examples:

- Milk (e.g., cow's, almond, soy, cashew, coconut, rice)
- Breast milk fortified with formula
- Infant formula
- Dairy or non-dairy creamer

Solid foods (8 hours) examples:

- Cereal, toast, crackers
- Fried foods, fatty foods, meats, cheeses (associated with delayed gastric emptying)
- Thickened formula
- All other foods

Giving medications on surgery day

- Give required medications with small sip of water PO or typical minimal water flush into enteral tube.
- Patients who cannot take thin liquids may have 1 tbsp. applesauce/ yogurt ≥ 4 hrs ahead of procedure to take required meds.
- If possible, reschedule medications to fall within the NPO guidelines (e.g., give medication 1 hour earlier) unless it will impact medication effectiveness
- Have a plan for medications in case surgery is delayed or rescheduled
- Orders should be placed by primary team.

Aim: To provide guidance for NPO times for nutrition and medications.

MEDICATIONS TO BE AVOIDED IN THE PERIOPERATIVE PERIOD

Medications NOT to take on morning of surgery (See also pages 2 and 3)

- Diuretics or weight loss medications
- Potassium supplements or vitamins
- Diabetes medications (Discuss glucose management plan with endocrinology)
  - Oral diabetes medications are typically held on the day of surgery (see below)
  - Basal Insulin is taken at half dose (on night before or AM of surgery)
  - Bolus Insulin (e.g., Lispro) is held while NPO

Medications to AVOID in the perioperative period:
***Medications associated with bleeding risk* (Note 2 & 3)**

NSAIDs

- **Short-acting agents:** Stop 1 day before surgery
  - Ibuprofen (Motrin), Indomethacin (Indocin)
- **Mid-acting agents:** Stop 3 days before surgery
  - Naproxen (Naprosyn)
- **Long-acting agents:** Stop 10 days before surgery
  - Meloxicam (Mobic)

Ketorolac (Toradol)

- Discuss perioperative use with operating surgeon

COX2 Inhibitors (e.g., Celebrex)

- Stop at least 2 days before surgery (nephrotoxicity risk)

Antiplatelet agents: P2Y agents – e.g., Clopidogrel (Plavix):

- Do not stop antiplatelet agents without carefully reviewing indications and minimum duration from stenting/shunt
- Cardiology should be consulted before stopping P2Y agents in post-stenting patients and patients with vascular shunt
- Consider continuing aspirin while holding the second antiplatelet agent
- Clopidogrel (Plavix): Stop at least 5 days before surgery if no contraindication to stopping
- Effient (Prasugrel): Stop at least 7 days before surgery if no contraindication to stopping

This guideline does not cover all medications with potential perioperative implications. Consult with pharmacist, the prescribing provider, and/or anesthesia and surgery if specific questions about medications and NPO timing.

Aspirin

- Aspirin is often held 5 days before surgery if no contraindication. Confirm with the operating surgeon, who may consult with cardiology.
- For cardiac cath, CV surgery, and EP patients, please see cardiology for patient-specific recommendations **(Note 3)**

Other antiplatelet agents

- Cilostazol (Pletal): Stop at least 3 days before surgery
- Ticlopidine (Ticlid): Stop at least 5 days before surgery
- Aspirin and Extended-Release Dipyridamole (Aggrenox): Stop at least 7 days before surgery

Warfarin (Coumadin)

- Discuss with primary, cardiology and/or hematology if bridging with lovenox or heparin is needed
- Stop 5 days before surgery

Direct Acting Oral Anticoagulants (e.g., apixaban (Eliquis), dabigatran (Pradaxa), rivaroxaban (Xarelto)

- Last dose should be at least 48 hours prior to the time of the procedure
- Pharmacy consult recommended for patients with renal dysfunction

NOTE 2:

Reference **Children's Minnesota Policy 322.00 Appendix VIII** for recommendations for all anticoagulation medication hold times and restart times.

NOTE 3:

All cardiac cath, CV surgery and EP patients should consult with cardiology regarding specific medication plan around the time of the procedure (including plan for anti-arrhythmics, anti-hypertensives, pulmonary vasodilators, anti-platelet agents, and anti-coagulation as applicable).

Restarting of medications should be determined by surgeon's clinical judgment and bleeding risk associated with procedure performed.

Aim: To provide guidance for NPO times for nutrition and medications.

MEDICATIONS TO BE AVOIDED IN THE PERIOPERATIVE PERIOD (continued)

Estrogen replacement, birth control pills

- Ideal to stop at least 1 month before surgery
- Weigh risk versus benefit
- If agent continued, consider DVT Prophylaxis measures

Diabetes Mellitus (discuss glucose management plan with endocrinology)

- Oral Hypoglycemics
  - Hold for NPO period as well as the AM of surgery
- SGLT2 Inhibitors – e.g., empaflifloxain (Jardiance)
  - Hold for 3 days prior to surgery (risk of ketoacidosis)
  - Resume when oral intake returns to normal
- Metformin (Glucophage)
  - Hold at least 24 hours prior to surgery (due to theoretical lactic acidosis risk)

Antihypertensives

- Diuretics
- Consider holding Calcium Channel Blockers while NPO
- ACE Inhibitors and Angiotensin Receptor Blockers (hold one dose before surgery)
  - Avoiding within 11 hours, reduces risk of immediate post-induction hypotension

Ophthalmologic surgery: Cataract

- Notify surgeon of Tamsulosin use in the perioperative period (due to risk of Floppy Iris Syndrome)
  - Ophthalmologists can take preventive measures at surgery if they know of Tamsulosin use
  - As a long-acting medication, stopping the medication immediately before the procedure will not alter the risk

Parkinsonism Agents

- MAO inhibitors should be tapered off 2–3 weeks before the procedure
  - Includes Selegiline and Rasagiline
  - Risk of interaction with perioperative Meperidine, Dextromethorphan, Ephedrine, Opioids
- Avoid stopping carbidopa-levodopa in perioperative procedure (risk of Parkinsonian hyperpyrexia syndrome)
- Stay moving in the post-operative period (within 2–3 days of procedure — incorporate PT/OT)

Miscellaneous agents

- Alendronate (Fosamax)
  - Stop at time of surgery due to instructions that are difficult to follow perioperatively (e.g., NPO)

DMARDs and TNF Agents

- Stopping before orthopedic procedures (esp. TNF agents) lowers the risk of surgical site infections
- Agents are stopped 1–2 weeks before procedure and resumed 1–2 weeks after surgery
- Consult with orthopedics and rheumatology regarding specific medications and patient risk factors

Herbal preparations

- Stop all herbals and supplements at least one week before surgery
  - Safest overall strategy due to numerous combination products
- Specific agents with known risk in the perioperative period
  - Echinacea
  - Ephedra (should be avoided in general)
  - Garlic (discontinue at least 7 days before surgery)
  - Gingko (discontinue at least 36 hours before surgery)
  - Ginseng (discontinue at least 7 days before surgery)
  - Kava (discontinue at least 24 hours before surgery)
  - Omega-3/Fish oil (hold for 7 days before surgery)
  - St. John's Wort (stop at least 5 days before surgery)
  - Tumeric/Curcumin (hold for 7 days before surgery)
  - Valerian (slowly taper off before surgery)

REFERENCE:

1. Danielson D, Bjork K, Card R, et al. Institute for Clinical Systems Improvement. Preoperative Evaluation. Updated July 2012.

2. (2012) *Anesthesiology* 116:522-38

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