Hold Tube Feeds for 4 hours Prior to Extubation?

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How can I prevent harm in my critically ill patients?

Pro: Hold TFs—Prevent complications of Aspiration

- ICU patients at high risk of aspiration
- Peri-Extubation = high risk period
- Content of aspirated material matters
- Aspiration leads to increased morbidity/mortality

Aspiration is Common in the ICU

- Epidemiology complicated b/o the lack of specific and sensitive markers of aspiration
- Aspiration events are very unlikely to be overt
- Metheny, et al. found that ~88% of intubated ICU patients receiving enteral nutrition had at least one aspiration episode (using pepsin assay)
ICU Patients = High Aspiration Risk

- Altered Level of Consciousness
  - Medications (sedatives, narcotics)
  - Encephalopathy
  - Primary CNS problem (e.g., stroke, TBI)
  - Delirium
- Impaired gastric emptying
  - Ileus
  - Recent surgery
  - SBO
  - Narcotics
- GERD
- Impaired swallowing
  - Especially within first 24h of extubation

Impaired Swallowing After Mechanical Ventilation

- Swallowing dysfunction has been demonstrated in patients who have been intubated for as short as 48h
- Possible etiologies for swallowing dysfunction:
  - Residual sedation
  - Decreased cough reflex
  - Decreased airway reflexes and upper airway sensitivity
  - Mechanical problems (Laryngeal muscular dysfunction, glottic injury)
- Post-extubation dysphagia is common in ICU (up to 60% of pts w/o and 90% of patients with neurologic disorders)

High risk of Aspiration Peri-Extubation

- Leder, et al. *Fiberoptic endoscopic documentation of the high incidence of aspiration following extubation in critically ill trauma patients.*
  - Trauma patients intubated > 48h
  - Identified aspiration in 45% of pts w/in first 24h of extubation
  - Trauma patients intubated for > 48h
  - ~15% rate of aspiration in first 24h post-extubation
  - All patients who developed PNA had aspiration event

Decreased Cough Reflex Postextubation

- 86 pts undergoing CABG
- Baseline cough reflex measured, then within 2hrs post-extubation and multi. subsequent time points until reflex returned
- 60% of pts with NO reflex at first measurement
What/How much is Aspirated Matters

- Lower pH = higher risk of chemical pneumonitis
- Higher volume/particulate matter = higher risk of PNA
- Metheny, et al.-- Recurrent aspiration of acidic material increases r/o PNA

Aspiration Increase Risk of PNA and ALI/ARDS

- Aspiration is recognized as a major cause of ALI/ARDS
  - Studies show approximately 1/3 of patients with aspiration pneumonitis go on to develop ALI/ARDS
- Possible need for re-intubation (mortality increase demonstrated in numerous studies)

Risk of Aspiration Too High, Hold TFs!

- Aspiration is common in the ICU
- Peri-extubation, ICU patients carry numerous risk factors for aspiration
- Aspirated material content matters: oral secretions ≠ gastric contents or particulate matter
- Aspiration → increased r/o ALI/ARDS, re-intubation → increased health care costs, morbidity and mortality

• How can I prevent harm in my critically ill patients?
Con: Continue tube feedings prevent Malnutrition/Underfeeding

- Malnutrition from underfeeding is common in the ICU and increases morbidity and mortality.
- No data that continuing TF increases risk for aspiration.
- There are preliminary data that continuing TF in the peri-extubation period is safe and improves nutrition.

Importance of enteral tube feeding in critically ill patients

- Emerging data that nutritional support is essential for recovery of critically ill patients.
- Optimal provision of calories and protein is demonstrated to
  - Reduce Morbidity and Mortality
  - Reduce Length of hospital and ICU stay
  - Improve function of the immune system
  - Mitigate weakness and deconditioning
  - Improve wound healing
  - Reduce Health care costs

Data supporting continuation of TFs

- While data is limited, there are some clinical trials in pediatric population that continuing TFs peri-extubation is safe and results in more optimal nutrition
- Lyons et, al: RCT comparing continuous TFs to interrupted feeds at time of extubation in pediatric patients
  - No increase in adverse events in continuous TF group
  - Significant increase in calorie percentage in continuous TF group (55% greater)
- Multiple studies have shown that it is safe to continue TFs in the perioperative period
  - Patients with continuous TFs have fewer wound infections
  - Patients require less albumin supplementation
  - Overall better outcomes

A typical timeline for holding tube feedings for extubation

- NPO and hold TF at midnight (possibly 4 am) for morning extubation.
- Patient placed on SBT & sedation weaned at 6 am. ABG sent.
- ICU team rounds start at 9 am.
- ICU team sees patient on rounds, but needs to confer with the primary team prior to extubation.
- ICU finished rounds between 11 am and 12 pm.
- Patient may be extubated following ICU rounds provided the team is not distracted by admissions, a procedure, a code blue, etc.
- Tube feeds are held for 2 to 4 hours following extubation to ensure that the patient will not need reintubation.
- Result: Tube feedings are held for 8 to 16 hours which is too much time to be made up with increased tube feeding rates and patient is malnourished that day.
Continuing TF not necessarily increasing risk

- While the concern for aspiration exists, there are no data that continuing TFs increases risk.

Incidence of Aspiration for **Planned verses Unplanned** Extubation

- Unplanned extubations may result in aspiration and possible reintubation, leading to increased morbidity and mortality.
  - The factors contributing to the higher reintubation risk in unplanned extubation are continuing sedation, decreased GCS, increased secretions, impaired ability to protect airway, severity of illness — not ready.
- However, patients who undergo *planned* extubation do not carry the same risk, thus risk of aspiration and reintubation is likely small.

Continuing TF is right for most ICU patients

- The reintubation rate for planned extubations is ~17% while the reintubation rate for unplanned extubation is ~50%.
- The risks for aspiration and reintubation simply are not present for most ICU patients who have planned extubations.
  - Sedation has been weaned.
  - Awake and demonstrate neurological readiness for extubation.
  - Minimal secretions.
  - Able to protect airway — strong cough and gag.

Continuing TF is right for most ICU patients

- Patients who receive continuous TF meet 90% of nutritional requirements while those with interrupted TF only meet 50%.
Conclusions: Continuing TF is right for most patients!

- Continuing TF for extubation optimizes nutrition while minimizing risks of underfeeding with relatively small risk or aspiration in most patients.
- Given the relatively small reintubation rate for planned extubations, continuous TF would ensure that ~83% of patients would receive 90% of their nutritional requirements.
- Furthermore, there are data that those patients who require reintubation would have required intubation regardless of whether TF are running or not.
- There is no diagnostic tool that measures whether those intubations could be attributable to aspiration of TF versus many other risk factors around extubation such as LOC, etc.

References