

# Issues in Enteral Feeding: Aspiration



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Presented by:  
Kathleen Stoessel, RN, BSN, MS  
Clinical Education Specialist

# Disclosures

- The presenter serves as a clinical education consultant for ΔVΔNOS through Kelly Outsourcing and Consulting Group.
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# Issues in Enteral Feeding: Aspiration

## Objectives

- Identify complications associated with enteral nutrition
- Explain the potential consequences of aspiration in patients receiving enteral nutrition
- Discuss steps that can be taken to prevent aspiration
- Describe best practices for the management of aspiration



# Indications for Enteral Nutrition

Enteral nutrition is provided to patients who:

- Have intact and functional digestive tracts
- Cannot maintain adequate nutrition by oral intake of food and/or oral nutritional supplements
- Cannot eat or drink safely



# Indications for Enteral Feeding

- Swallowing disorders
- Upper gastrointestinal (GI) obstruction
- GI dysfunction, malabsorption
- Increased nutritional requirements
- Mental health issues



# Enteral Nutrition

## Types of Feeding Tubes

- Nasogastric
- Nasoduodenal
- Nasojejunal
- Orogastric
- Orojejunal
- Transesophageal
- Gastrostomy (G-tube)
- Percutaneous endoscopic gastrostomy (PEG)
- Jejunostomy (J-tube)
- Percutaneous endoscopic jejunostomy (PEJ)
- Gastrojejunostomy



# Enteral Nutrition

## Types of Feeding Tubes

Transnasal tubes (i.e., naso-gastric, -duodenal, -jejunal) are:

- less invasive and less expensive than other methods
- best suited for short term (< 6 weeks) enteral feeding
- often poorly tolerated by conscious or confused patients
- subject to complications including mucositis, paranasal sinusitis, reflux esophagitis, pressure ulcers



# Enteral Nutrition

## Types of Feeding Tubes

Percutaneous endoscopic tubes (i.e., PEG, PEJ) are:

- Preferred over Transnasal for longer term enteral nutrition
- More invasive; relatively higher in cost
- Subject to peri-stomal infection or leakage at the insertion site





## Polling Question 1

**Which of the following is a potential complication of enteral feeding?**

- A. diarrhea
- B. metabolic disturbances
- C. aspiration
- D. all of the above



## Polling Question 1

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# Complications of Enteral Feeding

- Adverse drug interactions
- Diarrhea
- Epistaxis
- Intestinal ischemia
- Metabolic disturbances



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- Diarrhea
- Epistaxis
- Intestinal ischemia
- Metabolic disturbances
- Mechanical complications
- Nasopharyngeal lesions
- Pulmonary complications
- Sinusitis
- Tube obstruction



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**Aspiration**



# Definition of Aspiration

- Aspiration: the inhalation of oropharyngeal secretions or gastric or small-bowel contents into the larynx and lower respiratory tract



## **Polling Question 2**

**Aspiration often occurs without obvious evidence of vomiting or regurgitation.**

- A. true**
- B. false**



## Polling Question 2

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- A. true**
- B. false





# Definition of Aspiration

- Aspiration: the inhalation of oropharyngeal secretions or gastric or small-bowel contents into the larynx and lower respiratory tract
- Silent microaspiration: asymptomatic aspiration of small volumes of oropharyngeal secretions or gastric fluid into the lungs



# Incidence of Aspiration

## Aspiration:

- Occurs in up to 89% of critically ill patients fed via nasoenteral tube
- Is common in patients with impaired consciousness or poor gag reflexes
- Has occurred in:
  - up to 30% of patients with tracheotomies
  - 12.5% of neurology patients



# Potential Consequences of Aspiration

Consequences of Pulmonary Aspiration range from:

- asymptomatic normal physiologic clearance, to
- potentially life-threatening conditions
  - Aspiration pneumonitis
  - Aspiration pneumonia



# Potential Consequences of Aspiration

- Aspiration pneumonitis:
  - Acute lung injury after aspiration of acidic gastric contents, causing chemical burns of the trachea-bronchial tree and pulmonary parenchyma.



# Potential Consequences of Aspiration

- Aspiration pneumonitis:
  - Acute lung injury after aspiration of acidic gastric contents, causing chemical burns of the trachea-bronchial tree and pulmonary parenchyma.
- Aspiration pneumonia:
  - An infectious process characterized by inhalation of colonized oropharyngeal material into the respiratory tract.



## **Polling Question 3**

**Aspiration of gastric contents is most likely to result in:**

- A. Aspiration pneumonitis**
- B. Aspiration pneumonia**
- C. Vomiting**
- D. Diarrhea**



## Question 3 Response

**Aspiration of gastric contents is most likely to result in:**

- A. Aspiration pneumonitis**
- B. Aspiration pneumonia
- C. Vomiting
- D. Diarrhea



# Diagnosis of Aspiration

- No bedside test available
- Diagnosed via clinical signs
  - Dyspnea
  - Cyanosis
  - Tachycardia
  - Hypotension
  - X-ray changes





# Causes of Aspiration

- Causes include
  - Gravitational back-flow
  - Impairment of lower esophageal sphincter (LES)
  - Infrequent esophageal contractions
  - Feeding tube across the gastric cardia



# Device-Related Risk Factors for Aspiration

- Malposition of the feeding tube
- Mechanical ventilation
- Nasogastric tube
- High bolus feeding volumes
- High gastric residual volume (GRV)



# Patient- Related Risk Factors for Aspiration

- Supine position
- Sedation
- Vomiting
- Presence of high risk disease or injury
- Poor oral health
- Advanced age



# Risk Factors for Aspiration

- Nursing staff level
- Patient transferred for procedures to other units and facilities



# Risk Factors for Aspiration Pneumonia

- Esophagitis
- Gastroesophageal reflux
- History of aspiration or pneumonia
- Impaired level of consciousness
- Neurologic deficits

# A Closer Look ...



- **Supine positioning**
- Sedation
- Enteral tube placement
- Enteral feeding
- Promotility agents
- Gastric residual volume
- Long term feeding



# Supine Positioning

- Study compared incidence of nosocomial pneumonia in intubated, mechanically ventilated patients
- The incidence of pneumonia was:
  - Lower incidence in semi-recumbent
  - Highest for supine position

Source: Drakulovic, M. B., A. Torres, et al. (1999). "Supine body position as a risk factor for nosocomial pneumonia in mechanically ventilated patients: a randomised trial." Lancet **354**(9193): 1851-1858.



# Supine Positioning

- Study compared incidence of nosocomial pneumonia in intubated, mechanically ventilated patients
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Supine body position and enteral nutrition were independent risk factors for nosocomial pneumonia





# Supine Positioning

- Methany and colleagues compared care:
  - 88% of patients aspirated with usual care
  - 39% of patients aspirated under ARRP\* protocol:
    - Elevate HOB 30° or higher
    - Distal small bowel feeding tube placement
    - Algorithmic approach for patients with high GRV

\*ARRP: Aspiration risk-reduction protocol



# Elevate the Head of the Bed

For patients at high risk of aspiration pneumonia:

- Elevate HOB 30° to 45°, unless contraindicated
- Keep HOB elevated for at least an hour after feeding
- If necessary to lower the HOB, return the patient to HOB elevated position ASAP
- Infants under 1 year of age should sleep on their backs and should not have the head of the bed elevated



# A Closer Look ...



- Supine positioning
- **Sedation**
- Enteral tube placement
- Enteral feeding
- Proton pump inhibitors
- Gastric residual volume
- Long term feeding



# Sedation

Sedation decreases or eliminates the swallowing or coughing reflex

To reduce the risk for aspiration in patients receiving enteral feeding, it is advisable to use the minimum level of sedation needed for patient comfort.

## A Closer Look ...



- Supine positioning
- Sedation
- **Enteral tube placement**
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# Ensure Correct Placement

- 1-2% of blindly placed, small-bore feeding tubes enter airway

**Increases risk of aspiration**

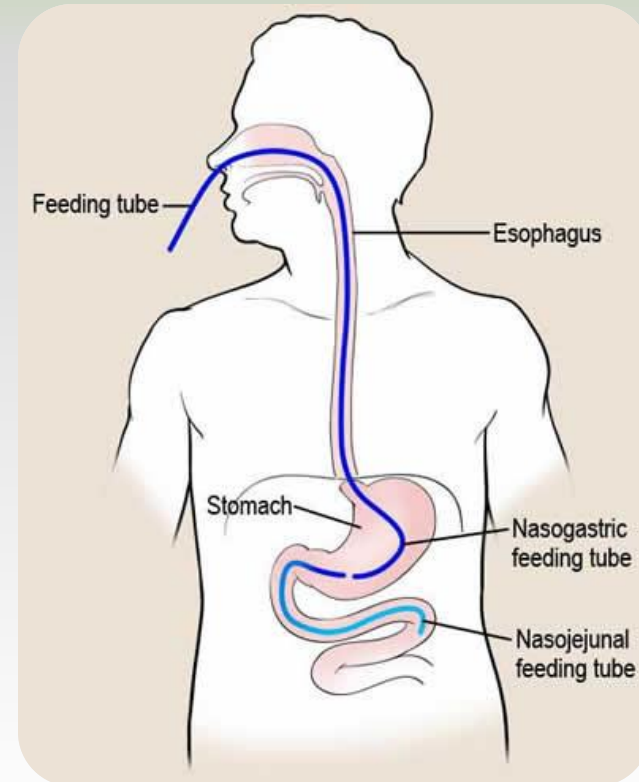


# Ensure Correct Placement

- Modalities used to ensure correct placement:
  - Fluoroscopic
  - Endoscopic
  - Electromagnetic

# Monitor Tube Placement

After correct initial placement, ongoing assessment is required







# Monitor Tube Placement

AACN recommends placement be assessed every 4 hours

- Observe location of marked portion
- Look at notes on radiography report
- Note any changes in aspirate volume
- Measure aspirate pH if feeding interrupted for 1 hour or more
- When in doubt, request radiograph

Source: American Association of Critical Care Nurses, Practice Alert, downloaded from <http://ccn.aacnjournals.org/> by AACN on January 25, 2019. e20



# A Closer Look ...



- Supine positioning
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- Promotility agents
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# Post-Pyloric Feeding

- *Consider Post-Pyloric Feeding*
- Small-bowel feedings appropriate for patients with:
  - Gastric obstruction
  - Severe gastroparesis
  - Known reflux, aspiration



# Feeding Tube Site

- Relationship between feeding tube site and respiratory outcomes compared:
  - 428 critically ill, ventilated patients
  - 11.6% lower with tubes in first part of duodenum
  - 13.2% lower in second/third part
  - 18% lower in fourth part

Conclusion: Feeding in the distal small bowel reduced risk of aspiration



# A Closer Look ...



- Supine positioning
- Sedation
- Enteral tube placement
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- **Promotility agents**
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# Promotility Agents

- 50-60% of critical-care patients experienced delayed gastric emptying
- Abdominal, bowel status assessment is a priority



# Promotility Agents

- 50-60% of critical-care patients experienced delayed gastric emptying
- Abdominal, bowel status assessment is a priority
- Prokinetic, or promotility, agents (e.g., metoclopramide) help the stomach empty more quickly
- Consider promotility agents in patients with delayed gastric emptying



# A Closer Look ...



- Supine positioning
- Sedation
- Enteral tube placement
- Enteral feeding
- Proton pump inhibitors
- **Gastric residual volume**
- Long term feeding





# Gastric Residual Volume (GRV)

- GRV used as an indicator for aspiration risk
- For continuous feedings, check GRV during infusion
- For intermittent feedings, check after 1 hour



# Gastric Residual Volume (GRV)

A single high GRV result must be assessed in relation to other indicators of gastrointestinal intolerance to tube feedings (e.g., abdominal distention, abdominal discomfort, nausea & vomiting)



# A Closer Look ...



- Supine positioning
- Sedation
- Enteral tube placement
- Enteral feeding
- Proton pump inhibitors
- Gastric residual volume
- **Long term feeding**



# Long-term Feeding

Long term feeding via a PEG or PEJ tube may reduce risk of aspiration, however ...

regular assessment is needed to confirm:

- retention device is properly approximated
- no tube migration
- no excessive tension to exterior of tube
- condition of surrounding skin



# Long-term Feeding

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- retention device is properly approximated
- no tube migration
- no excessive tension to exterior of tube
- condition of surrounding skin

Conduct post-extubation assessment if  
intubated for more than 2 days



## **Prevention of Aspiration**



# Reducing the Risk of Aspiration Pneumonia

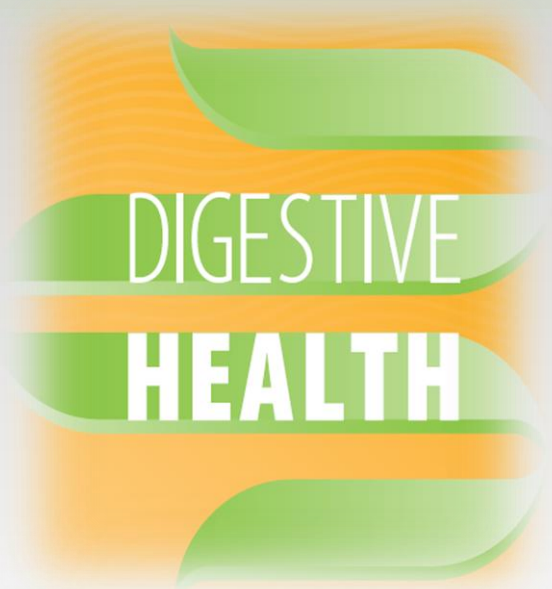
- Evaluate patients for risk
- Employ steps to reduce risk
- Elevate the head of the bed 30°- 45° during administration
- Keep sedation level to a minimum
- Verify feeding tube position every 4 hours



# Reducing the Risk of Aspiration Pneumonia

- For high risk patients ...
  - Insert or advance feeding tube tip into the small bowel
  - Deliver enteral nutrition continuously
  - Consider promotility agents
  - Provide good oral hygiene
  - Deliver long term feeding via PEG and PEJ tubes
  - Conduct a post-extubation assessment





# Management of Aspiration



# Management of Aspiration

- If aspiration is witnessed/suspected
  - Stop the feed
  - Remove aspirated material
  - Initial treatment with antibiotics
  - Quantitative bacteriology using BAL sample
  - Discontinue antibiotics if no bacterial growth is observed



# Management of Aspiration

- Treatment consists of
  - Supportive management for pneumonitis
  - Antimicrobial therapy for pneumonia



# Management of Aspiration

## **Surgical Approaches for Intractable Aspiration:**

- Laryngectomy
- Laryngotracheal separation



# Management of Aspiration

## Surgical Approaches for Intractable Aspiration:

- Laryngectomy
  - Results in loss of voice box
  - Significant cosmetic deformity



# Management of Aspiration

## **Surgical Approaches for Intractable Aspiration:**

- Laryngectomy
  - Results in loss of voice box
  - Significant cosmetic deformity
- Laryngotracheal separation
  - Patient breathes through neck
  - Requires alternate vocalization method



# Issues in Enteral Feeding: Aspiration

## Summary

- Enteral nutrition improves nutritional status for patients
- Aspiration is a risk factor for enteral nutrition
- Preventive measures that reduce the risk of aspiration should be employed
- Treatment of aspiration may include suctioning, bacterial culture and antibiotics, or surgical intervention



# Issues in Enteral Feeding: Aspiration

**Thank you!**

Kathleen Stoessel, RN, BSN, MS  
kathleen.stoessel@gmail.com