LEARNING MODULE
FOR
NASOGASTRIC TUBE, INSERTION, MAINTENANCE & REMOVAL
(POST ENTRY LEVEL COMPETENCY)

Date: November, 2006
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Medical/ Surgical Resource Team

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RN AND LPN LEARNING OBJECTIVES: NG TUBE INSERTION

Following review of the policy and learning module, the RN, or the LPN in approved practice settings only, will be able to:
1. identify the indications for nasogastric tube insertion
2. describe the appropriate nursing assessments and interventions required to perform this procedure
3. discuss the theory and procedure related to assessing position/placement, patency, flushing and checking residuals
4. describe patient care considerations prior to and following nasogastric tube insertion

LPN LEARNING OBJECTIVES: NG TUBE REMOVAL

Following the review of this policy and learning module, the LPN will be able to:
1. describe the appropriate nursing assessment and patient care considerations prior to and following nasogastric tube removal
2. explain the procedure for nasogastric tube removal

METHOD OF CERTIFICATION

To be deemed competent in the insertion and removal of a nasogastric tube, the nurse will:
1. review the Policy & Procedure and Learning Module associated with nasogastric tube insertion, maintenance and removal.
2. review theory and procedural information found in Perry and Potter (2006), Clinical Nursing Skills and Techniques; Sixth edition, pages 1136 to 1143 and 1014 to 1035.
3. complete the self-test.
4. demonstrate the successful insertion of a nasogastric tube and assess placement, to clinical nurse educator or designate (RN’s, and LPN’s in approved practice settings only).
5. demonstrate removal of a nasogastric tube to a clinical nurse educator or delegate (LPN specific).
6. maintain a record of competence.
7. conduct a yearly self-assessment of competency level and develop a plan in conjunction with the unit manager to meet ongoing needs.

THEORY

Insertion of a small-bore weighted feeding tube is similar to placement of other nasogastric tubes with the exception of the following:

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• the weighted tip has a polymer coating or lubricant that is activated by dipping the tip in water
• verification of placement can be performed using the same techniques as outlined in Perry & Potter, (2006) Clinical Nursing Skills and Techniques (pg. 1021-1024) However, small-bore nasogastric tube placement must be verified by x-ray after initial tube placement, prior to nutrition or medication administration.
  o It is also recommended that x-ray confirmation of tube placement be obtained after emesis, vigorous coughing episodes, or any other reason to believe that the tube may be malpositioned (such as changes in color of aspirate and pH value).

**Nasogastric Tube Insertion: Possible Complications**

Possible complications of nasogastric tube insertion include:

1. bronchial intubation
2. pulmonary aspiration potentially leading to pneumonia
3. tissue trauma
4. malposition

Placement of the catheter can induce gagging or vomiting, therefore suction should always be ready to use in the case of this happening.

Possibly the most important nursing intervention to decrease the risk of aspiration in a patient with a nasogastric tube, is to keep the head of the bed elevated at least 30 degrees. (ASPEN, 2002; Methany and others, 2002a). If the patient must have the bed in a flat position, it is possible to keep the bed flat yet elevate the head by placing the bed in reverse Trendelenburg position.

To avoid tissue trauma, do not put the large-bore nasogastric tube in the refrigerator (to make it firmer) prior to inserting the tube and do not force the tube past resistance.

**Checking Placement:**

Routine assessment for placement of nasogastric tubes is primarily a nursing responsibility. Traditionally, the auscultatory (air pop or insufflation) method of assessing placement was used. Since the late 1980’s there have been several studies showing that the auscultatory method to detect gastric or intestinal tube placement is unreliable. This method cannot detect when a feeding tube has inadvertently been placed into the respiratory tract and cannot distinguish between placement in the stomach versus the intestine (Metheny and others, 1990).

Before the NG tube is thoroughly secured, non-radiographic confirmation of its successful placement should be obtained. All confirmation methods have some degree of questionable reliability, so it is wise, to use more than one method. X-ray evaluation is the most definitive way to confirm the position of an NG tube, however, since tube position should be checked every 4 to 12 hours, it is not feasible to do x-ray checks at this frequency. Other methods of determining placement should be employed. (Perry & Potter, 2006)
Following initial x-ray verification that a nasogastric feeding tube is positioned in the desired site (either the stomach or small intestine), the nurse is responsible for ensuring that the tube has remained in the intended position before administering formula or medications through the tube. Therefore tube position or placement must be verified every 4 hours (when there is a concern) to 12 hours and as needed.

**Methods for Checking Placement:**

1. Measure the pH of the gastric aspirate. This practice is reliable, and should be performed when checking for positioning of the tube. If the pH is less than 4, the nasogastric tube has an approximately 95% chance of having its tip in the stomach. Furthermore, non-respiratory placement is almost guaranteed. (Perry and Potter 2006). Aspirated fluid can occasionally be obtained from the lung, but the pH should be 6.0 or higher.
   1.1 If the pH of the aspirate is 5 or below (between 4 and 6), commence feeding, as there are no known reports of pulmonary aspirates with a pH of less than 5. If the pH is 6 or above, do **not feed**, as this may be bronchial secretions. Leave it for up to an hour and check the pH again. Document findings. The most likely reason for failure to obtain gastric aspirate below pH of 5 is the dilution of gastric acid by enteral feed. Waiting for up to an hour will allow time for the stomach to empty and the pH to fall. If during the re-check in one hour, there is any doubt about the position and/or the clarity of the colour change on the pH indicator strip, then feeding should not commence, notify physician. (National Patient Safety Agency, UK, 2005).
   1.2 Although this technique is reliable, there are some patients who have an alkaline stomach pH. Causes for this include duodenal reflux, antacids, H2 blockers, or recent instillation of formula or medications. (Perry and Potter 2006). For patients who are regularly on antacids, the initial pH of the aspirate (at the time of x-ray) should be documented on the patient’s kardex.
   1.3 If you are not successful on the initial attempt to obtain a gastric aspirate from the small-bore tube:
      1.3.1 Try injecting 10 -20mL of air into the tube prior to aspirating. The air might be enough to dislodge the tip of the tube from the gastric mucosa.
      1.3.2 Have the patient turn onto their left side or change position to see if the tube will move into the fluid pocket and away from the gastric mucosa.
      1.3.3 Advancing the tube 1-2 cm to ensure that the tip is sitting in a pool of fluid in the stomach.
   1.4 Sometimes it is difficult, or not possible to aspirate fluid from the small bore feeding tubes. If after repeated attempts, it is not possible to aspirate fluid from the small bore feeding tube that was originally confirmed by x-ray examination to be in desired position, and if (a) there are no risk factors for tube dislocation, (b) tube has remained in original taped position, and (c) patient is not experiencing respiratory distress, assume tube is correctly placed (Methany and others, 1993). You should however confirm placement utilizing the remaining placement check criteria, listed below (omit #3).

2. Ask the patient, if he or she is awake and cooperative, to talk. If the patient cannot speak, respiratory placement is likely. Note that with small-bore tubes, patients may still be able to speak despite tracheal placement.

3. Check the color of the gastric aspirate obtained. Normal gastric aspirate is usually cloudy and green, but may be off-white, tan, bloody, or brown in color.

4. Inspect the posterior pharynx for presence of coiled tube. Some tubes are pliable and can coil up in the back of pharynx instead of advancing into the esophagus.
5. Initially upon insertion, document the external length of the tube and place a mark on the at the entry point into the nare. Check for the external markings or tape (at the entrance to the nares) prior to each feeding. Recheck the external length as required. This would help to indicate any possible movement from when the tube was initially placed and (if required) x-rayed. Increased external length of a tube may indicate that the distal tip is no longer in the correct position. DO NOT interpret the absence of respiratory distress as an indicator of correct positioning. AVOID reliance on the “whoosh” or “air pop” method to determine placement. (Khair, J, 2005)

If at any time, there is concern or uncertainty about the position of the nasogastric tube, an x-ray should be done to confirm placement. Once correct tube position is confirmed, the tube should be marked and secured.

After the x-ray is done, it may be necessary to advance or pull the nasogastric tube back to the desired position in the patient’s stomach. If required, you can advance it another 2.5 to 5 cm (1 to 2 inches), and repeat the placement checks. If the x-ray indicates that the tube is in the intestine, pull the tube back 2.5 to 5 cm. and repeat placement checks.

**Aspiration Pneumonia:**

Aspiration pneumonia occurs when there is an abnormal entry of fluids, particulate matter, or secretions (gastric contents) into the tracheobronchial passages or lower airways. There are three types of aspiration pneumonia:

1. **Bacterial infection**- of the lower airways is the most common form of aspiration pneumonia. The usual pathogens are anaerobic bacteria that colonize the oropharynx. Onset and progression of symptoms are more insidious than those of gastric acid pneumonitis. Usual findings are those of a bacterial lung infection with cough, fever, and purulent sputum. Chest x-rays show an infiltrate in a dependent lung segment, determined to some extent by the patient's position during aspiration. The major therapeutic modality is antibiotics directed against the involved pathogens. (Merck Manual of Diagnosis and Therapy).

2. **Mechanical obstruction**- of the lower airways may be caused by aspiration of inert fluids or particulate matter (e.g., in drowning victims or patients with severely compromised consciousness who aspirate nonacid gastric contents, oral feedings, etc). These patients may need immediate tracheal suctioning. Symptoms depend on the caliber of both object and airway. Therapy consists of extracting the object, usually by bronchoscopy. (Merck Manual of Diagnosis and Therapy).

3. **Chemical pneumonitis**- occurs when aspirated material is directly toxic to the lungs. The most common is acid pneumonitis after gastric acid aspiration. Aspiration of low pH gastric secretions is associated with immediate injury to the tracheobronchial tree and lung parenchyma best likened to a "flash burn". Chest x-ray invariably shows infiltrates usually in one or both lower lobes. Arterial blood gas analysis shows hypoxemia. The patient presents with acute dyspnea, tachypnea, and tachycardia. Bronchoscopy in such cases shows diffuse bronchial erythema. The severity of lung injury is directly related to the pH of the aspirated material and is greatest when the pH is less than 2.5. The most important therapeutic modality is respiratory support, usually with intubation and positive pressure ventilation. Mortality is 30 to 50%. (Johnson, J.L. & Hirsch, C.S., 2003).
Assessment findings - Aspiration pneumonia:
Aspiration of stomach contents into respiratory tract (immediate response) in the alert patient, can be noted by coughing, dyspnea, cyanosis, or decreases in oxygen saturation values. A more delayed response would be evidenced by auscultation of crackles or wheezes, dyspnea, or fever. (Perry and Potter, 2006).

REFERENCES


Merck Manual of Diagnosis and Therapy (1999), Seventh Edition, Section 6, Pulmonary Disorders, Chapter 73: Pneumonia, Merck & Co., Inc.


ADDITIONAL READINGS


NASOGASTRIC TUBE INSERTION, MAINTENANCE AND REMOVAL

SELF TEST

1. Verification of placement of a nasogastric tube is an important nursing assessment. To adequately verify tube placement before each NG irrigation, the nurse must:
   a. Auscultate for bowel sounds
   b. Place the end of the tube in a glass of water to check for bubbling
   c. Determine color and pH of gastric contents
   d. Listen for an “air pop” by auscultating the abdomen while injecting 30 mL of air through tube

2. Your patient has a Salem sump on low gomco suction that has a very small amount of dark green thick liquid in the canister, but nothing noted in the tubing. The patient complains of abdominal discomfort and nausea. His abdomen is slightly distended and tender. What are your nursing actions?
   a. Remove the nasogastric tube because it was not working and prepare to re-insert another one
   b. Call the physician to come and assess the patient’s abdomen and nausea
   c. Flush the nasogastric tube with 30 mL sterile water, reconnect, and reassess
   d. Flush the blue lumen on the Salem sump with 30 mL sterile water and reconnect

3. A new order for enteral nutrition has been written. The patient has not yet received any feeds. The nurse checks placement of the small-bore nasogastric feeding tube. The following results were obtained: 20 mL of light brown fluid, pH of 4. Based on these findings, where is the tip of the tube most likely positioned?
   a. Respiratory tract
   b. Stomach
   c. Intestine
   d. Esophagus

4. You come on your shift and there is an order to restart enteral nutrition on one of your patients. The patient has a small-bore nasogastric feeding tube insitu that was clamped because he had severe vomiting. When the tube was initially inserted two days ago, x-ray confirmed that the tube tip was in the stomach. What are the necessary nursing steps to restart enteral nutrition on this patient?
   a. Check tube placement using pH indicator strip, assess color of gastric residual and if required confirm with x-ray. If okay, initiate feeds at a decreased rate
   b. Auscultate for bowel sounds, check tape mark on the tube to ensure that the tube has not moved, and initiate feeds
c. Clarify with physician if it is okay to re-start feeds, and initiate feeds as ordered

d. Check tube placement by injecting 30 mL air into the tube while auscultating for air pop over epigastrium, if okay, initiate feeds as ordered

5. To measure the length of N/G tube to be inserted, the RN measures:
   a) from tip of the earlobe to nose to the umbilicus
   b) from tip of the nose to the tip of the earlobe to the sternal notch
   c) from tip of the nose to the tip of the earlobe to xiphoid process

6. What are the most important nursing interventions to decrease the risk of aspiration while a patient is receiving a continuous infusion of enteral nutrition via a nasogastric tube?
   a. Ask the patient to notify you if they are starting to feel too full
   b. Elevate the head of the bed approximately 30 degrees
   c. Flush the tube feed with 30 mL of sterile water every 4-6 hours
   d. Checking gastric residuals every 4-12 hours
   e. Check frequency of patient’s bowel movements, and if necessary, obtain order for fleet enema to ensure GI motility.

   1. a and c
   2. b and d
   3. c and e
   4. a, b, and c
   5. c, d, and e

7. Your patient is receiving a continuous infusion of enteral nutrition. Four medications are ordered to be administered at 1000hrs. When giving multiple medications via this small-bore nasogastric feeding tube, the nurse must be aware to:
   a. Give each medication separately and flush the nasogastric tube with water only after administering the final medication dose
   b. Crush each pill separately, and flush the tube with water before administering the first medication, between each different dose of medications and after administering the last dose of medication.
   c. Crush all of the pills together, mix them with the feeding formula, administer the medications and then flush the tube with water
   d. Space the medications out and give them over the next two hours, flushing the tube prior to giving each medication.

8. The physician has ordered the NG tube to be removed. When performing this procedure, the nurse must remember to do all of these steps except:
a. Using a small suction catheter, suction the back of the patient’s throat and down along the tube, prior to initiating the removal of the tube
b. Ensure that oral/pharyngeal suction equipment is available
c. Tell the patient to take and hold a deep breath
d. Place patient in semi-fowler position or higher, if tolerated by the patient

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Answers to Self Test:

1. c
2. c
3. b
4. a
5. c
6. 2
7. b
8. a
**Capital District Health Authority**
**Nursing Division**
**Proficiency Standard Skills Checklist**

**TITLE:** Nasogastric Tube Insertion

**NURSING UNIT:**

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<tr>
<td>1</td>
<td>Checks physician’s order for type of NG tube and whether to connect it to suction (note type) or drainage.</td>
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</tbody>
</table>
| 2 | Assembles appropriate equipment:  
- Water soluble lubricant (for tubes not pre-lubricated)  
- NG tube  
- Stethoscope  
- Tape or NG nare strip  
- Tongue blade  
- Flashlight (if needed)  
- Gloves (non sterile)  
- Catheter tip syringe (60 mL)  
- Safety pin  
- Incontinent pad or towel  
- Emesis basin  
- Tissues  
- Marker and measuring tape  
- Glass of water with straw  
- Saline for irrigation  
- Appropriate suction or drainage device (if applicable)  
- Suction equipment in case of aspiration  
- PH test strip |
| 3 | Identifies patient by checking armband and provides for patient privacy |
| 4 | Explains procedure to patient |
| 5 | Assesses nares, oral cavity and abdomen of patient. Checks for previous nasal fractures, surgery, polyps or other blockages, which may make insertion technically difficult or even impossible. |
| 6 | Positions patient in high Fowler’s position |
| 7 | Measures length of NG tube to be inserted and marks length on tube with tape or marker. Measures from tip of nose to earlobe to xyphoid process of sternum to ensure tip of tube reaches stomach. |
| 8 | Cuts tape for anchoring tube. Prepares suction equipment |
| 9 | Prepares tube by curving the tip and lubricating tube, (if not pre-lubricated) or dip in water. |
| 10 | With patient’s neck extended back against pillow, inserts tube to point of nasopharynx. If patient starts to gag, stops advancing tube, pulls tube back a few cm., and will wait a few seconds for the patient to catch breath. Then will have |
patient flex head forward and drink water or make swallowing motion while tube is being advanced as far as the mark.

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<thead>
<tr>
<th>11</th>
<th>Checks tube placement by:</th>
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<tbody>
<tr>
<td></td>
<td>(a) Observing patient for cyanosis, coughing or gasping for air- remove tube immediately</td>
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<tr>
<td></td>
<td>(b) Asking patient to talk or hum, if able</td>
</tr>
<tr>
<td></td>
<td>(c) Checking for coiled tube at back of throat</td>
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<tr>
<td></td>
<td>(d) Aspirate gently on the syringe to obtain gastric contents, observing color.</td>
</tr>
<tr>
<td></td>
<td>(e) Measure pH of aspirate with color-coded pH test strip.</td>
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<td></td>
<td><strong>pH values:</strong></td>
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<tr>
<td></td>
<td>Gastric: 0 – 4</td>
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<td></td>
<td>Duodenal: &gt;4 (4 to 7)</td>
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<tr>
<td></td>
<td>Respiratory: ≥6</td>
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<td></td>
<td>If patient is receiving acid-inhibiting agents pH range may be 4 to 6</td>
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</tbody>
</table>

**Note:** pH may be altered by medications and feeds.

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<thead>
<tr>
<th>12</th>
<th>Anchors tube securely to nose and fasten tube to gown</th>
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<tr>
<td>13</td>
<td>Ensures x-ray verification is obtained, if initiating feeds or medications.</td>
</tr>
<tr>
<td>14</td>
<td>Ensures that tube has either a mark or piece of tape at point of insertion to nare. This could be used as an indicator to assess for tube migration.</td>
</tr>
<tr>
<td>15.</td>
<td>Measures and documents external length of the tube from insertion at nare to tube tip</td>
</tr>
<tr>
<td>14</td>
<td>Connects NG tube as appropriate (i.e., intermittent or continuous drainage device, enteral nutrition set)</td>
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<tr>
<td>15</td>
<td>Provides comfort measures and mouth care to patient</td>
</tr>
<tr>
<td>16</td>
<td>Documents NG tube insertion, tube size, drainage amount, color and pH; and patient response to procedure in patient health record.</td>
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</tbody>
</table>
Proficiency Standard Skills Checklist

**TITLE:** Nasogastric Tube Removal

<table>
<thead>
<tr>
<th></th>
<th>When performing nasogastric tube removal, the Nurse:</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Verifies physician order to discontinue N/G tube</td>
<td></td>
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<tr>
<td>2</td>
<td>Explains the procedure to patient</td>
<td></td>
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<tr>
<td>3</td>
<td>Turns off suction and disconnects nasogastric tube from suction or drainage bag</td>
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<tr>
<td>4</td>
<td>Places patient in semi-fowler position or higher, if tolerated by the patient. This decreases the risk of aspiration in the event of emesis.</td>
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<tr>
<td>5</td>
<td>Will have oral/pharyngeal suction equipment available</td>
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<tr>
<td>6</td>
<td>Removes tape from nose and unpins tube from gown</td>
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<tr>
<td>7</td>
<td>Instructs patient to take and hold a deep breath. (Note: If the patient is unable to hold their breath, removes tube during exhalation).</td>
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<tr>
<td>8</td>
<td>Clamps or kinks tubing and then withdraws tube steadily and smoothly while patient holds breath (or exhales)</td>
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<td></td>
</tr>
<tr>
<td>9</td>
<td>Measures amount and character of drainage from the suction canister, if applicable and records on I&amp;O record.</td>
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<tr>
<td>10</td>
<td>Provides mouth and nare care</td>
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</tr>
<tr>
<td>11</td>
<td>Documents N/G tube removal amount and character of drainage, and patient response in patient’s health record.</td>
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