Tube Feeding: Care and Management

Quick Links to:

Site Applicability

VGH, UBCH (Acute), GFS

Practice Level

RN, LPN (with appropriate education/training), NP (Nurse Practitioner)

Policy Statements

- The initiation of tube feeding requires a prescriber (Physician or NP) order, dietitian consult, and implementation of the Tube Feeding Initiation Orders (pre-printed orders) for VGH (including Banfield, GFS, UBCH including Purdy)
- The insertion of a feeding tube requires a prescriber (Physician or NP) order
- Reinsertion of the stylet into the feeding tube is not permitted while the tube is in situ.
- It is preferred that continuous feeds are administered using an enteral feeding pump. Do not use an infusion pump to deliver tube feeds.
- Blue dye must NOT be added to tube feeding formula due to safety concerns.

Need to Know

- Common enteral access devices:
    - Large Bore PVC feeding tubes (e.g., Salem®, Levine®)
    - Small Bore polyurethane feeding tubes (e.g., Entriflex®)
- The most common routes for tube feeds are: nasogastric, nasoduodenal, nasojejunal, gastrojejunal, jejunal and percutaneous gastric.
- There are two feeding delivery methods that may be ordered by the physician or dietitian: open and closed

- **The enteral feeding plan is ordered and advanced by the prescriber in consultation with the dietitian and nurse. The plan includes: type of feeding formula, method of delivery (closed or open), amount, feeding schedule, flow rate and total fluid requirement.**
- A routine flush helps to maintain feeding tube patency as well as provide patients with supplemental fluid to meet their hydration needs and can be administered using the feed and flush tubing sets and the enteral feeding pump settings. Alternatively, if the feed and flush tubing sets are not being used a large bore syringe (60 cc) can be used to manual flush the feeding tube by instilling fluids directly into the feeding tube.
- A large bore syringe (60 cc) should be used when aspirating fluid from a feeding tube.
- Auscultation of air insufflated through the feeding tube (the 'whoosh' test) is NOT a reliable method for determining feeding tube tip placement.
- Please contact your unit dietitian using the unit contact information Monday to Friday (8:00 to 4:00 pm). For urgent matters on the weekends and Stat Holidays, to access the on-call dietitian contact your site diet office (UBCH/VGH only)
- A patient is defined as tolerating feeding when they have reach and maintained their final goal rate for 48hrs
- Bacterial contamination of feeding formula poses serious health risk such as diarrhea and has been linked to sepsis. Precautions should be taken to avoid contamination of the feeding system.

Practice Guideline

There are three tubing sets that can be used to administer formula: feed only, feed and flush sets as well as gravity sets. The feed and flush sets allow nurses to pre- program routine flushes of water or saline and should be used whenever possible. Please see Appendix H: Decision Support Tool to determine appropriate tubing set. See Appendix E: Dietitian guidelines for ordering the closed system for tube feeding.

In some cases, gravity feeding may be required and require the nurse to calculate the rate to ensure accurate administration: See Appendix G: Drip rates calculation- Gravity feeds

The remainder of this guideline outlines:

1. Types of Delivery systems for enteral feeding (closed/open)
2. Key potential problems and related interventions such as:
    - Aspiration
    - Improper placement or dislodgement of feeding tube
    - Intolerance of feeds
    - Bacterial contamination
    - Decreased skin integrity
    - Blocked feeding tubes
3. Medication administration via feeding tubes

A. Types of Feeding Delivery Systems for Enteral Feeding

I. **Closed Enteral Feeding System**- The closed Enteral feeding system is the preferred method whenever possible to help minimize the risk of bacterial contamination. **The dietitian will determine if the closed enteral feeding system will best meet the patient's needs. Closed enteral feeding system is indicated when:**

a. the formula required is available in the closed system (Enteral formulary)
b. changes to formula type is not expected in the next 48hrs
c. a minimum of 1000-1500 ml is required over 48hr (minimum rate 20 to 30 ml per hour)

Each closed enteral feeding system formula container holds 1000-1500 ml of formula and can be hung for 48hrs at room temperature. The formula container and tubing set should be changed every 48hrs or when a new formula container is required.

Procedure for preparing the closed enteral feeding system container:

1. Wash hands
2. Obtain appropriate tubing set (see decision support tool for product selection) and closed enteral feeding system formula container
3. Ensure closed enteral feeding system formula container is labeled with patient name and date/time it was hung. Expiration date is 48hrs after seal has been pierced with spike of tubing set
4. Shake the formula container vigorously and remove the protective cap from formula container. If foil seal or protective cap is missing **DO NOT USE. DO NOT** touch porthole underneath cap.
5. Remove protective cap from spike of tubing set
6. Lie ultra pak flexible container on sturdy, flat surface then spike formula container with the tubing set. **DO NOT** touch piercing surface.
7. Turn threaded spike of tubing set clockwise until tightly fastened. The formula container is spiked properly when the shaft of the spike from the tubing set is not showing and is all the way into the port of the formula container. NOTE: Once the container is spiked even if formula is not used it must be discarded.
8. Invert the formula container and hang for feeding
9. **Fill flush bag (if using feed and flush sets) with tap water and cap bag. Refill as needed.**
10. Before use, swab access ports of the enteral feeding tube with alcohol swab and let dry, connect tip of tubing set to enteral feeding tube.
11. Program enteral feeding pump with correct volume and rate. Reminder when using Kangaroo e-pump, use continous feeding function only for both continous and intermittent feeds. See Appendix F: VGH Quick Reference Operational Guide for Kangaroo e-pump for enteral feeding pump set up and instructions

II. **Open Enteral Feeding System**- The open enteral feeding system should be used:

a. for any specialty formula not available in the closed system
b. when 2 formulas are mixed
c. when low volumes/rates of formula are required or

d. when frequent formula changes are anticipated

The dietitian will determine if the open enteral feeding system will best meet the patient's needs. Special care and attention should be taken when using the open system to reduce bacterial contamination (see Potential problems-Bacterial contamination). The open feeding system requires the formula bag and tubing set to be changed every 24hrs.

Procedure for preparing the open system feeding bag:

1. Wash hands
2. Obtain appropriate tubing set (feed only, open enteral feeding system bag with the feed and flush tubing sets)
3. Wash hands prior to preparing formula
4. Before use, swab top of can and access ports of the enteral feeding tube with alcohol swab and let dry
5. Pour no more than 4 hour supply of formula into open enteral feeding system bag and ensure the tubing set is closed
6. Fill flush bag (if using feed and flush sets) with tap water and cap. Refill with tap water as needed.
7. Label open enteral feeding system bag with date and time it was hung. Label any unused open formula and refrigerate, ensure formula container is covered, and dispose of any unused formula after 24 hours
8. Hang open enteral feeding system bag and prime appropriate tubing set
9. Program enteral feeding pump with correct volume and rate. Reminder when using Kangaroo e-pump, use continous feeding function only for both continous and intermittent feeds. See Appendix F: VGH Quick Reference Operational Guide for Kangaroo for enteral feeding pump set up and instructions

III. Process of obtaining closed or open feeding system

a. Dietitian will order either closed or open feeding system on preprinted tube feeding orders Nutrition (TPN, IDPN, Tube Feeds, Diet Orders)
b. At VGH: On Diet Order Fax form indicate closed or open feeding system
c. At GFS: Indicate on the Diet Order PPO closed or open feeding system
d. At UBC: A tube feed order is placed through PCIS Diet order entry by selecting the appropriate delivery system (closed or open)

B. Prevention and Interventions for Potential Problems

1. Aspiration

i. Prevention

- Elevate head of bed (HOB) at least 30 degrees during all enteral feeding and HOB should remain elevated for a minimum of 30 minutes post intermittent feeds
- Give intermittent enteral feeding over a minimum of 45 to 60 minutes every four to six hours or as per dietitian's instructions

- Single maximum volume for gravity enteral feeding should not exceed 500 mL per feeding if using a standard formula and 250 mL per feeding if using a concentrated formula
- Monitor for signs and symptoms of aspiration:
  - auscultating lung sounds at least once per shift
  - checking daily vital signs
  - observe for signs and symptoms of respiratory distress
  - observe for signs of delirium as it may increase the risk of aspiration

ii. Interventions when aspiration is suspected:

- Stop feeding immediately
- Position in high fowlers or sitting as upright as possible based on patient's condition
- Suction patient as required
- Monitor O2 saturations and administer oxygen and/or consult with respiratory therapy as required See Oxygen Therapy: Initiation and Maintenance[D-00-07-30238]
- Notify physician immediately
- Encourage deep breathing and coughing
- **Monitor for pulmonary edema i.e., hypotension, tachypnea, dyspnea, cyanosis, delirium**
- Observe and monitor patient for signs of pulmonary infection (purulent sputum, fever, delirium)

2. Improper Placement or Dislodgement of Tube

i. Prevention- Small Bore (nasal, oral or esophageal insertion)

- The insertion of a small bore feeding tube requires a prescriber (Physician or NP) order.
- Trained Registered Nurses (RNs) and Nurse Practitioners (NPs) who have completed an in-house education and training may insert small bore feeding tube in General nursing and Critical care areas.
- Trained RNs or NPs may insert a small bore feeding tube in patients except those who have or are thought to have any of the diagnoses/conditions listed below:
  - Major neck trauma/surgery
  - Basal skull fractures or extensive skull base surgery
  - Facial trauma
  - Esophageal-gastric or duodenal surgery
  - Esophageal varices or esophageal obstruction
  - Thermal or chemical injury to upper respiratory tract and esophagus
  - Transsphenoidal surgical approaches performed recently (less than a year) e.g. removal of pituitary tumors
  - Nasal Surgeries
  - Significant GI Bleed Elevated ICP
- Consultation between the Physician and appropriate health care team members must occur prior to proceeding with bedside insertion when any of the below **high risk* diagnoses/conditions are present:
  - Coagulopathies
    - INR ≥ 2 or platelet ≤ 50, 000/ mm^3 are associated with increased risk of epistaxis

  - Thrombocytopenia
  - Neutropenia
  - Pharyngeal Disorders related to oropharyngeal cancer, structural abnormalities
  - Presence of an Endotracheal device such as, Tracheostomy
- Identified Gastric Stasis i.e. Gastric residual volume >250ml despite 24hr trial of prokinetic e.g. Maxeran, Erythromycin – (Nasogastric placement)

  *If the risk is assessed to be high post consultation, insertion should be attempted by the Physician or a referral to Radiology should be made.

- X-ray confirmation for correct placement is the gold standard for small bore feeding tube insertions.
- Confirmation of correct placement by X-ray is required prior to use, for all initial placements of small bore feeding tubes.
- ***The following authorized prescribers can read the x-ray to confirm placement of feeding tube prior to initiating tube feeds:*** Staff physician or Radiologist, Radiology Fellow, Critical Care Fellow, ICU Medical Attending, or Trauma Fellow.
- Reinsertion of the stylet into the feeding tube is not permitted while the tube is in situ.
- Bedside insertion of small bore feeding tube requires that an authorized prescriber is available to read the X-ray to confirm correct placement of the tube. It is preferable that tube insertion is only performed when an authorized prescriber is on-site and/or available.
- **Measure** and **record** the length of tubing extending from the insertion site at nares to the end of the tube port.
- This documentation should occur within the Progress notes, Care Plan, Tubes/Drains Flow sheet (as applicable), Tube feed initiation orders (Pre-printed orders) - as applicable, Special Care – Nursing assessment record (as applicable).
- As an ongoing assessment for tube placement:
- Measure length of tubing from the insertion site at nares to the end of the tube port, per shift. Record and compare this length to the actual length measured at the time of insertion to determine displacement. Measurement can be repeated more than once a shift if displacement is suspected.
- Inspection of tube should occur per shift (check mouth - back of throat for coiling)
- Mark the point where the tube enters the nostril with a permanent black marker as needed. This will aid in timely identification of tube displacement/migration.
- **Tube placement should be checked regularly if feeding continuously or before each intermittent feed and/or after vomiting or coughing vigorously or any procedure that could potentially dislodge tube, (e.g. upper endoscopy)**
- If displacement is suspected:
  - Stop feeds immediately if currently infusing
  - Assess patient
  - Contact physician and/or NP
  - Placement X-ray may need to be repeated to rule out displacement of small bore feeding tube

- Do not initiate feeds until proper tube placement is confirmed

Note: No bedside method is 100% reliable for confirming tube placement. Negative results do not replace clinical judgment.

ii. Prevention- Large Bore (nasal, oral insertion)

- For large bore nasogastric tubes (e.g. Salem) there are two methods to confirm proper tube placement:
  - measurement of pH of gastric contents (see Appendix A)
  - visual assessment of aspirated gastric fluid
- Once correct tube tip placement has been confirmed, mark the tube (use waterproof black marker) at the point of entry into the nare
- Measure and record the length of tubing extending from the nose to the outer end of the tube. This is recorded on the tube feed initiation orders and the kardex
- Tube placement should be checked every shift if feeding continuously or before each intermittent feed and/or after vomiting or coughing vigorously or any procedure that could potentially dislodge tube, (e.g. upper endoscopy)
- The following check is required: Inspection of tube (including mouth check for coiling) and measurement of tube for correct length extending from nare

Note: No bedside method is 100% reliable for confirming tube placement. Negative results do not replace clinical judgment.

iii. Prevention- Percutaneous

- With non-established tract (less than 10 days), place occlusive dressing over stoma site and immediately contact physician who inserted tube (should be reinserted by MD as soon as possible and at most 6 hours)
- With well-established tract, RN can insert foley catheter to maintain tract. Do not use for feeding until physician contacted and placement confirmed or new permanent tube inserted

If unable to confirm placement as outlined, or any time placement is questionable, hold feeds and contact physician.

3. Intolerance of Feeds – Prevention/Interventions

- Assess patient tolerance to feeding prior to each intermittent feeding and every 4 hours during continuous feeding until tolerance is well established (tolerating final goal rate for at least 48 hours)
- Monitor for signs and symptoms of intolerance q shift. Signs and symptoms include: nausea, vomiting, abdominal distension, cramps, diarrhea and constipation
- Metabolic symptoms of intolerance include glucose, fluid and electrolyte abnormalities
- Gastric residual volume (GRV) is checked for large bore gastric feeding only, not small bowel feeding (e.g. nasoduodenal, nasojejunal or jejunostomy tubes)
- GRV should be checked in situations where the patient is:

- hemodynamically unstable
- ventilated (acute)
- non-responsive and unable to communicate
- hx gastroparesis or on medications associated with impaired gastric emptying

- Do not check gastric residuals if the patient is eating as food particles may block tube
- When a gastric tube and a post pyloric tube (nasoduodenal ND) are both in position, the gastric tube is for decompression and to be used to assess GRVs. In this situation the GRV is to be discarded

Note: GRV is not a valid indicator of true gastric volume and rate of gastric emptying. It cannot be relied upon solely as an indicator of tolerance.

Note: If GRV check and medications are due at the same time, the GRV check should be done first.

If tube feeding intolerance is suspected, consult Dietitian. To view the GRV Algorithm, see Appendix B: Checking Gastric Residual Volumes for Large Bore Feeding Tubes.

4. Bacterial Contamination

i. Prevention for Closed Feeding System:

- Wash hands prior to preparing closed enteral feeding system formula container
- Remember DO NOT touch port hole or spike of tubing set during spiking
- DO NOT USE closed enteral feeding system formula container if protective cap or foil seal is missing
- Once the closed enteral feeding system is spiked, even if formula is not used, the container must be discarded as there is an increased risk for bacterial contamination or using formula passed 48hr expiry date.
- Remember to label the closed enteral feeding systerm formula container with the date and time when it was hung. Do not have closed enteral feeding system formula container hanging passed the 48hr expiry date
- Change closed enteral feeding system formula container and tubing set every 48hrs or whenever a new formula container is required
- When using feed and flush tubing sets, ensure tap water used for flushing, is changed every 48hrs and when tubing set is changed
- DO NOT REUSE formula container or tubing sets
- Syringes for flushing should be pulled apart and allowed to air dry between uses
- Graduated container (for water) should be emptied and allowed to air dry between uses

ii. Prevention for Open Feeding System:

- Wash hands prior to preparing formula
- Avoid touching the inside of the open enteral feeding system bag
- Pour no more than a 4-hour supply of formula into open enteral feeding system bag and ensure the set is closed
- Label with date and refrigerate opened formula, ensure formula is covered, and dispose of unused formula after 24 hours
- Before use, swab top of can and access ports on feeding tube with alcohol swab and let dry
- When using feed and flush tubing sets, ensure tap water used for flushing is changed every 24hrs and when each tubing set is changed
- If patient is on intermittent feeds, the feeding set should be capped in-between feeds and open enteral feeding system bag should be rinsed with tap water between feeding. This can be done using the enteral feeding pump or manually.
- Change open delivery set (bag, feeding line, syringes, cap, water container) every 24 hours
- If contamination is suspected, discard feeding bag or formula container and tubing set and any open cans of tube feed formula
- Label feeding equipment with current date
- Syringes should be pulled apart and allowed to air dry between uses
- Graduated container (for water) should be emptied and allowed to air dry between uses

5. Decreased Skin Integrity

i. Prevention - Nasogastric Tube:

- Assess tube insertion site, change tape and cleanse skin every 2 days
- Cleanse and lubricate nares with water soluble lubricant every 4 hours and prn
- Provide oral care every 4 hours and prn

ii. Intervention for Skin Breakdown- Newly Inserted Gastrostomy, Jejunostomy Tubes:

- Treat as a surgical wound until healed. Cleanse catheter insertion site daily with normal saline
- Protect skin from leakage i.e. use skin barrier
- If visible signs of skin breakdown are noted, consider changing securement position
- For newly inserted Gastrostomy, Jejunostomy Tubes, report continuous leakage at ostomy site to physician

6. Blocked Feeding Tube

i. Prevention

- The feeding tube should be flushed vigorously with a minimum of 15 - 30 mL of tap water (or as specified by the Dietitian or Physician to meet fluid needs or fluid restrictions).

Flushing can be completed using the enteral feeding pump and the feed and flush tubing sets or by manually flushing with a syringe.

- Flushes should occur:
  - every 4 hours in patients receiving continuous feeds
  - every time the feeds are held (even if just briefly)
  - before and after each intermittent feed
  - before and after medication delivery
  - after aspiration of gastric contents for GRV or pH
  - every 12 hours if tube is not being used

ii. Intervention

- If the tube becomes blocked, try to clear with increased pressure by using a small (6 cc) syringe, warm water and a gentle pumping action
- Do not use products containing sugar (e.g. coke, juice) or hydrogen peroxide
- Follow physician orders for feeding tube occlusion (medication included on pre-printed order). See Appendix C: Instructions for Unclogging Feeding Tubes for instructions on how to use
- Discuss removal or replacement with physician if two attempts to clear the tube have failed and all possible causes of tube occlusion (e.g. kinked tube) have been ruled out

C. Prevention and Interventions for Potential Problems

i. Medication Administration Procedures

To prevent tube occlusion, always:

1. Administer medications separately. Do not mix medications together and do not mix medications with formula as this can cause formula to curdle and clog the feeding tube and may also decrease the effectiveness of the drug
2. Ensure medications are completely dissolved before administering
3. Ensure all medication is administered from cup and syringe
4. Hold the feed while delivering medication and resume feeds as soon as possible
5. **FLUSH the tube vigorously with 15-30 mL water**
   - **Before meds (as soon as feeds held)**
   - **Between consecutive medications**
   - **After meds**
6. Review the medication administration record and consult with the pharmacist and the dietitian if necessary.
7. Coordinate medication dosing time with feeding schedule. Some medications should be taken with meals to prevent gastrointestinal irritation or on an empty stomach to obtain maximum drug efficacy. Contact Pharmacy for detailed information.
8. **Precautions:** Some medications cannot be administered via the feeding tube. Alternatives should be prescribed. Check equivalent liquid dosages. Consult a pharmacist about the safe administration of medications through the feeding tube. See below for specific guidelines:

Medication / Medication Type	Guidelines
Phenytoin	Interacts with the tube feed formula. Consult with the dietitian to adjust the tube feed schedule. The tube feed formula should be stopped 2 hours before the medication dose and restarted 2 hours after in order to minimize interaction with the tube feed formula. Phenytoin suspension should also be diluted with at least equal parts of water and the feeding tube must be flushed with 15-30 mL of water before and after medication administration.
Warfarin	Interacts with vitamin K in the tube feed formula to cause a decreased in effect of warfarin. Monitor the INR closely when starting or discontinuing the tube feed formula.
Tablet dosage form	Crush tablet into a fine powder. Mix powder with 15-60 mL of water. Make sure the tablets are completely dissolved before administration.
Hard gelatin capsules	Capsules that open in the middle should be opened, and the powder dissolved in water as directed by Pharmacy. Hard gelatin capsules that do not have an opening can be accessed by poking a pin-hole in one end and squeezing out the contents.
Liquid forms	Should be avoided when possible as many oral solutions contain large amounts of sorbitol, which can cause osmotic diarrhea. If diarrhea occurs, and the liquid medication contains sorbitol, replace with solid tablet dosage form. Highly concentrated and viscous liquids (i.e. Lactulose, Colace): dilute with 15 to 60 mL of water.
Enteric-coated tablets (e.g. ENTROPHEN, BISACODYL)	Should not be crushed and administered via feeding tube. Crushing impairs the protective effects of the enteric coating.
Long-acting tablets/capsules	Long-acting tablets/capsules should NOT be administered via feeding tube. Crushing the tablets or opening the capsules to insert the beads will impair the long-acting effects and may result in dose-dumping and toxicities.
Bulk forming agents (e.g. METAMUCIL)	Avoid these agents as they quickly congeal when mixed with water. Consult with a dietitian.
Buccal or sublingual medications (e.g. nitroglycerin)	Should not be given via the feeding tube as they are formulated at smaller doses and will lose their effectiveness.

PATIENT/ CLIENT / RESIDENT EDICATION

Available Brochures/Information Booklets: (order through Patient Health Education Materials)

- Gastrostomy Tube (G-Tube): Frequently Asked Questions (Cat # BB.210.G219)
- Making Decisions about Tube Feeding: Patient & Family Information (Cat # BB.210.M289)
- Tube Feeding at Home: A guidebook for patients, families & caregivers (Cat # BB.210.T79)
- Feeding Tube Placement (PEG): Answers to your questions (Cat # BB.210.F32)

Documentation

- Label feeding bag with:
  - Patient Name
  - Formula
  - Date/time bag hung
- **Complete on appropriate record (i.e. Flowsheet, fluid balance sheet, progress notes, kardex).**
  - Time, type, amount and rate of flow of the feeding (for closed system feeding ensure new entry is made for each 1000 or 1500ml container) see: Guideline for 24hr fluid balance record
  - Time, type and amount of flushes
  - Any signs or symptoms observed that indicate intolerance
  - Gastric residual volumes and characteristics
  - Interventions (dressing change) and patient's response

Related Documents

- Tube Feeding: Small Bore Feeding Tube (Entriflex®, Rusch®), insertion of [D-00-12-30336]
- Guideline for 24hr fluid balance record
- Enteral formulary
- Appendix A: Obtaining gastric aspirate to measure the pH of gastric contents
- Appendix B: Checking Gastric Residual Volumes for Large Bore Feeding Tubes
- Appendix C: Instructions for Unclogging Feeding Tubes for instructions on how to use
- Appendix D: Instructions for Using the Closed System Feeding Bottle
- Appendix E: Guidelines for Ordering closed feeding system
- Appendix F: VGH Quick Reference Guide for Kangaroo e-pump
- Appendix G: Drip rate calculations - Gravity feed
- Appendix H: Tubing Set – Decision Support Tool

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Alternate Search Terms

tube feed, tubefeed, tube-feed, tubefeeding, tube feeding, tubefed, GRV, gastric, gastric residual, reefed, nutrition

Appendix A
Obtaining gastric aspirate to measure the pH of gastric contents

Note: Many things can affect gastric pH such as medication therapy or enteral feeding. Check to see if the patient is on any medication(s) that may increase the pH level of the gastric contents (e.g. H2 antagonists, PPI). If the patient is on either of these medications the pH may not be accurate to assess tube tip position. Feeding formula can also affect the pH of gastric contents. The most accurate pH will be from fasting patients (for example, between intermittent feeds).

Obtaining a Gastric Aspirate Sample

1. Perform hand hygiene before patient contact.
2. Verify the correct patient using two identifiers per organization policy.
3. Observe the external portion of the tube for movement of the length mark away from the mouth or naris.
4. Perform hand hygiene and don gloves.
5. Draw back on syringe slowly, and obtain a small amount of gastric aspirate.
6. Observe appearance of aspirate.
7. Perform pH testing as below.
8. Irrigate tube to maintain patency.
9. Discard supplies, remove gloves, and perform hand hygiene.
10. Document the procedure in the patient's record.

If after repeated attempts, fluid cannot be aspirated from a tube that a radiograph confirmed was in the desired position, assume the tube remains correctly placed if:

a. There are no risk factors for tube dislocation.
b. Tube has remained in original taped position.
c. Patient is not experiencing respiratory distress.

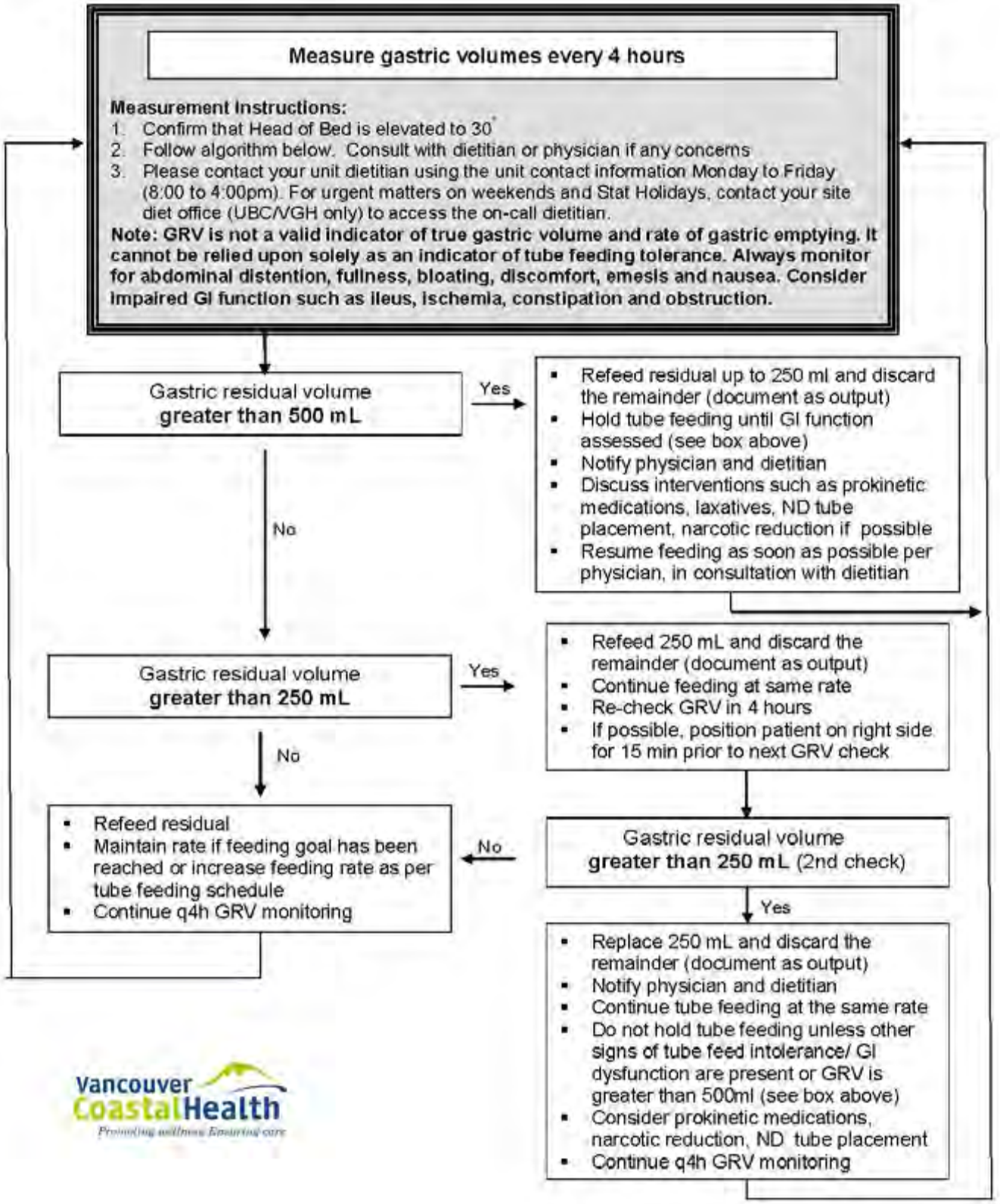
Testing pH of Gastric Aspirate

1. If the patient is receiving continuous tube feeding, test pH of the aspirate during a period when the tube feeding has been turned off.
2. Gently mix aspirate in syringe. Expel a few drops into a clean medicine cup.
3. Dip the pH strip into the aspirate or apply a few drops of aspirate to the strip.
4. Compare the strip color with the colour on the chart provided by the manufacturer.
   a. Gastric fluid from a fasting patient usually has a pH of 4 or less.
   b. Fluid aspirated from a tube in the small intestine of a fasting patient usually has a pH greater than 4
   c. Respiratory secretions have a pH of 5.5 or higher.

Adapted from Perry, A.G., Potter, P.A., Ostendorf, W.R. (2014). *Clinical nursing skills & techniques* (8th ed.). St. Louis: Mosby.

Clinical Review: Vicki M. Ross, RN, PhD, CNSC, September 2015

Appendix B: Checking Gastric Residual Volumes for Large Bore Feeding Tubes



Appendix C
Instructions for Unclogging Feeding Tubes

1. Crush and dissolve one sodium bicarbonate 325 mg tablet in 15 mL tap water.
2. Open one pancrelipase capsule (COTAZYM EQUIV) and empty contents in 15 mL warm tap water.
3. Draw up both sodium bicarbonate and pancrelipase solutions into one small syringe.
4. Wearing a mask and goggles is recommended due to possible splashback.
5. Attach an empty syringe to the feeding tube; then draw back on plunger of syringe to decompress all air and fluid from the feeding tube. Pinch off the tube with your fingers, and discard syringe.
6. Instill pancrelipase/bicarbonate mixture into feeding tube.
7. Clamp the tube (or leave syringe attached to the end of feeding tube); wait 30 minutes.
8. After 30 minutes, flush the tube with 30 mL of tap water.
9. Repeat once if necessary.

Discuss tube replacement with the physician if 2 attempts to clear the tube have failed and other causes of tube occlusion (e.g. kinked tube) have been ruled out.

Instructions for Using the Closed System Feeding Bottle

A 48 hour hang time on all closed system formula containers can be attained if all directions are followed and if the container is spiked with a new spike set (not previously used). The spike set must remain in place until the contents of the container are fully exhausted or by 48 hours. Spike sets are **single use** only.

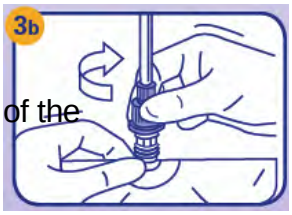
Gather necessary equipment: Formula in container and spike set. Remove the spike set from the package and **close the roller clamp**. Place the set on a clean surface.

LABEL the bottle with patient name, expiration date and time. **SHAKE WELL**.

After shaking well, prepare the bottle for spiking. Remove the protective purple cap. DO NOT TOUCH the open port hole.

If the cap is missing from the container, DO NOT USE.

Prepare the Spike. Remove the protective cap. DO NOT TOUCH THE PIERCING SURFACE OF THE SPIKE.
SPIKE the bottle. Hold container at the base of port. Insert tip of threaded enteral purple spike set.



Turn threaded enteral spike set clockwise until tightly fastened. The container is spiked properly when the shaft spike is not showing and is all the way into the port.

of the

Invert the bottle and **HANG** for feeding. Entire formula contents must be used within 48 hours after the seal has been pierced with the spike set. NOTE: Do not squeeze the bottle to prime the spike set.

Adapted from Nestle Nutrition – Nestle SPIKERIGHT Enteral Closed Systems Instructions for Use October 2011

Appendix E:
Dietitian Guidelines for Ordering the Closed System for Tube Feeding

The closed system is the preferred method of tube feeding whenever possible in both acute care and residential facilities. The products available in the closed feeding system are:

Enteral Product	Volume	Minimum Goal Rate
Isosource HN	1500 mL	30 mL/hr
Isosource HN with fibre	1500 mL	30 mL/hr
Isosource 1.5 Cal	1500 mL	30 mL/hr
Isosource VHP	1000 mL	40 mL/hr
Resource Diabetic	1500 mL	30 mL/hr
Novasource Renal	1000 mL	20 mL/hr
Peptamen 1.5	1000 mL	20 mL/hr

Procedures

Indications for using the closed system:

1. Use the closed system when ***all*** of the following conditions are met:
   a. Formula used is noted above. A mixture of formulas is not being used.
   b. Change in formula type is not expected in the next 48 hours.
   c. Minimum of 1500 mL (or 1000 mL for Isosource VHP, Novasource Renal and Peptamen 1.5) will be needed in 48 hours.
   d. An enteral feeding pump is being used to administer the tube feed.
2. For all other situations, use the open system.

To order the closed system:

1. On the Tube Feeding Orders indicate if the tube feeding is to be provided using the closed or open system by ticking the appropriate box.
2. Diet office communication:
   - VGH: On the Diet Order Fax Form indicate if the tube feed formula is to be provided in the closed or open system.
   - GFS: On the Diet Order PPO indicate if the tube feed formula is to be provided in the closed or open system.
   - UBCH: Use PCIS to place tube feed orders and select Pump – Closed for the Method and Delivery System

Monitor and evaluation

Monitor tolerance and tube feed usage. Follow up and modify feeding as required.

Vancouver Coastal Health

KANGAROO ePUMP
Enteral Feeding Pump

Quick Reference
Operational Guide - VGH

NOTE: The continuous feeding mode is the default mode and should be used for both continuous and intermittent feeding.

Pump OPERATIONS:

A. *Prepare and Load a Feeding Set*

- ❒ **Need 18 inches from the bottom of the bag/bottle to the top of the Pump** for proper formula delivery. Choose the correct feeding system tubing to be used for the patient – Closed or Open; With or Without flushing system
- ❒ **Prepare type of formula ordered** – If using Flush and Feed dual system ensure the water flush is in the correct bag (Tap water is used as flush – unless ordered otherwise)
- ❒ **Turn on the pump**
- ❒ Option to clear settings (new patient) or continue with same settings
- ❒ Open **Blue door** on side of pump
- ❒ **Load tubing:**
  - ❒ Hold "thumb tab" insert into left pocket loading area. Ensure thumb tab is in line with the white line (on the pump)
  - ❒ Wrap counterclockwise around rotor (black wheel)
  - ❒ Load black retainer valve into right pocket **Caution** – DO NOT over stretch the tubing
  - ❒ Close blue door
- ❒ Once tubing is loaded SET LOADED Menu appears – pump is now ready to be programmed

CONTINUOUS feeding mode is the **default** option – is the *mode used for both continuous and intermittent feeds* (set rate per hour and volume to be infused)

B. *Prime the Pump: Feed and Flush or Feed Only*

- ❒ The pump automatically knows which type of tubing has been loaded and main screen will display options available to program pump (if feed only tubing will not display FLUSH option)
- ❒ **PRIME PUMP**. (**Feed and Flush**)
- ❒ **Press** and **Release** PRIME PUMP
  - ❒ Option for Manual Prime and Automatic Prime (**AUTOMATIC** preferred method)
  - ❒ Will prime **Flush First** and then Feed just short of the end of the tubing
  - ❒ Pump screen notification will flash and remind to **disconnect from patient**
  - ❒ When Auto priming done status line will show AUTO PRIME COMPLETE (and will no longer show AUTO PRIME option)
  - ❒ Hold MANUAL prime to complete priming of tubing to the end
  - ❒ Select DONE to return to the main menu

C: Program the Pump: Feed and Flush Mode

- ❒ Select **ADJUST FLUSH** option in opening Menu
  - ❒ Press **FLUSH VOLUME** to define volume per flush
  - ❒ Press arrow buttons ▸ ❙❙❙ to program the flush volume from **10 to 500ml**
  - ❒ Press ENTER to exit
- ❒ Press **FLUSH INTERVAL** to define interval between beginning of each flush
  - ❒ Press arrow buttons ▸ ❙❙❙ to program the time interval from **1 to 24 hours**
  - ❒ Press ENTER to exit
  - ❒ Press DONE to return to main menu
- ❒ Select **ADJUST FEED** option
  - ❒ Press FEED RATE to define the rate of delivery
  - ❒ Press arrow buttons ▸ ❙❙❙ to program the rate from **1 to 400mL/hr1**
  - ❒ Press ENTER to exit
- ❒ Set volume to be delivered (**VTBD**)
  - ❒ Pump will stop and sound alarm when volume delivered
- ❒ Press **ENTER** to exit menu
- ❒ Press **RUN** to start feed
- ❒ On Pump screen will display settings and also total volume of formula delivered during current feeding. If flush mode used will display programmed flush rate and volume delivered

Program FEED ONLY mode: CONTINUOUS FEEDING

- ❒ Select **ADJUST FEED** option I opening menu
  - ❒ Press FEED RATE (1 to 400mL/hr)
  - ❒ Press ENTER to exit
  - ❒ Set volume to be delivered (VTBD)
  - ❒ Press ENTER to exit the menu
  - ❒ Press RUN

ADVANCED FEATURES:

- ❒ **EMPTY** feeding bag/bottle will trigger FEED ERROR to **REPRIME**:
  - ❒ **Disconnect** from patient; Refill Bag;
  - ❒ Press CONTINUE to begin pump running
  - ❒ Press HOLD
  - ❒ Press ADJUST SETTINGS
  - ❒ Hold ▸ arrow to prime line
  - ❒ Once primed reconnect to the patient
- ❒ **ADJUST SETTINGS**:
  - ❒ Select HOLD while pump is running
  - ❒ Select ADJUST SETTINGS – to adjust all settings
  - ❒ Select RUN to return to normal operation
- ❒ **FLUSH NOW**: Immediate "Flush on Demand"
  - ❒ Used for when medications are given and PRN
  - ❒ Press FLUSH NOW in the running menu
  - ❒ Program the Volume to be immediately flushed
  - ❒ Press ENTER to exit the menu. Once flush now complete it will begin feed cycle; if no feed cycle is required the pump will need to be turned off.
    - ❒ **NOTE**: Flush Now will NOT change main periodic flushing program
    - ❒ If pressed by accident will return to main screen after 10 seconds
    - ❒ Flush Now only available in Feed and Flush mode
- ❒ **KEEP TUBE OPEN (KTO)**: when activated used to run rotor very slowly in order to maintain patency of the tube
  - ❒ Press the KTO button (shows on screen a few seconds after the RUN button is pressed)
  - ❒ Program the desired amount of time for KVO 5 to 240 minutes
  - ❒ At the end of programmed time the pump will resume the programmed operation
- ❒ **RESUME IN:** Similar to KTO feature. Allows for inactive time. Select RESUME IN feature and feeding pump will **Pause** the nutrition for a **pre programmed** time of **30 minutes**
  - ❒ To Activate the resume feature:
    - ❒ Press HOLD during the feeding cycle
    - ❒ Select RESUME IN
    - ❒ Pump will show Resume in 30 Minutes
- ❒ **72 Hour HISTORY:** Max 72 hr past history can be retrieved – excluding data from the past hour
  - ❒ Press **MORE** from main menu screen
  - ❒ Press HISTORY
  - ❒ Press arrow buttons to select the time of interest for the History

D: *Locking Pump: On and Off*

- ❑ Hold down third arrow from top on left hand side when in run mode until lock appears
- ❑ To unlock hold down third arrow until lock disappears

Appendix G: Drip Rate calculations – Gravity Feeds

ONLY FOR KANGAROO BAGS

To Give Tube Feed by Gravity (Blue Kangaroo Gravity Bag)

*** 1 mL = 20 drops**

Rate (mL per hour)	Drops per Hour	Drops per Minute	Drops per 10 seconds
125	2500	42	7
175	3500	58	10
200	4000	67	11
225	4500	75	13
250	5000	83	14
275	5500	92	15
300	6000	100	17

Appendix H: Tubing Set – Decision Support Tool

TYPE OF TUBING SET	PATIENT SITUATION
Feed Only	• Continuous low volume flushes are required to reduce the risk of aspiration OR • Continuous free water administration is required OR • Patient will be self- administering flushes OR • Frequent medications that facilitate adequate flushes delivered manually **OR** • When training patients for home tube feeding or when patient will be self-administering flushes"
Feed and Flush	When bolus flushes: • Are considered safe and will not pose any increased risk of aspiration
Gravity	Patient is being fed without access to electronic pumps