Management of Gastrostomy Tube Complications for the Pediatric and Adult Patient

Introduction
Ideally, Gastrostomy Tube (GT) management should not be a problem. However, there may be underlying conditions predisposed to gastrostomy tube complications. Enteral feedings tubes are not all the same. They can be placed by three different methods: surgical; endoscopic or radiologic. Today there are many types of gastrostomy tubes available.

There are three basic types of gastrostomy tubes:

- **Balloon Tip**: This is a tube with a balloon on the distal end, similar to an indwelling urinary catheter. The commercial gastrostomy tubes have an external bumper to stabilize the tube. The initial insertion of this tube requires abdominal surgery. When the PEG tube is removed, it typically is replaced with a balloon tip tube. Foley catheters were not intended for gastrostomy feedings and have a higher rate of complications than a commercial GT.

- **Percutaneous Endoscopic Gastrostomy (PEG)**: This GT is placed by endoscopy, and the tube has an internal bumper secured against the abdominal mucosa and an external bumper to stabilize the tube. This procedure is done under local anesthesia, and no hospitalization is required. Thus procedure has a faster recovery time.

- **Low Profile Gastrostomy Tube**: This is a skin-level tube with either a balloon or mushroom tip. This tube was first introduced for the pediatric patient and known as a “button,” but it is now used in the adult population. The advantage of this tube is there is less chance of it being pulled out, and it is easier to conceal under clothing. This tube is usually placed once the stoma tract has matured, replacing the original GT (See Photo 1 on Page 10).
## Complications/Causes

### Leakage around gastrostomy tube

Possible causes:
- Tube displacement
- Improper balloon inflation
- Using a larger French tube is not indicated for stopping leakage around a small French g-tube since it is rarely effective.
- Inadequate tube stabilization
- Recent weight loss
- Increased abdominal pressure related to:
  - Cough, constipation, hypertonicity/spasticity
  - Presence of granulation tissue/hyperplasia
  - Inability to decompress gastric content (i.e. burp)
  - Delayed gastric motility
  - Body structure changes (spinal stenosis, scoliosis)
- Failure of tract closure related to inadequate wound healing

### Assessment of Leakage
- Assess appropriateness of tube (i.e., low profile for a patient who pulls the tube; gastrostomy tube with a stabilizer vs. using a urinary catheter)
- Assess for persistent cough
- Assess for constipation and/or compliance with bowel program
- Assess the tube, peri-tube skin, and stoma daily for:
  - Leakage – assess color and amount
  - Tube displacement
  - Tube stabilization
- Assess for patient positioning during feeding
- Balloon volume should be checked weekly
Nursing Intervention for leakage
Use proper hand washing technique before and after all nursing interventions.

- If balloon catheter, check tube for proper inflation of balloon
  - Verify tube type and proper amount of fluid in the balloon as recommended by manufacturer
  - Using a syringe attached to the port, pull back the fluid in the balloon. A slip-tip syringe may be necessary for certain low-profile tubes
  - If insufficient fluid is present in the balloon, re-inflate with the correct amount of sterile water
  - Balloon volume should be checked weekly.

- Stabilize the tube
  - Gently pull up on the tube until the internal anchoring device or balloon is against the wall of the stomach
  - Slide the external stabilizer down to rest comfortably on the skin without excess tension
  - If unable to stabilize in this manner or there is no anchoring device, consider the use of an external stabilizing device (See Photo 2 on Page 10)

- Note the manufacturer’s mark on the tube to assess for migration (in or out of the tract). If the tube doesn’t have markings, use tape or an indelible ink marker.
- Verify leakage has ceased
- If leakage cannot be controlled, consider the following:
  - Tube replacement
  - Refer to manufacturer’s directions for sizing
  - Barrier ointment, such as zinc oxide
  - Non-alcohol skin sealant
  - Gauze, alginate, or foam dressings to absorb fluid
  - Do not stack dressings under an external bumper
  - Pouching

Skin Irritation (See Photo 3 on Page 10)
Possible causes:
- Leakage
- Sutures
- Latex sensitivity (if using Foley catheter or latex malecots)
- Pressure (i.e., if bumper is too tight to skin or if button type tube is too short)
- Infection
Assessment of Skin Irritation

Assess the peri-tube skin daily for:
- Maceration from excess moisture
- Denudation from acidity of gastric fluid leakage
- Fungus (candida albicans) from moisture/wet dressings
- Risk of pressure
- Pressure ulcers from bumpers or stabilizers
- Infection
- Skin stripping from adhesive

Nursing Interventions for Skin Irritation

- Topical treatments to consider:
  - Antifungal powder, ointment or barrier (See Fungal Infection)
  - Absorptive powders
  - Zinc based products
  - Non-alcohol skin barrier film
  - Skin barrier wafer
- Cover with dry gauze or non-adhesive foam under stabilizer to wick minor drainage until the skin irritation is resolved. Ensure there is adequate space for the foam dressing below the bumper/stabilizer so the tube is not under excessive tension. Avoid tape if possible.
- Avoid leaving the extension attachment on the low profile tube

Infection

Any invasive procedure increases the risk of infection, particularly in compromised patients.

Possible causes:
- Inadequate stabilization or excessive pressure between the PEG’s external and internal bolsters can increase risk for ulceration and subsequent infection.
- Patients are at increased risk for infection if they are: diabetic, obese, on chronic corticosteroids or immunosuppressed
- Excessive handling and manipulation of tube
Assessment for GT Site Infection
Assess the peri-tube skin daily for:
- Warmth
- Redness
- Induration
- Edema
- Purulent drainage
- Pain

If incision/sutures present, assess for partial or full thickness dehiscence

Nursing Interventions for GT Site Infection
- Communicate findings to primary healthcare provider
- Frequent, daily reassessment
- Treatment recommendations to consider:
  - Antimicrobial absorptive dressings (see Glossary)
  - Absorptive dressing
  - Culture of drainage
  - Antibiotics (systemic)
  - Tube removal

Pressure Ulcers
Possible causes:
- Excess tension of the anchoring device against the skin
- Failure to rotate bumper after initial insertion
- Location of tube in a skin fold
- Excessive dressings under stabilizer
- Weight gain or increased girth
- Sutured bumpers

Assessment of Pressure Ulcer at GT Site
Assess the peri-tube skin beneath the bumper daily for:
- Partial or full thickness breakdown
- Early signs of pressure ulcers include persistent, non-blanchable color change, indentation of bumper at peri-tube skin. Pain that doesn't subside once pressure is relieved
**Nursing Interventions for Pressure Ulcers At GT Site**

- Assure the stabilizer rests comfortably against the skin without excess tension
- Rotate bumper daily
- Avoid bulky dressings under the external bumper
- Consider eliminating the need for the bumper by utilizing a tube anchoring device
- Depending on characteristics of the ulcer, consider the following:
  - Absorptive powder
  - Hydrocolloid
  - Absorptive dressing
- Ask primary care provider if suture removal is an option

**Fungal Infection (Candidiasis)**

Possible causes:
- Trapped moisture at the tube site as a result of drainage or wet dressings
- Hot humid environment
- G-tube is located in deep skin fold
- Diabetes
- Antibiotic therapy
- Immunosuppressed patient

**Assessment for GT Site Fungal Infection**

Assess peri-tube skin daily for:
- Pustule with secondary lesions of papules from abraded pustules and plaque
- Erythema, maceration and pruritus
- Satellite lesions

The definitive diagnostic test for candidiasis is potassium hydroxide (KOH) preparation scraping from an intact pustule.

**Nursing Interventions for GT Site Fungal Infection**

- Reduce predisposing factors:
  - Keep dressing dry
  - Protect the skin from moisture with alcohol-free skin sealants or ointments
  - Moisture, by adjusting heat and humidity
- Refer to primary care provider
- Topical antifungal can be applied twice daily. Continue treatment for two weeks after skin is clear
- Recalcitrant or severe fungal infections may require systemic therapy
**Tube Occlusion**

Possible causes:
- Lack of adequate flushing of tube
- Kinking of tube
- Instilling crushed or powdered meds through the tube
- Small bore tubes, size, design and material of tube
- Formula precipitation in the tube
- Placement in stomach provides higher occlusion risk than duodenal placement (acid environment)
- Formula composition
- Rate of delivery of feeding
- Aspiration to check residue
- Fungal growth in the tube
- Formula coagulation from drug-nutrient interactions

**Assessment for Tube Occlusion**

Assess for:
- Slowing of formula infusion
- Inability of formula or medication administration to flow
- Inability to clear tube with water irrigation
Nursing Interventions for Tube Occlusion

Prevent occlusion by:
- Flushing tube with at least 30 ml of warm water (adults) every four hours during continuous feedings or before and after intermittent feedings
- Use at least 3-5 ml as the flush volume for pediatric patients
- Consult primary care provider for specific flush volumes if patient is on fluid restriction
- Water has been found to be a more effective irrigant than colas or cranberry juice
- When giving medicine by tube, use liquid form when possible. If using tablets, completely crush them to powder (do not use timed release, enteric coated or sustained release medications) and mix with water. If unsure whether a medication can be crushed, check with a pharmacist
- Give only one drug at a time and flush with 5 ml of water between each medication
- Flush the tube (20-30 ml warm/tepid water) before and after instilling medications
- Avoid checking for residual (tubes clog when protein formulas mix with low pH gastric juices) or at least flush tube after checking for residual (with 20-30 ml warm/tepid water)
- Don’t allow formula bags to run dry
- When possible use a less calorically dense formula
- Consider a feeding pump with an automatic water flush feature
- If irritation with water fails to unclog tube, further steps should be taken:
  - Try milking the tube
  - Use of pancreatic enzyme (ex. Viokase) crushed with one tablet of sodium bicarbonate (324mg) dissolved in 5ml of water just prior to injection into blocked tube. Clamp tube (5-15) minutes after instillation. Use 1/8 teaspoon baking soda dissolved in 5ml warm water if pancreatic enzyme is not available. Need order for primary care provider.
  - Consider prophylactic pancreatic enzyme/sodium bicarbonate suspension
  - Refer to primary provider if no results

Please note: need healthcare provider order for all pediatric dosages.

Hyperplasia
(Also known as hypergranulation tissue, proud flesh)
Possible causes:
- Moisture, i.e., drainage, ointment use
- Bacteria
- Occlusive wound dressings may initiate an inflammatory response
- Tube not stabilized
- Ill-fitting low profile GT
- Use of hydrogen peroxide
Assessment for Hyperplasia
Assess peri-tube skin for:
- Growth of excess, moist pink-red tissue protruding from the stoma site
- Often secretes clear, serous, brown exudate
- Tissue may bleed easily
- Pain

Nursing Interventions for Hyperplasia
- Stabilize tube securely to avoid movement
- Dressings to be considered must keep tissue dry, such as polyurethane foam, alginate, hydrofiber, silver antimicrobial
- Silver nitrate applied by an experienced caregiver will inhibit growth of tissue but may not be available (may need more than one application)
- Refer to primary healthcare provider for:
  - Kenalog cream 0.5% tid, 7-10 days
  - Triamcinolone cream 0.5% tid
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Photo 1: Low-Profile Gastrostomy Tube

Photo 2: External Stabilizing Device

Photo 3: Skin Irritation