MEDICATION ADMINISTRATION VIA ENTERAL TUBES

POLICY:

1. A physician's order is required for the administration of any medication via feeding tube.
2. Tablets that must be crushed prior to administration via feeding tube require a specific order related to crushing.

EQUIPMENT AND SUPPLIES:

1. Medication to be administered
2. 60ml syringe with catheter tip (large bore tube) or Luer-Lok tip (small bore tube)
3. Mortar and pestle (recommended) or pill crusher
4. Needle and syringe (if administering soft gelatin capsule)
5. Warm water for dissolving medications (sterile water for irrigation is recommended)[11]
6. Warm water for flushing enteral tube (sterile water for irrigation is recommended[11] but filtered water may also be used)[12]
7. Clamp
8. Stethoscope
9. Gloves and plastic apron

PROCEDURES:

1. Turn off pump to stop continuous feeding 1-2 hours prior to medication administration if medication is associated with an incompatibility or 30 minutes prior to administration if the medication should be given on an empty stomach.
2. Perform hand antisepsis by washing hands with warm water and liquid soap. Put on gloves and a clean disposable plastic apron.
3. Establish the privacy of the resident.
4. Explain the procedure to the resident.
5. Check the Medication Administration Record (MAR) to confirm the order: note the medication, dose, route (tube), frequency, and volume of diluent.
6. Prepare medications for administration:[1, 2, 3, 8]
   a. Crush immediate-release tablets into a fine powder then dissolve in 30ml of warm water, or prescribed amount.
   b. Open immediate-release capsules, crush contents into a fine powder, and dissolve in 30ml of warm water, or prescribed amount.
   c. Aspirate soft gelatin capsules, remove contents using a needle and syringe, and mix with 10-30ml (30ml may be needed if contents are viscous) of warm water, or prescribed amount.
   d. Dilute liquid medications with 10-30ml (30ml may be needed if liquid is viscous) of warm water or enteral formula (if the liquid medication is hyperosmolar and compatible with enteral formulas).
   e. Sustained-release capsules and enteric coated capsules - check with manufacturer (See also - "Specific Product Considerations" on Side Two)
7. Elevate head of bed to 30-45 degrees (semi- or high-Fowler's position).
8. Check for proper tube placement.
9. Check gastric content for residual feeding.
10. If a pump is being used for continuous infusion, turn it off if it hasn't already been (see step #1).
11. Remove plunger from the 60ml syringe and connect syringe to clamped tubing.
12. Put 15-30ml of water in syringe and flush tubing using gravity flow. Clamp tubing after the syringe is empty, allowing water to remain in the tube.
13. Pour dissolved/diluted medication in syringe and unclamp tubing, allowing medication to flow by gravity.
14. Flush tubing with 15-30ml of water, or prescribed amount. (If administering more than one medication, flush with 5ml of water, or prescribed amount, between each medication.) Allow water to remain in tubing.
15. Clamp tubing and detach syringe.
16. Restart continuous feeding, if appropriate. If a medication with incompatibility issues was administered, leave pump off for 1-2 hours after medication administration.

DOCUMENTATION:

1. Medication given, dosage, time and date, route, amount and type of diluent, and amount of flush.
2. Verification of tube placement.
3. Amount of residual gastric content.
4. Resident's response to the procedure.
5. If the resident refused the procedure, the reason(s) why and intervention taken.

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GENERAL GUIDELINES:

1 Preferred Route of Administration

a. Oral administration is always the preferred route.

b. When oral administration is not feasible, consider alternate routes of administration, such as intravenous, rectal, or transdermal.

c. When all other methods of administration are not feasible, administer via enteral tube.

d. Consult as needed with physician and dietitian about adjusting tube feed times and quantities to accommodate medication administration.

2 Dosage Forms for Enteral Administration[1]

Liquid Preparations
Administer liquid medications with proper dilution.

Immediate-Release Tablets
Administer immediate-release tablets after crushing and mixing with water.

Immediate-Release Capsules
Administer immediate-release capsules after crushing capsule contents and mixing with water.

Soft Gelatin Capsules
Administer soft gelatin capsules by aspirating liquid contents and diluting with water.

3 Crushing Medications

a. **Do not crush** enteric coated, sustained-release, enzyme-specific, buccal, or sublingual tablets or capsules.

b. Sustained-release formulations are generally denoted by the following suffixes: CC, CD, CR, ER, LA, SA, SR, XR, XT, XL.

c. Sustained-release products can usually be changed to a therapeutically equivalent short-acting preparation (tablet or liquid) with smaller doses and more frequent administration.

4 Gastrointestinal (GI) Considerations

Hyperosmolar Products

- Side effects such as diarrhea, cramping, abdominal distension, and vomiting may occur following enteral administration of hyperosmolar products
- Reduce severity of these GI effects by diluting hyperosmolar products with 10 to 30 ml of water or enteral formula **(IF COMPATIBLE)**
- Check with a pharmacist before administration for information on compatibility and osmolarities

Sorbitol

- Sides effects such as gas, bloating, cramping, and diarrhea may occur following administration of liquid medications containing sorbitol
- Sorbitol is an osmotic laxative that is commonly used to sweeten solutions or to improve stability
- Check with a pharmacist for information on sorbitol content

5 Compatibility of Medications with Enteral Solutions

a. Enteral feedings may alter the bioavailability of some medications. The most common incompatibility problems are associated with the following medications:

1) quinolone antibiotics **
   - ciprofloxacin (Cipro®)[2, 3]
   - norfloxacin (Noroxin®)[3]
   - ofloxacin (Floxin®)[2]
   - levofloxacin (Levaquin®)[2]
   - moxifloxacin (Avelox®)
2) phenytoin (Dilantin®)[2, 3]
3) warfarin (Coumadin®)[2, 3]
4) carbamazepine suspension (Tegretol® suspension)[3]
5) hydralazine[3]
6) levothyroxine[3]
7) penicillin V potassium[3]
8) theophylline[3]
9) tetracycline[13]

** It is recommended that medications in the quinolone family not be administered via a jejunostomy tube because the duodenum appears to be the predominant site for their absorption.[2]

b. The following medications are considered physically incompatible with enteral formulas because they may precipitate and clog the feeding tube:

1) brompheniramine/phenylephrine elixir (Dimetapp®)[1]
2) calcium glubionate 1.8g/5ml (Neo-Calglucon®)[1]
3) crushed ibuprofen tablets[13]
4) crushed magnesium oxide tablets[13]
5) crushed sodium/potassium phosphate tablets[13]
6) ferrous sulfate 220mg/5ml (Feosol®)[1]
7) guaifenasin 20mg/ml (Robitussin®)[1]
8) hydrochlorothiazide/triamterene (Dyazide®)[13]
9) lithium citrate 8mEq/5ml[1]
10) medium chain triglyceride oil (MCT Oil®)[1]
11) metoclopramide 1mg/ml (Reglan®)[1]
12) opium tincture, camphorated, 0.04% elixir (Paregoric®)[1]
13) potassium chloride 10% liquid, 20% liquid[1]
14) pseudoephedrine 6mg/ml (Sudafed®)[1]
15) sodium biphosphate 480mg/ml (Fleets Phospha Soda®)[1]
16) sucralfate (Carafate®)[3]
17) thioridazine 30mg/ml[1]
18) zinc sulfate capsules[1]
19) aluminum hydroxide[1]

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SPECIFIC PRODUCT CONSIDERATIONS

Sustained-Release Capsules

The pellets inside **SOME** microencapsulated dosage forms may be poured down the feeding tube after being removed from the capsule, provided that the pellets are not crushed. Medications that can be administered in this manner include:[1]

- Avinza®
- Carbatrol®
- Cardizem CD®
- Depakote Sprinkle®
- Effexor XR®
- Kadian®
- pancreatic enzymes (e.g., Creon®, Lipram®, Ultrase®, etc)
- Micro K®
- Slo-bid®
- Tiazac® and Taztia XT®
- Topamax Sprinkle®
- Verelan®, Verelan PM®

Bulk-forming Laxatives

Bulk-forming laxatives, such as methylcellulose (e.g. Citrucel®) or psyllium (e.g. Metamucil®), should **NOT** be administered through feeding tubes. These products form a semisolid mass that may occlude the tube. Sometimes these products can be mixed with 250ml or more of fluid and be administered successfully; however, the resulting solution may still clog feeding tubes.[1]

Proton Pump Inhibitors

For patients who have a nasogastric tube in place, the medications listed below can be administered as follows:

Lansoprazole (Prevacid® Capsule)[6]

1. Open capsule.
2. Mix intact granules with 40ml of apple juice. Do not use other liquids.
3. Inject through the nasogastric tube.
4. Flush with additional apple juice to clear the tube. The fruit juice protects the base-labile granules until they reach the small intestine for absorption.
   Note: It should be noted that Prevacid® packets for oral suspension should not be given through enteral administration tubes.

Lansoprazole (Prevacid® SoluTab™)[6]

1. Place tablet in oral syringe.
2. Draw up 4ml of water for the 15mg tablet or 10ml of water for the 30mg tablet and shake gently to disperse.
3. After tablet has dispersed, inject through the nasogastric tube (greater than or equal to 8 French) within 15 minutes.
4. Refill the syringe with approximately 5ml of water, shake gently, and flush the nasogastric tube.

Proton Pump Inhibitors *(continued)*

Esomeprazole (Nexium®)[7]

1. Open capsule, empty intact granules into a 60ml catheter tipped syringe, and mix with 50ml of water.
2. Replace the plunger and shake for 15 seconds. Use the suspension immediately after preparation. Do not administer the pellets if they have dissolved or disintegrated.
3. Inject through nasogastric tube.
4. After administration, flush the nasogastric tube with additional water.

Omeprazole (Prilosec®)*[9]

1. Open capsule and empty intact granules into a 10ml syringe (with 20-gauge needle in place) from which the plunger has been removed.
2. Replace plunger and uncap needle. Withdraw 10ml of 8.4% sodium bicarbonate solution for 20mg dose or 20ml of sodium bicarbonate solution for 40mg dose.
3. Allow pellets to completely break down (approximately 30 minutes; agitation is helpful). The resultant preparation is partially dissolved and partially suspended. According to study, this preparation maintains >90% potency for 7 days at room temperature.
4. Shake again immediately prior to injecting through the nasogastric tube.
5. Flush with 5-10ml of tap water and clamp nasogastric tube for at least one hour.

Pantoprazole (Protonix® Delayed-Release tablets)*[14]

1. Grind 40 mg tablet into a fine powder with mortar and pestle and transfer to glass container.
2. Rinse mortar and pestle twice with 5ml of 4.2% (0.5 M) sodium bicarbonate solution and add suspension to the glass container
3. Close the container and mix for 10 minutes until a uniform suspension is formed.
4. Transfer suspension to a 20ml polypropylene syringe, rinsing glass container twice with 5ml of 4.2% sodium bicarbonate solution and adding rinse to the syringe.
5. The total volume of the suspension is 20ml with a pantoprazole concentration of 2mg/ml.
6. The suspension should be protected from light and can be used up to 4 hours after preparation.
7. Suspension should be administered via nasogastric tube (size 16 french), followed by a 20ml water flush.

**Although the manufacturer's labeling does not suggest opening the capsules or crushing the tablets, some studies have suggested alternative methods of administering the medications.*

Various liquid formulations have been compounded extemporaneously from sodium bicarbonate solution, with omeprazole or lanzoprazole granules, or crushed pantoprazole tablets. These formulations have a limited shelf life and may adhere to the syringe and tubing used for administration, with the result that the tubing has the potential to become clogged.[15]

QUESTIONS AND ANSWERS: *(continued on side four)*

How do I deal with a clogged feeding tube?[5]

1. Check for kinks in the tubing.
2. Withdraw any enteral solution remaining in tube.
3. Attempt to remove obstruction, using the following methods in the order given:*
   a. **Warm Water Method:** Inject 5ml of warm water into tube and clamp for 15 minutes. Flush with water until clear. If still obstructed, try alkalinized enzyme method.
   b. **Alkalinized Enzyme Method:** Crush one sodium bicarbonate 324mg tablet. Mix powder with contents of one Cotazym® or Viokase® capsule and 5ml sterile water. Inject alkalinized enzyme mixture into tube and clamp for 5 minutes. Flush with water until clear.
4. If steps 1-3 have been followed and response is inadequate, have a qualified individual assess the need for replacement of the feeding tube.[1]

**Cranberry juice should not be used to unclog a feeding tube*

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QUESTIONS AND ANSWERS *(continued)*

Should I flush with water between each medication?

Medication administration guidelines from the Centers for Medicare and Medicaid Services (CMS) suggest flushing the enteral tube before and after the administration of medications through the tube. Tag F-333, Section 483.25(m) of the CMS Intrepretive Guidelines specifically states,

"Flush the enteral feeding tube with at least 30ml of preferably warm water before and after medications are administered. While it is noted that some facility policies ideally adopt flushing the tube after each individual medication is given, as opposed to after the group of multiple medications is given, unless there are known compatibility problems between medicines being mixed together, a minimum of one flushing before and after giving the medications is all the surveyor need review. There may be cases where flushing with 30ml after each single medication is given may overload an individual with fluid, raising the risk of discomfort or stress on body functions. Failure to flush, before and after, would be counted as one medication error and would be included in the calculation for medication errors..."

For years, the standard recommendation has been to administer medicines individually and flush between each one. The reason for this recommendation is to ensure that medicines do not interact as they are being administered. When five, ten, or more medications are administered at one time, the potential for interactions does exist. While there is little research on compatibility of medications when administered by the enteral route, some medications have been shown to be incompatible with enteral solutions.

As mentioned in the CMS Interpretive Guidelines, one potential risk of flushing between each medication is the risk of fluid overload. Some residents with renal or heart disease need to have their intake of fluid restricted. In these individuals, the volume of water needed to flush between each medicine could be potentially harmful. However, it is important to note that within this cautionary statement from CMS, it also suggests using 30ml flushes between each medication. This differs from the current standard of practice, which is 5ml flushes.[3] Therefore, the risk of fluid overload might not be as significant when considering this reduced fluid volume.

Another problem is that flushing between each medication can be extremely time-consuming. The administration of medicines to a single resident could take 20 to 40 minutes if this approach is used. If the facility has several residents with feeding tubes, staffing limitations may present an obstacle to following this approach on a routine basis.

What is the answer? There isn't a clear answer. In practice, professional judgment should be exercised to determine the best approach when special circumstances arise.

What are the main characteristics of the various types of feeding tubes?

i Nasogastric (NG tube)

- for short-term use (less than 6 weeks)
- used in patients with functional GI tract
- small size increases potential for tube blockages

ii Nasoduodenal or Nasojejunal

- for short-term use
- used in patients with functional GI tract
- may be used postoperatively following gastric surgery
- cannot be used for intermittent/bolus feedings
- longer than NG tube

iii Gastrostomy (PEG tube; G-tube)

- surgically or laparoscopically placed tube
- for long-term use
- directly into stomach
- used in patients with functional GI tract
- frequently used for patients with swallowing difficulties secondary to neurologic disease, brain injury, etc.
- often has side port for medication administration

iv Jejunostomy (PEJ tube; J-tube)

- requires surgical placement in the jejunum
- commonly used for long-term use, but can be used short-term after GI tract surgery
- used in patients at risk for aspiration and for patients whose GI tracts are compromised above the jejunum
- higher risk for tube blockages with this type of tube due to its smaller diameter[4]

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