

PALLIATIVE PEARLS

BY ENCLARA PHARMACIA

Medication Administration via Feeding Tube May 2017

Patient Case

RD is a 55-year-old woman with a primary diagnosis of ovarian cancer with peritoneal carcinomatosis. She has a history of well controlled epilepsy, GERD and HTN. She has no drug allergies. A jejunostomy tube (J-tube) was placed while RD was hospitalized approximately 1 month ago for complications of bowel obstruction from her cancer. RD lives at home with her husband and 3 children, two of whom are away at college. RD would like to continue j-tube feedings, as she hopes to see her son graduate high school in two months.

Current medications:

- Acetaminophen 20mL (650mg) VJT every 4 hours as needed for mild to moderate pain or temp > 99.5°F
- Acetaminophen 650mg PR every 4 hours as needed for mild to moderate pain or temp > 99.5°F
- Bisacodyl 10mg supp PR every 3rd day as needed for constipation
- Hyoscyamine 0.125mg/mL – 1mL SL every 4 hours as needed for excess secretions
- Levetiracetam 100mg/mL oral solution – 5mL (500mg) VJT twice daily for seizures
- Lorazepam 2mg/mL conc soln 0.25mL SL every 4 hours as needed for anxiety
- Metoprolol 25mg VJT twice daily for blood pressure
- Milk of magnesia 30mL VJT daily as needed for constipation
- Morphine 20mg/mL 0.5mL (10mg) SL every 2 hours as needed for severe pain
- Omeprazole 20mg cap dissolved in 10mL sodium bicarbonate 8.4% VJT daily for reflux
- Prochlorperazine 25mg supp PR every 12 hours as needed for nausea and vomiting
- Continuous tube feeding with Jevity 1.2 Cal – interrupted at 8am and 8pm for medication administration

RD has a history of 3-4 loose stools per day for the past week. She has abdominal cramps but no nausea/vomiting and is afebrile. Her stool is negative for *C. difficile*. Ten days ago, her tube feeding formula was changed to one with more fiber after RD noted that her stools were hard to pass. She and her family are reviewing other formulas that may provide a better balance of fiber and are requesting a medication remedy for the diarrhea in the short term. They wonder if they could use Pepto Bismol® (bismuth subsalicylate) suspension as they have some in the home.

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What are some key terms and considerations of enteral tubes?¹⁻⁵

- Enteral feeding tube size:
 - Small bore (5-12 Fr) – Liquid medications ONLY
 - Large bore (≥ 14 Fr)
- Insertion site and tip location
 - Oro – inserted via mouth
 - Orogastric (OG) – terminates in the stomach
 - Naso - Inserted via nose
 - Nasogastric (NG) – terminates in the stomach
 - Nasoduodenal (or post pyloric) – terminates in the duodenum
 - Nasojejunal (NJ) – terminates in the jejunum
 - Percutaneous - via abdominal wall and commonly placed endoscopically. A permanent tract (stoma) forms after 3 weeks at the site of insertion.
 - Gastrostomy (G-tube) – inserted into stomach with termination in stomach
 - i.e., percutaneous endoscopic gastrostomy (PEG) tube
 - Jejunostomy (J-tube) – inserted into jejunum with termination in jejunum
 - i.e., percutaneous endoscopic jejunostomy (PEJ) tube, percutaneous endoscopic gastrojejunostomy (PEGJ) tube
- Function of tube
 - Enteral nutrition – may be used for medication administration
 - Aspiration or drainage – NOT suitable for medication administration
- Enteral nutrition delivery method: Continuous or bolus?
 - If continuous, the feeding will need to be stopped for medication administration. If patient receives bolus feeding, medication administration will need to be timed in between feedings.

WHY IS IT IMPORTANT TO KNOW THE FEEDING TERMINATION SITE BEFORE ADMINISTERING MEDICATIONS?

The stomach is an acidic environment where food is mixed with enzymes to continue the breakdown process initiated by the mouth. Food is then passed through the small intestines via peristalsis where it is mixed with secretions from the pancreas, gallbladder and liver. The duodenum is largely responsible for the continuous breaking-down process while the jejunum and ileum are responsible for absorption of nutrients. The large intestines (cecum, colon, rectum, anus) is responsible for processing waste and facilitation of emptying bowels.⁶

Administer meds via the oral route whenever feasible. Medications for oral administration (to be swallowed) are designed with the intent of traveling to each site in the GI tract. Some may require the acidic environment of the stomach to be effective (i.e., antacids, bismuth, sucralfate) and others may be absorbed mainly in the duodenum (i.e., quinolone antibiotics) instead of the jejunum and the ileum.^{2,3,5}

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Bypassing one of these organs with a J-tube, for example, could potentially alter effectiveness, making it important to understand individual medication properties.

WHAT ARE SOME OTHER MEDICATION ADMINISTRATION CONSIDERATIONS?¹⁻⁷

- Reference drug monographs for administration guidance regarding food. Should a specific time interval be allowed before and/or after administering the drug? (i.e., levothyroxine must be administered on an empty stomach)
- Medications should NOT be added to enteral feed for administration.
 - Drug-nutrient interactions may occur with continuous enteral feeding.
 - Considering holding tube feeding for a least one to two hours before and after medication administration if drug absorption may be affected.
- When several medications are being given at the same time, each one should be administered separately. Flush tube with at least 5-10mL of water between medications.
- **Liquid preparations**
 - **Solutions (preferred)**
 - Suspensions – granules may be too large or suspension too viscous to pass through the feeding tube
 - Syrups – greater than 10 grams of sorbitol per day can cause gas and bloating and > 15 grams daily will cause diarrhea. In addition, these dosage forms will clump when water is added and may clog tube – avoid if possible.³
- **Solid dosage forms that disintegrate**
 - **Soluble tablets (preferred)** – dissolve completely in water
 - Effervescent tablets – dissolve completely in water but may require large water volume
 - Dispersible tablets – will disintegrate in water to give particles or granules that may be too large for administration via small-bore tubes
 - Orodispersible tablets – designed to disperse on the tongue. Administration via tube varies, depending on medicine – some formulations are not suitable for small-bore tubes
 - Buccal/sublingual tablets – NOT suitable for administration via enteral feeding tubes. Designed to be absorbed through the oral mucosa and bypass first-pass metabolism of the liver. They are useful alternatives for patients that are NPO or unable to swallow.
 - Compressed tablets – immediate-release, non-coated. Most tablets in this form will dissolve in water without crushing beforehand. Consider crushing tablets as a last resort because a portion of the drug will be lost in transfer or dispersed in the air.
- **Solid dosage forms that do NOT disintegrate (immediate-release ONLY)**
 - Make sure the tablets can be crushed⁸
 - Make sure capsules contain powder (and not granules) and can be opened. Granules increase risk of tube clogging.
- **Enteric-coated tablets**
 - This form is NOT suitable for administration via enteral feeding tubes. Enteric-coating is added to tablets to prevent degradation from the stomach's acid. This coating would

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need to be removed prior to administration which increases risk of drug lost and decreases dose of drug delivered. Additionally, there is increased risk of tube clogging if medication is administered with coating intact whether crushed or not crushed.

- **Extended-release formulations**

- As a general rule, these forms should NOT be administered via enteral feeding tube.
- Some capsule formulations contain microencapsulated pellets. These capsules may be opened and pellet contents left intact (NOT crushed) and administered with adequate flushing.³ Note there is still an increased risk of medication sticking to the tube and/or tube clogging. Check with a pharmacist prior to administration.
 - Medications with microencapsulated pellets include potassium chloride extended-release capsules and Kadian® (morphine extended-release) capsules
 - **Solutions for injection**
- This dosage form varies widely depending on the properties of the individual medication. With bioavailability unknown in the majority of cases, cost constraints compared to oral forms, and risks with confusion on intended route, they are generally not recommended.
 - Acetylcysteine, vancomycin and vitamin K solutions for injection are examples of medications that ARE commonly used for enteral administration.³

- **General administration guidelines:**

1. For continuous feeds, stop the enteral feed
2. Flush tube with 10-30mL of water
 - For all solutions, dilute with up to 30mL. Some undiluted solutions are hyperosmolar and thus pull water into the GI tract to balance the osmolality – this causes bloating, cramping and/or diarrhea.³
 - For suspensions, shake the medication bottle thoroughly
 - For effervescent tablets, add tablet to appropriate size container with suitable quantity of water to allow effervescence without spillage
 - For soluble, dispersible, orodispersible and compressed tablets, remove oral syringe plunger and place tablet in the barrel of the syringe, then replace the plunger. Draw 10mL water into syringe and allow the tablet to dissolve, shake as needed.
 - For immediate-release tablets that do NOT disintegrate, use a mortar and pestle to crush tablet(s) into a fine powder. Add 5mL water to crush further to form a paste. Add 5-10mL more water and continue to mix paste to form a suspension
 - For immediate-release capsules containing powder, open capsule into an appropriate size container and add water to dissolve. Mix and add additional water to form a suspension.
3. Administer medication via feeding tube
4. Flush tube with 10-30mL of water
5. For continuous feeds, re-start the feed unless a specific time interval is needed after the administration of the drug

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Pharmacist Assessment:

- Bismuth subsalicylate (Pepto Bismol®) needs to be in the acidic environment of the stomach to go through hydrolysis into bismuth oxychloride and salicylic acid and may have reduced bioavailability when this site is bypassed via J-tube administration.
- Loperamide (Imodium®) is a more practical option. Therapeutic response is not affected by jejunal administration and loperamide is available as an oral solution and suspension. Even in suspension form, loperamide is not viscous and draws into a syringe and flushes down small-bore tubes without resistance and mixes well with water.

Recommendations:

- Advise caregivers that Pepto Bismol® will not be as effective for RD as other anti-diarrhea medications because the J-tube bypasses the stomach
- Loperamide is a suitable alternative and is available in an oral solution over-the-counter and is effectively administered via a J-tube
 - Loperamide 1mg/5mL oral solution; 10mL (2mg) VJT now, then 10mL VJT after each unformed stool, not to exceed 8 doses (16mg) per day.

For additional information on this topic, please review these references:

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