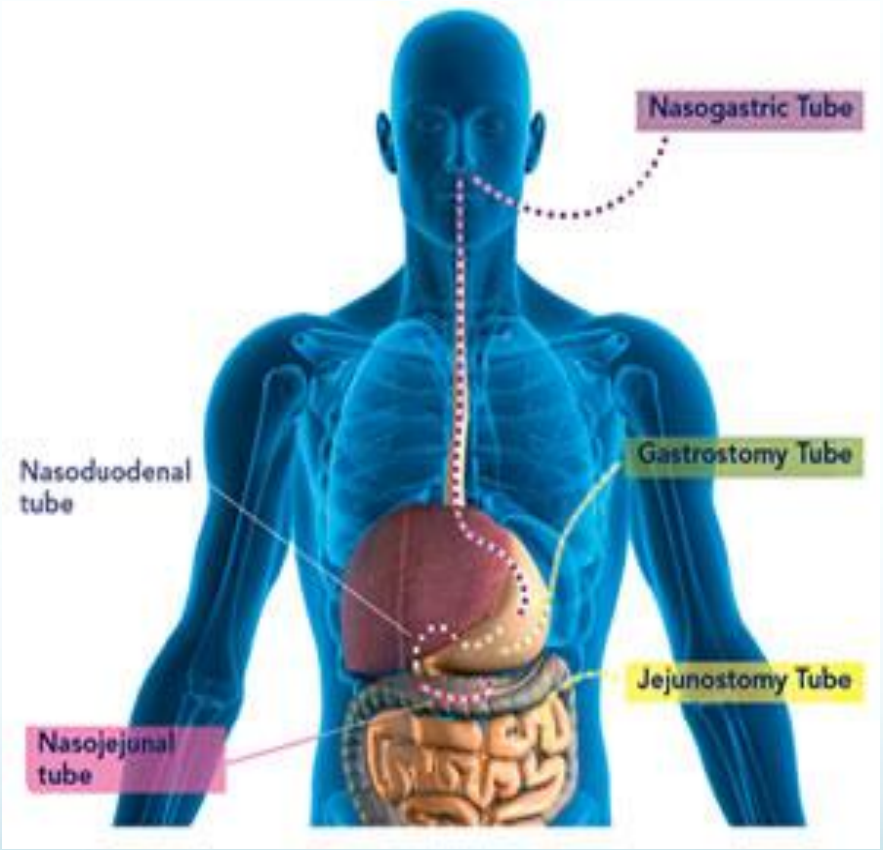
Medication administration via enteral feeding tubes

Tom Richardson
Clinical Pharmacist – The Alfred Hospital

Types of feeding tubes



Characteristics and diameter

- External diameter expressed using French (Fr) unit
- Each Fr = 0.33mm
- Compositions:
  - Polyvinylchloride (PVC)
  - Polyurethane (PUR)- **Preferred option**
  - Silicone
  - Latex

Softer and more flexible than PUR- need thicker walls → smaller diameter

How is it decided on which type to use?

- Intended duration of feeding
- Part of GI tract feeds need to be delivered to
- Short to medium term (days to weeks)
  - Nasoenteric (Nasogastric/ Nasojejunal)
- Long term (months to years)
  - Ostomy

Implications for drug administration

- Site of drug delivery
  - Most drugs absorbed in the jejunum
  - Drug absorption may be reduced due to pH (alkaline environment) or delivery beyond site of absorption
- Function of enteral tube
  - Aspiration/free drainage
- Multilumen tubes

Issues

- Use of enteral feeding tubes for drug administration is increasing but size of tubes are decreasing (for patient comfort and acceptability)→ Blockages
- Crushing medications for enteral administration is considered “off-label” ie. You are liable NOT the drug company.
- Interactions

What causes tube occlusion?

- Feed precipitation
- Stagnant feed in the tube
- Contaminated feed- Can lead to precipitation
- **Incorrect drug administration**
- Feeding tube properties

Common Culprits

- **Creon (Pancreatic Lipases)**
  - Pellets become sticky in fluid
    - may stick to fine bore tubes
- Recommendations:
  - Use granule formulation
    - (smaller pellets)
  - Suitable for >10 French tubes
  - Acidic fluids such as ‘nectar-like’ fruit juices reduce pellet clumping

Common Culprits

- **Proton Pump Inhibitors (PPIs)**
  - Crushing inactivates PPIs
    - Give granule formulation
    - Some PPIs are present in pellets within tablets and can be dispersed – Eg Omeprazole, Lansoprazole
- Recommendations:
  - Granules to be used in 16 french or larger
  - Granules have reduced absorption with food/feeds
    - Wait 30 mins post dose before restarting feeds
  - Use Lansoprazole orally disintegrating tablets if possible

Tackling the issues- Blockages

- Flushing of tubes should occur:
  - Before and after each intermittent feed
  - Every 4-6 hours during continuous feeding
  - Before and after each drug administration

- Why?
  - To help prevent interactions between the feed and drug administered.
  - Prevent blockages

How to flush meds

1. Appropriate drug formulation
2. Stop/suspend the enteral feed
3. Flush before & after each drug administration(15-30mls of water)
4. Rinse tablet crusher/containers, and/or draw up water into the syringe used and flush this down tube.
5. One medication at a time
7. If more than one medicine is to be administered –flush between drugs with at least 10ml of water to ensure that the drug is cleared from the tube.
8. Restart feed unless a specific time interval is needed
9. Document water flushes if applicable

Tackling the issues- Interactions

- Drug –tube interactions
- Drug –nutrient interaction (if no break in feed)
- Drug-drug interactions (if > one drug given at a time)

Drug interactions

- Chemical interaction
  - drugs and feeds bind e.g. ciprofloxacin, doxycycline
- Physiological interaction
  - Feeds affect the absorption mechanism of drugs
- Physical interaction
  - drug and feed formulation interaction can cause change in feed consistency leading to blockage of feeding tube

Ciprofloxacin

- Interaction well established-absorption reduced by 50% with enteral feeds (e.g. Pulmocare, Ensure, Jevity, Osmolite)
- Ciprofloxacin binds to divalent ions in feeds (Fe, Ca, Mg)
- Recommendation:
  - Adjust feeding times – Intermittent feeding
  - Monitor outcome closely, recommended upper end of dosing to be used

Drug- nutrient interaction examples

- **Levodopa**- Absorption decreased by high protein diet.
  - Levodopa is transported across the lumen by the phenylalanine transporter

    → Leads to fluctuations of disease control
  - Dispersible IR tablets available
  - Apomorphine infusion where no other alternative

Warfarin

- Variable vitamin K content in enteral feed can result in fluctuation of INR until dosing regimen is stabilised
- Evidence of physiological interaction between enteral feed and warfarin
- Recommendations:
  - **Monitor INR closely during and on discontinuation or alteration of feed**
  - All tablets can be crushed or dispersed in water
  - Administer prescribed dose via tube, rinse dosing apparatus and give via tube
  - Where possible give during break in feed

Carbamazepine

- Enteral feeding may decrease absorption of carbamazepine liquid preparation
- Carbamazepine liquid may adhere (absorb) to feeding tube, however dilution may prevent this
- May decrease serum drug levels =>monitor
- Recommendation:
  - Dilute with equal volume of water
  - If administering greater that 400mg /day divide into 4 equal doses
  - **Liquid contains sorbitol- beware of adverse effects such as diarrhoea**

Phenytoin

- Interaction with enteral feeds (Bauer et al 1982)
- Viscous suspension
- May decrease serum drug levels (70% reduction e.g Jevity,Isocal)
- Stop enteral feeding 2 hours before and after phenytoin administration
- Recommendation:
  - Flush before & after dose administeration
  - Liquid preparation is the preferred formulation
  - Adjust dose according to the drug levels, may require higher doses

Choosing medication formulations

YES	NO
Solutions (most appropriate)	Enteric coated products
Dispersible tablets	Modified release preparations (MR, SR ,XR ,LA, CR)
Effervescent tablets	Teratogenic or Cytotoxic drugs
Suspensions- granular and non-granular	Hormone products, prostaglandin products, steroids, antibiotics
Immediate release tablets	Buccal & sublingual preparations

Alternative routes

- Transdermal e.g. GTN, HRT
- Parenteral/injectable –not always long term option
- Sublingual or buccal e.g. GTN, NRT
- Orodispersible tablets e.g. olanazapine, lansoprazole
- Rectal e.g. suppositories for pain relief (paracetamol), enemas (melsalazine)
- Intranasal e.g. sumatriptan for migraine

Pharmacist responsibilities

- Review need for medication administration via feeding tubes
- Review appropriateness of formulations
  - Dose equivalence, interactions, handling precautions
  - Use of references

- Monitor for increase/decrease in effect
- Annotate chart- nurse should not administer drug until this is done

Thank you