Administration of Medications via Enteral Feeding Tubes

Derina Byrne
Senior Pharmacist, MUH
2nd May 2019

Enteral feeding tubes

- Provides convenient access to the GI tract and therefore frequently used for medication administration in patients who cannot swallow safely (unlicensed route)

- For patients unable to take oral medications, first consider
  - necessity of drug therapy
  - alternative routes of drug delivery

Alternative administration routes

Route	Limitations
Transdermal	Limited Availability
Sublingual or buccal	Mouth injuries, decreased mental status, dry mouth, excessive salivation, vomiting
Rectal	Undesirable, uncomfortable
Parenteral routes	More costly, inconvenient, painful, requires trained staff, increase potential for infections/other complications

Complications

- Interactions between drug and diet
- Interactions of several drugs administered simultaneously
- Inactivation of medicine or substantial changes in its strength of action
- Clogging of tube by fragments of solid dosage forms
- Exposure of patients to complications resulting from supply of medicines to wrong GI location
- Exposure of HCP to directly toxic effects of active substance released from pharmaceutical drug form

Feeding tube: Size and Placement Site

- Size
  - Small bore
  - Large bore

- Placement Site

Importance of Placement Site

- Drug action
  - Most oral medications absorbed in small intestine
  - For some medication, the stomach is the target for drug action and absorption e.g. Antacids, sucralfate, bismuth
- Drugs with extensive first-pass metabolism
  - Administered into jejenum
  - Increased absorption
  - Greater systemic effects
- Antibacterials/antifungals e.g. Flagyl
  - Decreased bioavailability via intestinal feeding tube
  - Require gastric acidity for optimal absorption
  - Environment less acidic as feeding tube tip moves further down GI
- Bypassing stomach
  - May result in incomplete drug absorption as stomach aids in medication disintegration and dissolution e.g. iron

Dosage form selection

- Liquid preparations
  - Preferred formulations
  - Readily absorbed
  - Less likely to cause tube occlusions
  - Elixirs/suspensions over syrups (less clumping)

Cautions – liquid formulations

- Adjustments in dosage and frequency may be required when switching formulations
- Large volumes – intolerability
- Hyperosmolar/large sorbitol content
  - Not directly into small intestine
  - Dilute with 10-30mls water
- High Viscosity
  - Dilute with equal volume of water to reduce resistance
- Some not suitable for enteral administration
  - Sucralfate suspension (bezoar formation)

Sorbitol content of liquid medications commonly used

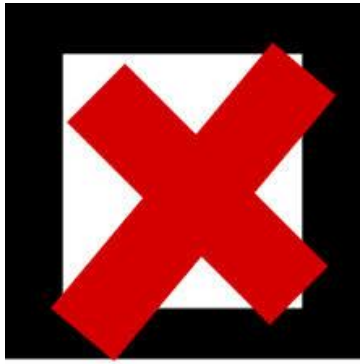
Generic	Proprietary name	Dose per day (approx)
Aciclovir	Zovirax (200mg/5ml)	11 – 45g
	Zovirax (400mg/5ml)	5 - 23g
Baclofen	Lioresal 5mg/ml	8 – 55g
Carbamazepine	Tegretol 100mg/5ml	1 – 25g
Co-danthromer	Codalax	1 – 2g
Co-danthromer Forte	Codalax Forte	1g
Cotrimoxazole	Septrin paediatric 240mg/5ml	13 – 39g
Domperidone	Motilium 5mg/5ml	7 – 30g
Erythromycin	250mg/5ml	4 - -19g
Itraconazole	Sporanox 50mg/5ml	1 – 6g
Ondansetron	Zofran 4mg/5ml	6 – 18g
Paracetamol	Calpol 6 plus 250mg/5ml	4 – 17g
Potassium	K-Cee-l 7.5%	4 – 20g
Ranitidine	Zantac 75mg/5ml	1 – 4g
Valproate sodium	Epilim liquid 200mg/5ml	2 – 9g

Solid Dosage Forms

- Dispersible/disintegrating/soluble tab 
- Most sugar, film-coated are immediate release products and may be crushed
  - Crush tablet to fine powder and mix well
- Hard gelatin capsules (except modified release): Opened and contents diluted in water
- Soft gelatin capsules – more challenging
  - Dissolve capsule in 15-30mls warm water
  - Remove undissolved gelatin before administration

Dosage forms not appropriate for enteral tube administration

- Enteric coated products
- Buccal or sublingual products
- Carcinogenic, Teratogenic, Cytotoxic medications
- Extended-release formulations e.g. SR, MR, LA, XL, XR, Retard, Prolonged release, Chrono, Continus etc (some exceptions)



DO NOT ADD MEDICATIONS TO ENTERAL FORMULA!

Drug-Feed Interactions
Feeding Breaks

- As a general rule, drugs recommended for administration on an empty stomach, should not be given at same time as enteral feed.

- Feeds may need to be stopped 1-2 hours before and/or after administration.

Drug and Enteral Feed Interactions*

Drug	Advice
Doxycycline (dispersible tablets only)	Stop feed 1 hour before dose. Restart feed 2 hours after dose.
Flucloxacillin	Stop feed 1 hour before dose. Restart feed 1-2 hours after dose.
Isoniazid	Stop feed 1 hour before dose. Restart feed 1 hour after dose.
Some antifungals (ketoconazole liquid, itraconazole)	Depends on formulation
Lansoprazole	Stop feed 1 hour before dose. Restart feed 1 hour after dose.
Lithium	Stop feed 1 hour before dose. Restart feed 2 hours after dose.
Metronidazole (liquid)	Stop feed 1 hour before dose. Restart feed 1 hour after dose.
Montelukast	Stop feed 2 hours before dose. Restart feed 1 hour after dose.
Phenytoin	Use IV route if possible. Stop feed 2 hours before dose. Restart feed 2 hours after dose.
Rifampicin	Stop feed 1 hour before dose. Restart feed 1 hour after dose.
Theophylline	Stop feed 1 hour before dose. Restart feed 2 hours after dose.
Warfarin	Stop feed 1-2 hours before dose. Restart feed 1-2 hour after dose.

STOP THE FEED

Flush the tube with 30ml* of water

Leave a feeding break if recommended for a particular drug

Aspirate 0.5-1ml of stomach contents and test with pH strips.
If pH is ≤ 5.5, then flush tube with 10ml sterile water.
Administer medication in accordance with recommendations

If pH is > 5.5 then wait 20 minutes, aspirate again and check pH again.
If after 3 attempts, each with a 20 minute interval, the pH remains at > 5.5 then contact the team for guidance.

Administer each medication separately as recommended, flush with 10ml sterile water each time.

Finally flush the tube through with 30ml sterile water

Leave a feeding break if necessary.

Re-start the feed.

**Smaller volumes may be appropriate in certain patients (15 – 30mls).*

Blocked tubes and Medication

- Precipitation of diet with drug of acidic pH
- Inadequate flushing
- Using wrong formulation of medication
- Improper drug administration (tabs not crushed properly)
- Viscous medication
- Granular content of medication e.g. omeprazole capsules

Tube occlusion/blockage

- 1. Flush tube regularly and if necessary try to unblock with tepid water (using a repeated push and pull method with a 50ml syringe over 10mins)

- 2. Milk" the tube, i.e. squeeze the tube between your fingers, working from base to end of tube.

- 3. Try flushing with carbonated water.
  NB: Do not use other fizzy drinks or fruit juices as their low pH can cause the feed to clump which could cause the blockage to worsen.

- 4. If this is not successful, pancreatic enzymes e.g Creon can be used (once prescribed).

- Open 1 capsule of Creon 10,000 & mix with 10ml vial of 8.4% Sodium Bicarbonate solution (prescribed). Allow mixture to sit for 15mins, then stir & use immediately. Syringe this mixture into the feeding tube and clamp the tube.

- OR (CREST Guidelines 2004):
- Pancreatic enzyme solution:
  - Contents of 3 capsules of Creon® + Mix with
  - ½ teaspoon Sodium Bicarbonate 20mls water
  - Flush the tube with this solution and leave in place for 30 minutes
- Flush with 50mls sterile water

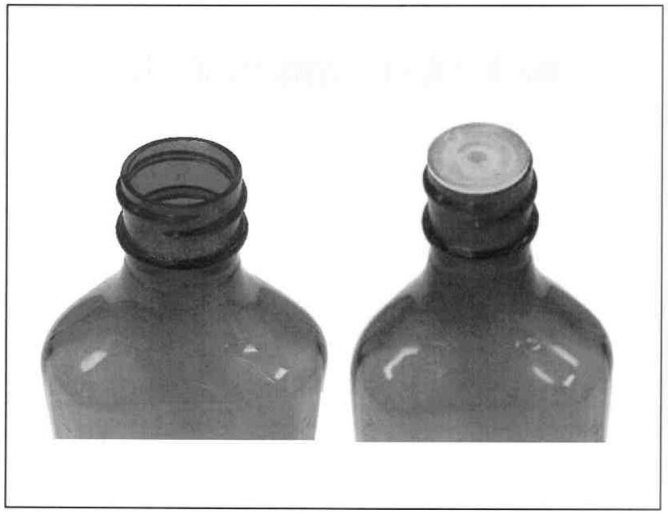
DO NOT USE COCA-COLA, JUICE OR OTHER SUGARY FIZZY DRINKS TO UNBLOCK!

Administration of medications using ENFit products

- ASPEN guidance (2016)
- May need bottle caps/medicine straws to aid administration

Administering Medications

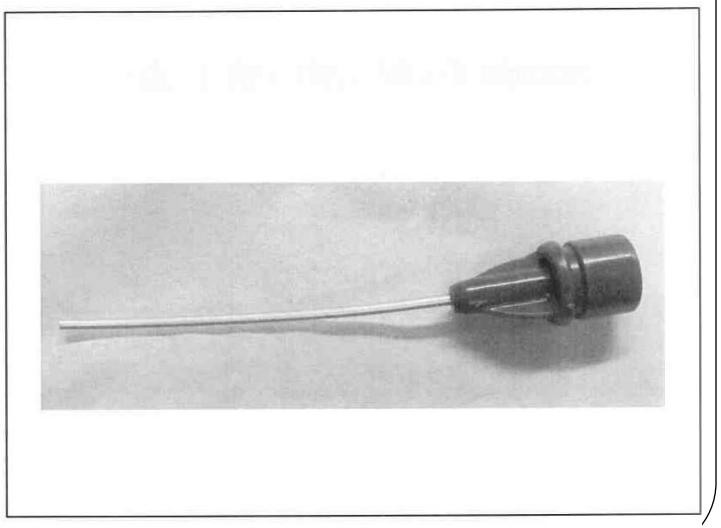
- Medication bottle should have ENFit compatible fill cap
- With ENFit fill cap attached, connect ENFit syringe
- Gently turn medication bottle upside down
- Gentle but quick motion, pull & push back syringe plunger to cycle it once or more (eliminates air bubbles)
- Pull plunger back to withdraw desired dose
- Return bottle to upright position & remove syringe



- If ENFit bottle cap does not fit medication bottle, fill syringe using medication straw (pictured)
- Connect ENFit compatible end of medication straw to medication syringe, insert straw into medication bottle through opening
- Position straw in bottle and draw up desired dose
- Take straw off syringe and gently tap to remove any medication
- When using ENFit medication straw [illegible] bubbles in syringe (air bubbles from [illegible] end of syringe). Carefully tap or flick [illegible] air

  bubbles before removing medication

  syringe to remove air bubbles



Special Cases
Phenytoin

- Liquid preparation preferred
- Interaction with feed – absorption can be reduced by up to 70%, reducing serum levels
- Stop enteral feed 2 hours before and after administration
- Dilute with same volume of water
  - Minimise adsorption to tubing
  - Improves tolerance
- Monitor plasma concentrations, larger doses usually required
- Jejunal administration
  - Not recommended as drug less effective
  - Absorption very poor
  - Hyperosmolar (diarrhoea)
  - If unavoidable: monitor plasma levels closely

Warfarin

- Challenges
  - ? altered response due to vitamin K content of feed
  - ? warfarin highly protein bound, may bind to proteins in enteral formulas
- Hold feed 1-2 hours before & after dose if possible
- Closely monitor INR/PT
- Dose may need to be increased OR
- Switch to another anticoagulant e.g. LMWH
- If switching back to oral: dose reduction

Proton Pump Inhibitors

- Challenging
- Medications: acid labile, inactivated by gastric acid
- Specially formulated to maintain integrity until delivery to alkaline pH of duodenum where absorption occurs

PPIs:
Large bore NG/Gastrostomy

- Lansoprazole
  - Zoton FasTab® licensed for admin via a naso-gastric tube
    - Dispersed in 10 mL of water; granules settle quickly but can be drawn into a syringe & administered via **8Fr NG tube** without blockage
- Esomeprazole
  - Nexium® licensed for administration via gastric tube
  - Detailed instructions (next slide)
- Omeprazole
  - Consider alternative licensed preparations

Nexium® via gastric tube

1. Put tablet into syringe with approximately 25-50 ml water & ~5 ml air.
2. Shake syringe to disperse tablet
3. Check tip has not clogged & attach syringe to tube with **tip up** position
4. Shake the syringe & position it with the tip pointing down. Immediately inject 5–10 ml into tube. Invert syringe after injection & shake (the syringe must be held with tip pointing up to avoid). Repeat until empty
5. Wash down any sediment

PPIs:
Small bore NG/Gastrostomy

- Omeprazole/Lansoprazole capsules
  - Oral alkaline suspension prepared
  - Dissolve intact enteric coated granules in sodium bicarbonate 8.4%
  - Simplified suspension
  - Prevents drug degradation from stomach acid by raising gastric pH
  - Less likely to cause tube occlusions

- Omeprazole Liquid

Metronidazole

- **Site of absorption (oral administration)**
- *Flagyl Tablets*
  - Metronidazole (base) is readily absorbed; bioavailability approaches 100%. Peak plasma concentrations occur 1–2 hours post dose.
- *Flagyl Syrup*
  - Metronidazole benzoate is hydrolysed in the stomach and has approximately 80% bioavailability, which is reduced by the presence of food; hence the recommendation to take before food.

Metronidazole contd.

- When possible use the intravenous or rectal route.
- Intragastric administration: use liquid preparation.
- Jejunal administration:
  - In theory tablets should be used
  - However last resort &
  - Alternative antibiotic therapy should be considered.

Key Points

- Use alternative routes if possible
- Do not administer medication while enteral feeding in progress
- Some medications require a feeding break
- Never mix medications together before or during administration
- Always flush feeding tube before and after each medicine
- Know your drug, its interactions and absorption site
- **Consult** with pharmacist/dietitian as needed

Where to find information?

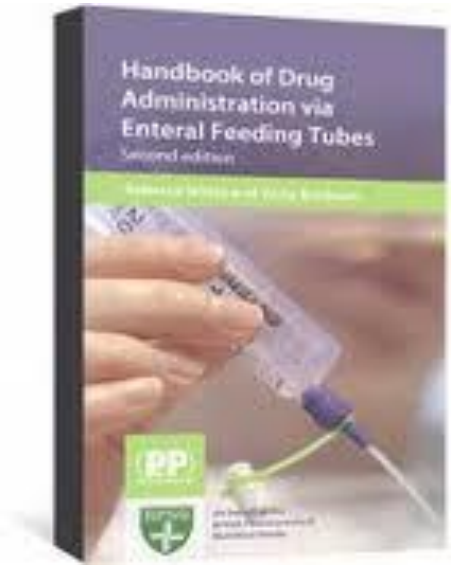
- Pharmacists (hospital, community)
- Local hospital pharmacy department guidelines
- Handbook of Drug Administration via Enteral Feeding Tubes
- NEWT Guidelines

For those in MUH...

- Electronic Reference

  “Handbook of Drug Administration via Enteral Feeding Tubes”

- Available by accessing
  - My Computer
  - Shared (\\NASDER1) (H:) Drive
  - Website Links
  - Medicines Complete



References

- Handbook of Drug Administration via Enteral Feeding Tubes, Pharmaceutical Press 2nd edition
- The NEWT Guidelines, 2nd edition, May 2010
- Nutrition Guidelines for Adult Patients, Mercy University Hospital, 2012
- Drug administration via enteral feeding tubes in intensive therapy, Anaesthesiology Intensive Therapy 2014, vol 46
- CREST Guidelines for the management of enteral tube feeding in adults, April 2004

References contd.

- Medication administration through enteral feeding tubes, Nancy Toedter Williams, Am J Health Sys Pharm. 2008;65(24)
- The administration of drugs via enteral feeding tubes, Nursing Times, Nov 2013, Vol 99 No 46