

## **1. Introduction**

- 1.1 The purpose of this guideline is to highlight possible drug and enteral feed interactions, advise when a break should be provided in an enteral feeding regimen to allow effective drug administration and allow the MDT to work effectively together to avoid drug nutrient interactions that may cause the medication to be ineffective.
- 1.2 A drug nutrient interaction has been defined as one that causes a 20% change in the pharmacodynamics or pharmacokinetics of the medication (Lingtak-Neander, 2013).
- 1.3 It is the responsibility of the Dietitians along with other MDT members to highlight these interactions. The Dietitian can then make appropriate adjustments to the patients enteral feeding plan.
- 1.4 There are 4 types of reactions:
  - i) Chemical interaction, binding the drug and reducing its absorption.
  - ii) Physical interaction between the drug formulation and the feed formulation, causing a change in the feed consistency and potentially resulting in blockage of the feeding tube.
  - iii) Interaction between the drug and a specific nutrient involved in the metabolism of that drug which can cause loss of drug effect due to impaired absorption, increased drug clearance or blocking of pharmacological action.
  - iv) Interaction with the feeding tube itself which can reduce plasma concentration of the drug compared to oral administration.

## **2. Scope**

This guideline is for dietitians to refer to when reviewing patients on an enteral feed and medications. It may also be useful of other members of the Multidisciplinary Team (MDT).

## **3. Recommendations Standards and Procedural Statements**

General points to consider when a patient is on an enteral feed and requires medications that may interact with it.

- 3.1 Will nurses be able to realistically implement the number of recommended breaks?
- 3.2 Will the number of breaks limit your ability to meet the patient's full nutritional needs?
- 3.3 Will the number of breaks lead to higher feed rates and will that impact feed tolerance?
- 3.4 Liaise with pharmacy and medical team to review drug necessity (de-prescribe where possible), medication preparations, administration routes, timings or correct monitoring of the therapeutic effect.
- 3.5 Drugs with enteric coating should not be crushed to go down a tube as the enteric coating is designed to protect the medication. Slow release drugs should not be crushed as these are intended to be released over a long period of time. Cytotoxic and hormone medications should not be crushed due to risk to the administrator.
- 3.6 Ensure that nurses are flushing the feeding tubes adequately before, between and after medications to minimise tube blocking. Please refer to Enteral Feeding Tube Administration in Adults Policy and Procedures (B30/2019)
- 3.7 Potential drug and enteral feed interactions will be documented on the enteral feeding regimen, and in the dietetic medical note entry. Verbal handover will be given to

nursing staff and added to nerve centre where appropriate. Long term plans are to include a flagging system on EMEDS.

- 3.8 Table one contains a list of possible drugs that may interact with enteral feeds. This list is not exhaustive. Enteral feed and drug interactions should be considered if a medication is not providing expected results. Liaise with Pharmacist for more information. The information has been taken from 3 main sources and where there is conflicting information, the longest break period has been recommended.

**Table one. Medications that require an enteral feed break**

Name of Medication	Interaction	Administration	Additional information and action required
Anti-retroviral (HIV) Dolutegravir Emtricitabine Tenofovir Elvitegravir Raltegravir	Dolutegravir interacts with feed and medications containing polyvalent cations: calcium, iron, zinc magnesium  Elvitegravir and Raltegravir interact with medications and feeds containing polyvalent cations: calcium, iron, zinc magnesium.	Dolutegravir Emtricitabine Tenofovir Elvitegravir  6 hour break pre drug administration and 2 hours break post administration  Elvitegravir and Raltegravir:  4 hour break pre and post drug administration.	Consider overnight feeding if long breaks from feeding are required. Always discuss with ward pharmacist if patient has HIV as many anti-retroviral medications can interact with enteral feeds. This list is not exhaustive.  HIV medications may also interact with oral nutritional supplements and timings of these may also need to be considered.
Bisphosphonates: Risedronate Alendronic acid  (osteoporosis)	Feed/food reduces absorption	2 hour break in feeding pre and post drug administration.	
Carbamazepine  (seizures)	Interacts with enteral feeding tube (polyvinyl tube). Some studies have shown a reduction in plasma concentration of the drug when compared with oral administration.	2 hour break in feeding pre and post drug administration, if therapeutic levels of carbamazepine are not reached.  Appropriate dilution of drug with sterile water to minimise the interactions.	Medical team to check bloods levels of the drug regularly. If short term carbamazepine is required a suppository is recommended. Dietitians to raise awareness of impact of starting or stopping an enteral feed may have on

			carbamazepine levels.
Digoxin (Atrial fibrillation)	Affected by high fibre intake. Changes in enteral fibre content can have an effect on drug's narrow therapeutic window.	If patient requires a fibre feed: 2 hour feeding break pre drug administration and 1 hour break post drug administration. No break required in a non-fibre containing feed.	Ensure the medical team are made aware – blood levels need to be checked regularly. Changing to a lower fibre feed can could cause a rise in the therapeutic level
Itraconazole Voriconazole (Antifungal)	Requires stomach pH to be as acidic as possible for absorption.	2 hour break in feeding pre and post drug administration.	No problems with fluconazole.
Levothyroxine (Hypothyroidism)	Interacts with calcium and iron in enteral feeds; interacts with the feeding tube. Most likely to have reduced therapeutic levels with jejunostomy feeds.	Usually prescribed in the morning at 06.00 therefore consider if need 1 hour feeding break pre and post drug administration.	This is not time critical and will be applicable to patients receiving feeds for more than 5-7 days. Suggest to medical team that thyroid function may require monitoring in long term patients on enteral feeds.
Penicillin Flucloxacillin (Antimicrobial)	The peak plasma levels of phenoxymethylpenicillin and flucloxacillin are affected by the presence of food. Best given on an empty stomach. Amoxicillin is unaffected.	1 hour break in feeding pre and post drug administration.	No problems with amoxicillin. Penicillin and flucloxacillin are dosed QDS and so the number of breaks may be impractical. Speak with medical team or pharmacist to consider different antibiotic or different preparation.
Phenytoin (Seizures)	Phenytoin reacts with the enteral feeding tube itself and the protein in the feed. This reduces drug absorption and consequent plasma concentration	2 hour break in feeding pre and post drug administration (oral or enteral dose).	Not applicable if prescribed intravenously (IV).  Discuss with Pharmacist the ability to reduce frequency or alter timings of administration

<p>Quinolones: Ciprofloxacin Levofloxacin Ofloxacin Moxifloxacin</p> <p>(Antibiotics)</p>	<p>Bioavailability can be decreased when administered via jejunostomy and absorption is reduced a further 25% if administered with continuous enteral feed. It binds with ions in the feed to produce insoluble chelates.</p>	<p>2 hour break in feeding pre and post drug administration Discuss with nurses that they are flushing feeding tube thoroughly before and after drug administration.</p>	<p>Advise medical team to consider doses at the higher end of the dosage range if on enteral feed and medical team to liaise with microbiology/pharmacy about this.</p>
<p>Rifampicin Isoniazid</p> <p>(Antibacterial)</p>	<p>Interact with carbohydrate in enteral feed and reduce plasma levels.</p>	<p>Rifampicin: 2 hour break in feeding pre drug administration and 30 minute break in feeding post administration. Isoniazid: 1 hour break in feeding pre and post drug administration.</p>	
<p>Tetracycline</p> <p>(Antibacterial)</p>	<p>Absorption is decreased by 80% with enteral feeding as they bind to calcium, iron and magnesium. These ions are present in higher concentrations in enteral feed than regular diet.</p>	<p>2 hour break in feeding pre and post drug administration. Medical team and pharmacist to consider a different medication.</p>	<p>Other drugs in this group do not have this affect so other options may be available.</p>
<p>Trimethoprim</p> <p>(Antimicrobial)</p>	<p>Reduced absorption when administered alongside enteral feed.</p>	<p>1 hour break in feeding pre and post drug administration.</p>	<p>Break length not specified in references.</p>
<p>Tacrolimus Azathioprine</p> <p>(Immunosuppressants)</p>	<p>Enteral feed/food reduces absorption.</p>	<p>2 hour break in feeding pre and 1 hour break post drug administration.</p>	<p>Consider in long term feeding whether feed break is required.</p>
<p>Warfarin (vitamin K antagonist)</p>	<p>High levels of vitamin K in enteral feeds which may cause variation in the INR. Warfarin also binds to protein, reducing drug absorption.</p>	<p>Consider holding enteral feed for 1 hour before and 1 hour after administration.</p>	<p>Highlight to medical team so that INR can be closely monitored.</p>

**Table two. Enteral medications that should require therapeutic levels to be checked or may block the tube.**

<b>Name of Medication</b>	<b>Interaction</b>	<b>Administration</b>	<b>Additional information and action required</b>
Digoxin (Atrial fibrillation)	This is affected by high fibre intake. Changes in enteral fibre content can have an effect on drug's narrow therapeutic window.	If patient requires a fibre feed: 2 hour break in feeding pre and 1 hour post drug administration. No break required in a non- fibre containing feed.	Ensure the medical team are made aware of alterations to fibre content of feed – blood levels need to be checked regularly. Changing to a lower fibre feed can could cause a rise in the therapeutic level.
Levodopa (sinemet/madopar)  (Parkinson's Disease)	Protein in the feed and blood stream competes with the drug for absorption and transport into the brain.	Higher drug dose or break in feed may be required. Timing of the breaks should be consistent to reduce variations in plasma levels set time in liaison with pharmacist/ medical team.	Dietitian to raise awareness to medical team if protein levels alter within enteral feed.
Potassium supplementation (sandoK, Kay-c-Lee)  (Hypokalaemia)	Potassium can physically react with enteral feed or with tube itself, thus leading to tube blockage if the supplement has not been sufficiently diluted before administration.	Ensure tube is flushed well by Nurses.	
Theophylline (bronchodilator)	Narrow therapeutic index. A diet high in protein and low in carbohydrate can induce hepatic metabolism and reduce bioavailability of the drug.	Close therapeutic monitoring, especially if changes made to enteral regimen.	Highlight any changes to enteral feed protein content to prescriber.

**Table three. Drugs not recommended for administration via enteral tube**

Name of medication	Reaction	Action required
Mucogel Gaviscon Peptac Maalox (Antacid)	Metal ions in the antacids bind protein in the enteral feed which can block the tube.	Highlight to pharmacist and medical teams that patient on enteral feed, so that an alternative can be considered.
Sucralfate (gastro protective complex)	Combines with enteral feed and forms an insoluble complex which can cause tube blockage.	Administration not recommended.

#### **4. Education and Training**

All staff groups highlighted above will need to be made aware of the guideline through team meetings and global dietetic email. No formal training will be required.

#### **5. Monitoring Compliance**

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Datix	Number of datixes related to drug and feed interactions	Dietetic Managers and Pharmacy managers	Monthly	Via team meetings and emails

#### **5. Supporting References**

Boullata J.I (2019) Guidebook on Enteral Medication Administration. ASPEN

The Newt Guidelines for administration of medication to patients with enteral feeding tubes or swallowing difficulties. Access via pharmacy on [www.newtguidelines.com](http://www.newtguidelines.com) (password required).

Lingtak-Neander, C., (2013). Drug-Nutrient Interactions. *Journal of Parenteral and Enteral Nutrition*, pp. 450-459.

White, R. & Bradnam, V., 2018. Drug, enteral feeding, tube feeding, drug administration Handbook of Drug Nutrient Interactions. [www.medicinescomplete.com](http://www.medicinescomplete.com) ed. London: Pharmaceutical Press.

CONTACT AND REVIEW DETAILS	
<b>Guideline Lead (Name and Title)</b> Moirra Dawson	<b>Executive Lead: Chief Nurse</b>
<b>Details of Changes made during review:</b> <b>Included additional medications:</b> Emtricitabine, Tenofovir and Tacrolimus. Re wording of the administration section to improve consistency and clarity. Updated in new format.	