

Guidelines For The Administration Of Medicines To Adults Via Enteral Tubes Within NHS Grampian

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Executive Sign-Off

This document has been endorsed by the Director of Pharmacy and Medicines Management

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Responsibilities for implementation:

Organisational: Chief Executive and Management Teams
Corporate: Senior Managers
Departmental: Heads of Service/Clinical Leads
Area: Line Managers
Hospital/Interface services: Assistant General Managers and Group Clinical Directors
Operational Management Unit: Unit Operational Managers

Policy statement: It is the responsibility of all staff to ensure that they are working to the most up to date and relevant policies, protocols procedures.

Review: This policy will be reviewed in three years or sooner if current treatment recommendations change.

Responsibilities for review of this document: Lead Pharmacist, Grampian Medicines Information Centre

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Responsibilities for disseminating document as per distribution list: Lead Pharmacist, Grampian Medicines Information Centre

Revision History:

Revision Date	Previous Revision Date	Summary of Changes (Descriptive summary of the changes made)	Changes Marked* (Identify page numbers and section heading)
February 2020	August 2017	Added the following monographs/presentations: Aciclovir Duloxetine Edoxaban Gabapentin oral solution Levetiracetam granules Mirabegron Morphine MST sachets Rifampicin Simvastatin oral suspension Sodium feredetate Ticagrelor orodispersible	Page 3 Page 12 Page 13 Page 16 Page 18 Page 22 Page 23 Page 31 Page 32 Page 32 Page 34
		Significant changes to the following monographs: Calcium and vitamin D Citalopram oral drops Co-beneldopa Loperamide Nitrofurantoin Pancreatin	Page 6 Page 8 Page 9 Page 19 Page 24 Page 26

* Changes marked should detail the section(s) of the document that have been amended, i.e. page number and section heading.

Guidelines For The Administration Of Medicines To Adults Via Enteral Tubes Within NHS Grampian

When the oral route is not available, patients may need to be fed and administered medicines through an enteral tube. Tubes may terminate in the stomach or the jejunum, and they may enter via the nose or through the abdominal wall. It is usually possible to give medicines via these enteral tubes, but it can be difficult to find guidance on the best approach. Important considerations include the diameter of the tube (and therefore risk of blockage), the suitability of the formulation used, whether the stability of the medication might be affected by the acid environment of the stomach, or whether absorption might be affected by bypassing the stomach in the case of jejunal tubes.

This document has been produced based on the most up-to-date information available. Specific factors relating to an individual patient may dictate a different approach. This document is not a substitute for professional clinical judgement. Where there are any concerns or individual patient advice is required please contact the Grampian Medicines Information Centre on 01224 552316. Please be aware the administration of medication to patients with enteral feeding tubes can be problematic and information can at times be lacking. In the first instance, the ongoing need for the medication should be reviewed by the prescriber.

The crushing and/or dispersing of tablets or the opening of capsules is rarely covered by the licence and licensed routes of administration should be explored in the first instance. However there may be no other option for some patients, and these cases should be discussed with the pharmacy team. Only prescribers can authorise the unlicensed use of medicines. Authorisation by the prescriber (ideally in writing) should be obtained prior to any adjustment in how an oral dosage is administered.

General recommendations for drug administration via enteral tubes:

- Use enteral syringes at all times, not injection syringes.
- For tubes terminating in the stomach, tap water is acceptable. For tubes terminating in the jejunum, sterile water should be used.
- Stop feed and/or flush enteral tube with 15-30mL of water prior to drug administration.
- Ensure the patient is sitting up at an angle of at least 30 degrees to avoid reflux of medication or water.
- Give medication via enteral tube as directed by the guidance within the table.
- If more than one medicine is being administered, flush with at least 10mL of water between each medication.
- After administration of the last medication, flush tube well with 15-30mL of water after the dose.
- Restart feed if a prolonged break in feed is not advised.

Practical advice for patient/carer/healthcare professional administering medicines:

- Do not crush modified release preparations. These might be indicated by 'MR', 'SR' or 'XL' after the brand name. If you are not certain, confirm with Pharmacy.
- Ensure protective equipment such as gloves and masks are worn when crushing tablets.
- Particular care must be taken to avoid exposure to antimicrobial, cytotoxic, steroid or hormonal preparations in the crushed/powder form. If you are unsure of the nature of a medicine, check with pharmacy.

If a tablet can be dispersed, this would ideally be carried out in a closed system, such as the barrel of an enteral syringe. To do this, remove the plunger and place the tablet in the barrel of a 50mL enteral syringe. Replace the plunger and draw up 10-15mL of water. Cap the syringe and allow the tablet to disperse, agitating if necessary. Shake well, remove the cap and administer the dose via the feeding tube. Flush with water as usual, and dispose of the syringe.

MHRA Advice - Epilepsy

Switching between different brands of an Anti-Epileptic Drug (AED) may risk exposing the patient to adverse effects or loss of seizure control. This risk is different for different AEDs. AEDs have been divided into three categories to help minimise the risks around medication changes. **This advice relates only when the medicine is prescribed for epilepsy and not for other conditions such as mood stabilisation or neuropathic pain.** Information on each category can be found via the link below:

<https://www.gov.uk/drug-safety-update/antiepileptic-drugs-updated-advice-on-switching-between-different-manufacturers-products>

When managing patients with enteral tubes it may not be possible to maintain the patient on their previous preparation due to the need to change to an appropriate formulation. However, all product switches should be carried out with care and close monitoring, with the patient and prescriber fully informed. Where possible, patients should be maintained from then onwards on a single manufacturer's product.

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Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
A				
Aciclovir	Dispersible tablets (preferred)	Disperse tablet in at least 50mL of water.	A prolonged break in feeding is not required before/after administration.	Flush well before and after use. If administered via a jejunal tube, there may be reduced absorption. Use a dose at the high end of the range and monitor for lack of effect. The liquid is viscous and may contain sorbitol or mannitol depending on the brand used. Tablets may be preferred, especially for intrajejunal administration.
	Suspension	Suspension can be given undiluted.		
Allopurinol	Tablets	Disperse in water and administer immediately. The 300mg tablets may take longer to disperse, so these should be crushed prior to dispersing.	Give immediately after feed has stopped or paused; it is better tolerated after food.	If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
Amiodarone	Tablets	Crush and disperse in 15-30mL of water. Tablets may disperse in 5 minutes without crushing. Give immediately following preparation.	A prolonged break in feeding is not required before/after administration.	Monitor the patient closely for re-emerging signs and symptoms or arrhythmias as enteral administration may reduce serum amiodarone levels. Note that reduced absorption may take many weeks to impact on response. Can also be administered via jejunal tube.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Amitriptyline	Oral Solution	Solution can be administered undiluted.	A prolonged break in feeding is not required before/after administration.	Absorption may be decreased by high fibre feeds. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Tablets	Crush and disperse in water. Crush well to ensure film coating is broken up sufficiently.		
Amlodipine	Oral Solution	Solution can be administered undiluted.	A prolonged break in feeding is not required before/after administration.	The Rosemont liquid is licensed for NG or PEG administration and should be used if available. Give immediately as amlodipine is light sensitive. Tablet dispersion should be used for intrajejunal administration, and monitor for loss of efficacy or increased side effects.
	Tablets	Crush and disperse in water. Many brands will disperse easily without crushing.		
Amoxicillin	Oral Syrup/ Suspension	Dilute with an equal volume of water prior to administration.	A prolonged break in feeding is not required before/after administration.	Flush well. Can also be administered via jejunal tube.
Apixaban	Tablets	Crush and disperse in water. Manufacturer recommends a volume of 60mL.	A prolonged break in feeding is not required before/after administration.	Flush well. Tablets are licensed for administration via a nasogastric tube. There is no data for intrajejunal administration, although no theoretical concerns. Monitor response.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Aspirin	Dispersible Tablets	Disperse in water.	A prolonged break in feeding is not required before/after administration.	Can also be administered via jejunal tube.
Atenolol	Oral Syrup	The syrup can be administered undiluted.	A prolonged break in feeding is not required before/after administration.	Give immediately as syrup is light sensitive. Ensure tablets are crushed well as they are film coated. Atenolol can also be administered via jejunal tube using either of the above methods.
	Tablets	Crush and disperse in 10-15mL of water.		
Atorvastatin	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration.	Give immediately as tablets are light sensitive. Flush well. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
B				
Baclofen	Liquid	The liquid can be diluted with water to aid administration.	A prolonged break in feeding is not required before/after administration.	The liquid contains sorbitol, which may cause diarrhoea at high doses. Use tablets for intrajejunal administration.
	Tablets	Disperse in water.		
Bendroflumethiazide	Tablets	Disperse in water.	A prolonged break in feeding is not required before/after administration.	Can also be administered via jejunal tube.
Bisoprolol	Consider switching to atenolol syrup.		A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Tablets	Crush finely and disperse with 15-30mL of water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information	
Bumetanide	Liquid	Solution can be administered undiluted.	A prolonged break in feeding is not required before/after administration.	For intrajejunal use, consider dilution of the liquid formulation immediately prior to administration to reduce osmolarity. Monitor for loss of efficacy or increased side effects.	
	Tablets	Crush and disperse with water.			
C					
Calcium					
	Cacit	Effervescent tablets	A prolonged break in feeding is not required before/after administration.	Flush well as calcium may bind to phosphate in feeds. Can also be administered via jejunal tube.	
	Calcichew	Chewable tablets			Disperse in water.
Calcium and Vitamin D					
			A prolonged break in feeding is not required before/after administration.	Flush well as calcium may bind to phosphate in feeds. Can also be administered via jejunal tube.	
	Cacit D3 (400mg calcium + 440iu colecalciferol)	Effervescent granules			Disperse in water.
	Calcichew D3 (500mg calcium + 200iu colecalciferol)	Chewable tablets			Disperse in 10mL of water.
	Calcichew D3 Forte (500mg calcium + 400iu colecalciferol)	Chewable tablets			
Candesartan	Tablets	Crush and disperse with water.	A prolonged break in feeding is not required before/after administration.	There is no information available on intrajejunal administration. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.	

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Carbamazepine	Liquid	Dilute with an equal volume of water.	A prolonged break in feeding is not required before/after administration, but give in a consistent manner. An alteration in carbamazepine absorption should be considered in any patient who commences or discontinues enteral feeds. Drug level monitoring should be carried out as necessary.	400mg modified release (MR) twice daily is equivalent to 200mg liquid four times daily. If administered via jejunal tube, monitor for loss of efficacy or increased side effects. Please note MHRA guidance on changing formulation/manufacturers for epileptic patients. Suppositories may be considered as a licensed alternative but note that they are only licensed for 7 days' use at up to 1g/day, and a dose conversion is required.
Cetirizine	Oral Solution	Solution can be administered undiluted.	A prolonged break in feeding is not required before/after administration.	Tablets may be more appropriate for intrajejunal administration due to sorbitol content of liquid. Monitor for loss of efficacy or increased side effects.
	Tablets	Crush finely and disperse with water.		
Chlorphenamine	Oral Solution	Solution can be administered undiluted.	A prolonged break in feeding is not required before/after administration.	Consider dilution of liquid formulation immediately prior to intrajejunal administration to reduce osmolality. Monitor for loss of efficacy or increased side effects.
	Syrup	Dilute with an equal volume of water.		
	Tablets	Crush and disperse with water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Ciprofloxacin	Tablets	Disperse in deionised water such as Water for Injections (if available). Ciprofloxacin can form insoluble complexes in contact with ions such as those found in tap water.	Withhold feed for 2 hours before dosing and for 2 hours after dosing.	<p>Do not use the oral suspension. Flush tube after each dose with 65mL of deionised water such as Water for Injections (if available). Can also be administered via jejunal tube.</p> <p>A dose at the upper end of the dose range should be used, especially for administration via jejunal tube. Do not crush the tablets, to avoid inhalation of the powder formed.</p>
Citalopram	Oral Drops	Mix drops with water prior to administration. Invert the bottle and let the drops flow; do not shake.	A prolonged break in feeding is not required before/after administration.	8mg (4 drops) of the oral drops is equivalent to a 10mg tablet. Flush well following administration. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Tablets	Crush and disperse in water.		
Clarithromycin	Liquid	Dilute with an equal volume of water immediately prior to administration.	A prolonged break in feeding is not required before/after administration.	Viscous solution. May block tubes smaller than 9Fr. An alternative should be considered. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
Clopidogrel	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration.	Can also be administered via jejunal tube.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Co-Amoxiclav	Oral Suspension	Dilute with an equal volume of water.	Give immediately prior to feed if possible, or during a pause in a 24 hour feed. A prolonged break in feeding is not required before/after administration.	There is insufficient clavulanic acid in 5mL of the 250/62 suspension for adult patients. At least 10mL of the 250/62 should be used. Can be administered via jejunal tube. Monitor for loss of efficacy or increased side effects.
Co-Beneldopa (Madopar)	Dispersible Tablets	Disperse in 10mL of water.	Doses should be given at the same times each day in relation to feeding regimen, as absorption may be enhanced by enteral feed proteins.	If converting from controlled release (CR) preparations at doses up to 1 x 100/25 three times a day: Continue the same daily dose but increase the dosing frequency. If converting from CR preparations at doses greater than 1 x 100/25 three times a day: Reduce the total daily dose to 70% of the CR dose (i.e. reduce by 30%). 'When required' doses may be needed for "on-off" effects. Levodopa is mainly absorbed in the jejunum so drug effect may be unpredictable if administered into the jejunum. See also NHSG Guideline for prescribing Parkinson's Disease Medication in Hospital

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Co-Careldopa (Sinemet)	Tablets	Disperse standard-release tablets in 10mL of water, and give immediately.	Doses should be given at the same times each day in relation to feeding regimen as absorption may be enhanced by enteral feed proteins.	If converting from modified release (MR) preparations, continue with the same daily dose but increase the dosing frequency. 'When required' doses may be needed for "on-off" effects Levodopa is mainly absorbed in the jejunum so drug effect may be unpredictable if administered this way. See also NHSG Guideline for prescribing Parkinson's Disease Medication in Hospital
	Alternatively switch to Co-Beneldopa (Madopar) dispersible tablets. Discuss with Pharmacy.			
Co-Codamol	Effervescent tablets	Disperse in 50mL of water.	A prolonged break in feeding is not required before/after administration.	Sodium content is approximately 13-17mmol per tablet. If patient is sodium or fluid restricted then the effervescent tablets may not be appropriate; consider giving paracetamol and codeine liquids separately instead. Can also be administered via jejunal tube.
Codeine	Oral Syrup/ Linctus	Dilute with an equal volume of water immediately prior to administration.	A prolonged break in feeding is not required before/after administration.	For intrajejunal administration, dilute the dose 3-4 times with water to reduce osmolarity. Linctus contains alcohol.
Co-Dydramol	Change to individual components (paracetamol and dihydrocodeine) or use co-codamol as above.			

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Co-Trimoxazole	Oral Suspension	Dilute with 2-3 times volume of water immediately prior to administration. Shake well.	A prolonged break in feeding is not required before/after administration.	For intrajejunal administration, dilute the dose at least 3 times with water to reduce osmolarity. Oral suspension contains 100mg/5mL alcohol.
Cyclizine	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration.	Can also be administered via jejunal tube. Give immediately as light sensitive.
D				
Dabigatran	Switch to an alternative anticoagulant			
Diazepam	Liquid	Dilute with an equal volume of water immediately prior to administration.	A prolonged break in feeding is not required before/after administration.	Use the tablets for intrajejunal administration.
	Tablets	Crush and disperse in water.		
Diclofenac	Consider changing to ibuprofen liquid.			
Digoxin	Elixir	Elixir should be given neat. Do not dilute.	For fibre containing feeds: Withhold feed for 2 hours before dosing and for 1 hour after dosing	62.5microgram tablets are equivalent to 50micrograms of the liquid, but some prescribers may choose to keep a patient on the same dose rather than follow the conversion. An individual assessment should be made. Tablets should be used for intrajejunal administration. Monitor the effect and consider checking drug levels if necessary as absorption may be decreased.
	Tablets	Crush and disperse in water.	No interaction is expected with fibre-free feeds.	

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Dihydrocodeine	Liquid	Suspension can be given undiluted.	A prolonged break in feeding is not required before/after administration.	Absorption may be increased when given via intrajejunal route. Monitor clinical effects and adverse effects. Do not crush the modified release MR ('Continus') tablets.
	Tablets	Crush and disperse in water.		
Docusate	Oral Solution	Solution can be given undiluted.	A prolonged break in feeding is not required before/after administration.	Can also be administered via jejunal tube.
Domperidone	Oral Suspension	Dilute with an equal volume of water.	A prolonged break in feeding is not required before/after administration.	For intrajejunal administration, ensure dilution with at least an equal volume of water.
Donepezil	Orodispersible Tablets	Disperse in 10-15mL of water.	A prolonged break in feeding is not required before/after administration.	Can also be administered via jejunal tube.
	Tablets	Crush and disperse with 10-15mL of water.		
Doxazosin	Tablets	Disperse the standard-release tablets in 10-15mL of water.	A prolonged break in feeding is not required before/after administration.	Flush well. Do not crush modified release tablets. Can also be administered via jejunal tube.
Doxycycline	Dispersible Tablets	Disperse in 10mL of water immediately prior to administration. This is best done in the barrel of an oral syringe.	Withhold feed for 2 hours before dosing and for 1 hour after dosing.	Consider an alternative antibiotic. Do not open capsules as contents are irritant. Prescribe at higher end of dosing range. Absorption may be reduced when administered intrajejunally.
Duloxetine	Capsules	The capsule contents are not suitable for tube administration.		An alternative agent should be prescribed.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
E				
Edoxaban	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration.	There is no information on intrajejunal administration, although there are no theoretical concerns.
Enalapril	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
Erythromycin	Oral Suspension	Solution can be given undiluted.	A prolonged break in feeding is not required before/after administration.	Absorption may be reduced when administered intrajejunally. Consider an alternative antibiotic.
F				
Felodipine	Modified release (MR) tablets which cannot be crushed – Consider changing to amlodipine, with blood pressure monitoring.			
Ferrous Fumarate	Oral Syrup	Dilute with an equal volume of water.	A prolonged break in feeding is not required before/after administration. Administration after feeds can reduce GI adverse effects.	Flush well as some iron preparations are incompatible with enteral feeds. If giving intrajejunally, absorption may be decreased.
Ferrous Sulphate	Convert to ferrous fumarate or sodium ferredetate and administer as described. Ferrous sulphate 200mg three times daily = ferrous fumarate 140mg/5mL, 10mL twice daily. Ferrous sulphate 200mg three times daily = sodium ferredetate 190mg/5mL, 10mL three times a day.			

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Finasteride	Tablets	Place tablets in the barrel of an oral or bladder tipped syringe. Draw up 10-15mL of water into the syringe and allow the tablet to disperse. Shake well and administer down the feeding tube.	A prolonged break in feeding is not required before/after administration.	Flush well. Women who are or who may become pregnant should not handle crushed, broken or dissolved tablets. A closed system should be used, such as the barrel of a syringe. Can also be administered via jejunal tube.
Flucloxacillin	Oral Solution	Solution can be given undiluted.	Withhold feed for 1-2 hours before dosing and for 1 hour after dosing.	Due to four times daily dosing and feed interaction, an alternative antibiotic should be considered. If administered via jejunal tube, dilute with an equal volume of water.
Fluconazole	Oral Suspension	Suspension can be given undiluted.	If the patient is on a fibre containing feed, either withhold the feed for one hour before and one hour after each dose or give enteral fluconazole during a feeding break. Fibre-free feeds would not be expected to interact.	If administered via jejunal tube, doses at the high end of the range should be given to ensure adequate absorption. Avoid inhalation of the capsule contents.
	Capsules	Open capsule and disperse the contents with water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Fludrocortisone	Tablets	Disperse in water. This should be done in the barrel of an oral syringe to avoid operator exposure. Do not crush the tablets.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
Fluoxetine	Liquid	Dilute with an equal volume of water immediately prior to administration.	A prolonged break in feeding is not required before/after administration.	Flush well. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Capsules	Can be opened and the contents dispersed with water.		
Folic Acid	Oral Syrup/Solution	Solution can be given undiluted.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, dilute with an equal volume of water.
	Tablets	Crush and disperse with water.		
Forceval	Soluble Tablets	Disperse in 50mL of water immediately prior to administration.	A prolonged break in feeding is not required before/after administration.	Can also be administered via jejunal tube.
Furosemide	Oral Solution	Solution can be given undiluted.	A prolonged break in feeding is not required before/after administration.	The Rosemont liquid is licensed for NG or PEG administration and should be used if available. If administered via jejunal tube, dilute with an equal volume of water.
	Tablets	Crush and disperse in water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
G				
Gabapentin	Oral solution	Give undiluted.	A prolonged break in feeding is not required before/after administration.	The Rosemont and Colonis liquids are licensed for NG or PEG administration and should be used if available. If administered via jejunal tube, use the capsules and monitor for loss of efficacy or increased side effects.
	Capsules	Dissolve contents in water and give immediately.		
Gliclazide	Tablets	Disperse in 10mL of water and give immediately.	A prolonged break in feeding is not required before/after administration. Give immediately prior to feeding if possible.	Monitor blood glucose levels closely for a change in efficacy. If administered via jejunal tube, monitor for loss of efficacy or increased side effects. Do not crush the modified release (MR) tablets.
Glimepiride	Tablets	Disperse in water and give immediately.	A prolonged break in feeding is not required before/after administration. Give immediately prior to feeding if possible.	Monitor blood glucose levels closely for a change in efficacy. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
I				
Ibuprofen	Syrup / Oral suspension	Dilute with an equal volume of water.	A prolonged break in feeding is not required before/after administration.	Can also be administered intrajejunally.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Indapamide	Tablets	Disperse the standard-release tablets in water.	A prolonged break in feeding is not required before/after administration.	Absorption is reduced when administered intrajejunally. Consider an alternative preparation. Do not crush modified release (MR) preparations.
Irbesartan	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration.	Flush well. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
Iron	See ferrous sulphate, ferrous fumarate and sodium feredetate.			
Isosorbide Mononitrate	Tablets	Crush and disperse the standard-release tablets in water.	A prolonged break in feeding is not required before/after administration.	Crushing tablets may increase the rate of absorption and side effects. Do not crush modified release tablets. No information on whether isosorbide mononitrate can be administered intrajejunally.
Ispaghula Husk	Not recommended for enteral tube administration. Consider an alternative laxative.			
L				
Lactulose	Oral Solution	Dilute 1 in 3 or 1 in 4 with water. e.g. Dilute 5mL of lactulose to a volume of 20mL.	A prolonged break in feeding is not required before/after administration.	Can also be administered intrajejunally once diluted.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Lamotrigine	Dispersible Tablets	Disperse in 10-15mL of water immediately prior to administration.	A prolonged break in feeding is not required before/after administration.	Monitor closely for changes in efficacy or increased side effects. If administered intrajejunally, monitor for loss of efficacy or increased side effects. Please note MHRA guidance on changing formulation/manufacturers in epileptic patients.
Lansoprazole	Orodispersible Tablets	FasTabs are licensed for administration via a nasogastric tube. Disperse in 10mL of water. Ensure all microgranules are administered by drawing up additional 10mLs of water and shaking.	Withhold feed for 30minutes before and 30minutes after each dose.	Can also be administered intrajejunally.
Levetiracetam	Granules	Suspend the granules by shaking in at least 10mL of water for at least 2 minutes. After the dose, flush twice with 10mL of water each time.	A prolonged break in feeding is not required before/after administration.	The granules (Desitrend®) are licensed for tube administration and should be used if available. Monitor closely for changes in efficacy or increased side effects. Can also be administered intrajejunally. Please note MHRA guidance on changing formulation/manufacturers in epileptic patients.
	Oral Solution	Solution can be given undiluted.		
	Tablets	Crush and disperse with water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Levothyroxine	Oral solution	The Creo brand is licensed for tube administration. Can be given undiluted. Flush twice after administration, with 10mL of water each time.	Food can affect the absorption of levothyroxine so dosing should be consistent in relation to intake of food. Consider withholding feed for 1 hour before and after each dose if this is practical.	Inhalation of crushed tablets should be avoided. Monitor patients' thyroid function closely. Can also be administered intrajejunally, but monitor for possible reduced effect.
	Tablets	Disperse. Some brands of tablets used to be licensed to be dispersed in 15-30mL of water. This should be done in the barrel of an oral syringe to avoid operator exposure. Do not crush the tablets.		
Lisinopril	Tablets	Disperse in water.	A prolonged break in feeding is not required before/after administration.	Can also be administered intrajejunally.
Loperamide	Syrup	Syrup can be given undiluted.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, dilute the syrup with an equal volume of water immediately beforehand.
	Capsules	Not suitable for tube administration due to risk of tube blockage		
Loratadine	Syrup	Dilute with an equal volume of water.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, dilute further with water and monitor for loss of efficacy or increased side effects.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Lorazepam	Tablets can be given sublingually.			
	Tablets	Crush and disperse in 15-30mL of water, give immediately.	A prolonged break in feeding is not required before/after administration.	If administered intrajejunally, monitor for loss of efficacy or increased side effects.
Losartan	Tablets	Crush and disperse in 10mL of water.	A prolonged break in feeding is not required before/after administration.	If administered intrajejunally, monitor for loss of efficacy or increased side effects.
M				
Macrogols				
Laxido	Sachet	Dissolve in 125mL of water.	A prolonged break in feeding is not required before/after administration.	Flush well. Can also be administered via jejunal tube.
Movicol	Sachet	Use of Laxido or an alternative laxative is preferred. Dissolve in 125mL of water.		
Madopar	See co-beneldopa			
Magnesium				
Co-magaldrox	Liquid	Not recommended for enteral tube administration. Use Magnaspartate as below.		
Magnaspartate	Powder for Oral Solution	Disperse in 200mL of water and give immediately. Licensed for administration via nasal, gastric and duodenal tubes.	A prolonged break in feeding is not required before/after administration.	Absorption is reduced when administered intrajejunally. Dose titration may be required.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Metformin	Oral Solution	Oral solution is the preferred option. Oral solution can be used undiluted.	A prolonged break in feeding is not required before/after administration.	Do not crush modified release preparations. The Colonis brand of oral solution is licensed for tube administration and should be used if available. Tablets are hard to crush, so do not crush at patient's bedside. Protective eyewear should be considered. Monitor blood glucose levels. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Tablets	Crush and disperse the standard-release tablet in water. .		
Metoclopramide	Oral Solution/ Syrup	Rosemont Pharmaceuticals 5mg/5mL oral solution is licensed for enteral tube administration and should be used when available. Give undiluted. Maxolon syrup should be diluted with an equal volume of water.	A prolonged break in feeding is not required before/after administration.	Flush well. The liquid contains sorbitol which can cause GI side effects. Tablets should be used for intrajejunal administration. Monitor for loss of efficacy or increased side effects.
	Tablets	Crush and disperse in 15-30mL of water.		
Metoprolol	Tablets	Crush and disperse the standard-release tablets in water.	A prolonged break in feeding is not required before/after administration.	Do not crush modified release tablets. Can also be administered via jejunal tube.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Metronidazole	Oral Suspension	Solution should be given undiluted.	Withhold feeds for 2 hours before and 1 hour after each dose. This is because the suspension is the benzoate salt, which needs to be broken down to metronidazole by gastric enzymes in the stomach.	Flush well. Tablets can be flaky and form large clumps therefore crush the tablets well to avoid blocking the tube Tablets should be used for intrajejunal administration, never the liquid.
	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration.	Avoid inhalation of the powder formed when the tablet is crushed.
Mirabegron	Crushing mirabegron tablets is not recommended. Consider switching to oxybutynin.			
Mirtazapine	Oral Solution	Solution can be given undiluted.	A prolonged break in feeding is not required before/after administration.	Flush well. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Orodispersible Tablets	Disperse in 10-15mL of water. Microgranules settle quickly and must be redispersed prior to administration.		
	Tablets	Crush and disperse in water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Montelukast	Chewable Tablets	Disperse in water.	Withhold feeds for 2 hours before and 1 hour after each dose.	If administered intrajejunally, monitor for loss of efficacy or increased side effects.
	Tablets	Disperse in 10mL of water.	A prolonged break in feeding is not required before/after administration.	
Morphine	Oral Solution	Solution can be given undiluted.	There is some evidence to suggest an incompatibility with some feeds. The nature of this interaction is not fully understood and it is unlikely to be clinically relevant.	Flush well. Dilute the liquid formulation immediately prior to intrajejunal administration and monitor for loss of efficacy or increased side effects. Prolonged release morphine products are not generally considered suitable for tube administration. Do not split one sachet into two doses.
	Controlled release sachets	MST Sachets CARE: Only consider this if the use of the oral solution is not possible. Dilute the sachet contents with at least 30mL of water. The suspension thickens on standing, so give immediately. Flush well with at least 15-30mL of water. A poorly flushed tube might result in an unintended bolus when the tube is next used.	If there are concerns about an altered response to morphine then contact Medicines Information for advice.	
Movicol	See 'Macrogols'.			

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Mycophenolate mofetil	Suspension	Suspension should be given undiluted.	A prolonged break in feeding is not required before/after administration.	CellCept oral suspension is licensed for nasogastric use. Can be administered via jejunal tube. Do NOT crush tablets or open capsules.
N				
Naproxen	Consider changing to ibuprofen liquid			
	Tablet	Crush and disperse in 15-30mL of water.	A prolonged break in feeding is not required before/after administration.	Can also be administered via jejunal tube. Do NOT crush enteric coated tablets.
Nicorandil	Tablet	Crush and disperse in water immediately prior to administration.	A prolonged break in feeding is not required before/after administration.	Can also be administered via jejunal tube.
Nifedipine	Consider changing to amlodipine.			
Nitrofurantoin	Oral Suspension	Dilute with an equal volume of water.	A prolonged break in feeding is not required before/after administration.	Irritant. Do NOT crush the tablets. Avoid inhalation of the capsule contents. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Prolonged release capsules ('Macrobid' brand)	Not suitable for tube administration		
	Capsules (made by Advanz but no associated brand name)	Open and mix with water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
O				
Omeprazole	Consider switching to lansoprazole FasTabs as these are licensed for administration via nasogastric tubes.			
	Dispersible Tablets	Place in an oral syringe with 25mL of water and 5mL of air and shake to disperse. After administration, ensure that all the beads are administered by drawing up an additional 25mL of water and 5mL of air and shaking before administration.	A prolonged break in feeding is not required before/after administration.	Flush well. The granules formed when the tablets are dispersed may block fine bore feeding tubes (<8Fr). For fine bore tubes or jejunal administration, change to lansoprazole FasTabs or contact Medicines Information.
Ondansetron	Oral Liquid	Oral liquid can be given undiluted.	A prolonged break in feeding is not required before/after administration.	The oral liquid contains sorbitol, so monitor for GI adverse effects. Flush well after administration of the injection. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Injection	Injection can be given undiluted via feeding tubes.		
Oxybutynin	Use patches if appropriate			
	Oral Elixir	Elixir can be given undiluted.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, monitor for loss of efficacy or increased side effects. Do NOT crush modified release tablets.
	Tablets	Crush and disperse the standard-release tablets in 10mL of water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Oxycodone	Oral Liquid	Oral liquid can be given undiluted.	A prolonged break in feeding is not required before/after administration.	When converting from modified release preparations divide the total daily dose by 6 and give 4 hourly. If administered intrajejunally, monitor for loss of efficacy or increased side effects.
P				
Pancreatin	Pancrex V Powder	Mix the dose of powder with 10-20mL of water immediately prior to administration. Switch Pancrex V powder to Creon capsules if the patient is able to take oral medicines.	Contact dietetics. If dietetics are unavailable, divide the total daily dose required into doses to be given every 2-3 hours during feeding until dietetic review.	1g of Pancrex V powder contains 1400 BP units of free protease, 25000 BP units of lipase, and 30000 BP units of amylase. Half a level 2.5mL medicine spoon of Pancrex V powder is approximately 1g. NB: This is a significant change to manufacturer's previous advice. If a patient's dose is prescribed in terms of grams of powder, confirm how they usually measure it. There is no direct conversion between Creon and Pancrex. Titrate as appropriate and monitor closely. Avoid handling or inhaling dry powder preparations as allergic reactions have been reported. If administered intrajejunally, monitor for loss of efficacy or increased side effects.
	Creon Capsules	If the tube is >10Fr then capsules can be opened and the contents dispersed in water. Rinse the container and administer the rinsing down the tube. The granules contained within the capsule must not be crushed. This method is not suitable for jejunal administration.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Paracetamol	Soluble Tablets	Dissolve in 50mL of water.	A prolonged break in feeding is not required before/after administration.	If patient is sodium or fluid restricted then the soluble tablets may not be appropriate. Can also be administered intrajejunally.
	Oral Solution	Dilute with an equal volume of water immediately prior to administration.		
Penicillin V (Phenoxymethyl-penicillin)	Oral Solution	Solution can be given undiluted.	Withhold feeds for 2 hours before and 1 hour after each dose.	Can also be administered intrajejunally.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Phenytoin	Enteral administration is difficult due to unpredictable absorption and interaction with feeds. Please consider other administration routes.			
	Oral Suspension (Phenytoin base)	Shake well and mix with an equal volume of water.	Withhold feeds for 2 hours before and 2 hours after each dose.	Flush with 30-60mL of water. Patient response and levels should be monitored carefully, especially after any changes in the feeding regimen, as the dosage may require adjustment.
	Capsules (Phenytoin sodium)	Open and disperse powder in 10mL of water. Leave for 5mins and stir to form a fine dispersion.		When converting between capsules and suspension, a dose conversion is required. 100mg phenytoin sodium (capsules) = 90mg phenytoin base (suspension). Absorption is poor intrajejunally. Monitor patient and plasma levels closely and dilute suspension to avoid GI adverse effects. See MHRA guidance on changing formulation/manufacturers in epileptic patients.
Phosphate	Sandoz Effervescent Tablets	Dissolve in 20mL of water.	A prolonged break in feeding is not required before/after administration.	Flush well as phosphate can bind to calcium in feeds. Can be administered via jejunal tube. Monitor for increased GI adverse effects.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Potassium Chloride	Effervescent tablets (Sando-K)	Dissolve in 50-100mL of water.	A prolonged break in feeding is not required before/after administration.	Flush well as potassium may cause coagulation of the feed. Kay-Cee-L contains sorbitol. If administered via jejunal tube, use the dispersible tablets where possible and monitor for increased GI adverse effects.
	Liquid (Kay-Cee-L)	Dilute with 50-100mL of water.		
Pramipexole	Tablets	Crush and disperse the standard-release tablets in water.	A prolonged break in feeding is not required before/after administration.	Do NOT crush modified release (MR) tablets. No specific information available on intrajejunal administration. See also NHSG Guideline for prescribing Parkinson's Disease Medication in Hospital
Prednisolone	Soluble Tablets	Dissolve in water. This is best done in the barrel of an oral syringe. For doses less than 5mg, dissolve one tablet in 5mL of water (1mg/mL), then give the appropriate volume.	A prolonged break in feeding is not required before/after administration.	The enteric coated tablets should NOT be crushed. Can also be administered via jejunal tube.
Pregabalin	Oral Suspension	Solution can be given undiluted.	A prolonged break in feeding is not required before/after administration.	Flush well. Can also be administered via jejunal tube. Monitor for increased GI adverse effects.
	Capsules	Open and disperse contents in 15-30mL of water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Prochlorperazine	Use buccal 3mg tablets where appropriate.			
	Oral Syrup	Syrup can be mixed with an equal volume of water.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, use the tablets.
	Tablets	Crush and disperse in 10mL of water.		
Propranolol	Oral Solution	Dilute with an equal volume of water.	A prolonged break in feeding is not required before/after administration.	Do NOT crush the modified release (MR) capsules. If converting from MR capsules, give the total daily dose in 2-4 divided doses. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
Q				
Quetiapine	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration.	Flush well. No information available on intrajejunal administration.
Quinine Sulphate	Tablets	Crush and disperse in 200mL of water.	A prolonged break in feeding is not required before/after administration.	Flush well. There is no information available on intrajejunal administration.
R				
Ramipril	Oral Solution	Solution can be given undiluted.	A prolonged break in feeding is not required before/after administration.	Some brands are licensed for NG or PEG tube administration, and these should be used if available. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Capsules	Open and disperse contents in water.		
	Tablets	Crush and disperse in water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Ranitidine	Effervescent Tablets	Dissolve in 75mL of water.	A prolonged break in feeding is not required before/after administration.	Liquid ranitidine preparations may contain 8% alcohol. If administered via jejunal tube, use the effervescent tablets and monitor for loss of efficacy or increased side effects.
	Oral Solution/Syrup	Solution can be given undiluted.		
Rifampicin	Syrup	Dilute with an equal volume of water immediately prior to administration.	Withhold feed for 2 hours before and 1 hour after each dose.	Absorption may be reduced when administered intrajejunally. Monitor response.
Risperidone	Oral Liquid	Liquid can be given undiluted.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
Rivaroxaban	Tablets	Crush and disperse in water.	A prolonged break in feeding is not recommended, and feed should recommence immediately after administration.	Tablets are licensed for enteral administration. Rivaroxaban is NOT suitable for intrajejunal administration. It is important that rivaroxaban is given with food, especially at doses of 15mg or more, otherwise absorption is poor.
Rivastigmine	Oral Solution	Solution can be given undiluted.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, monitor for loss of efficacy or increased side effects. Patches may be considered a licensed alternative. See the patch prescribing information for detailed dose conversions.
	Capsules	Open and disperse contents in water.		

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Ropinirole	Tablets	Crush and disperse in water	Where possible, administer dose after feed. A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, monitor for loss of efficacy or increased side effects. See also NHSG Guideline for prescribing Parkinson's Disease Medication in Hospital
	Prolonged release tablets	Not suitable for tube administration.		
S				
Senna	Oral Syrup	Syrup can be given undiluted.	A prolonged break in feeding is not required before/after administration.	Flush well. Can also be administered via jejunal tube.
Sertraline	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
Simvastatin	Oral suspension	Give undiluted.	A prolonged break in feeding is not required before/after administration.	The Rosemont liquid is licensed for NG or PEG administration and should be used if available. If simvastatin is administered via jejunal tube, monitor cholesterol levels and titrate dose as appropriate.
	Tablets	Crush and disperse in 10mL of water immediately prior to administration.		
Sinemet	See co-careldopa			
Sodium Feredetate	Oral Solution	Dilute with an equal volume of water.	A prolonged break in feeding is not required before/after administration. Administration after feeds can reduce GI adverse effects.	Flush well as some iron preparations are incompatible with enteral feeds. If giving intrajejunally, absorption may be decreased.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Sodium Valproate	Oral Liquid	Dilute with an equal volume of water immediately prior to administration.	A prolonged break in feeding is not required before/after administration.	Do NOT crush modified release products. If converting from modified release preparations, give the same total daily dose, but divided into more frequent doses. If administered via jejunal tube, use dispersed tablets or dilute the liquid 3-4 times with water. Monitor for loss of efficacy or increased side effects. Please note MHRA guidance on changing formulation/manufacturers in epileptic patients.
	Epilim Crushable Tablets	Crush and disperse in 10mL of water.		
Solifenacin	Crushing solifenacin is not recommended. Consider switching therapy to oxybutynin.			
Spirolactone	Tablets	Crush and disperse in 15-30mL of water immediately prior to administration.	A prolonged break in feeding is not required before/after administration.	Flush well. Can be administered via jejunal tube.
Sulfasalazine	Oral Suspension	Suspension can be given undiluted.	A prolonged break in feeding is not required before/after administration.	Can be administered via jejunal tube.
T				
Tamsulosin	Not suitable for tube administration. Consider using doxazosin as an alternative. Seek advice from Pharmacy.			
Temazepam	Oral Solution	Solution can be given undiluted.	A prolonged break in feeding is not required before/after administration.	If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
Tetracycline	Consider switching to alternative antibiotic such as doxycycline.			

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
Thiamine	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration.	Can also be administered via jejunal tube.
Ticagrelor	Orodispersible tablets	Disperse in water. Flush well.	A prolonged break in feeding is not required before/after administration.	Flush tube well after use. Plain and orodispersible tablets are licensed for nasogastric administration of tube size 8 or greater. No information available on intrajejunal administration.
	Plain tablets	Crush and disperse in water. Flush well.		
Tolterodine	Tablets	Crush and disperse the standard-release tablets in 10mL of water.	A prolonged break in feeding is not required before/after administration	Flush well. Do NOT use modified release preparations. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
Tramadol	Soluble Tablets	Disperse in 10-15mL of water.	A prolonged break in feeding is not required before/after administration.	Flush well. Do NOT crush modified release preparations. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Orodispersible Tablets	Disperse in 10-15mL of water.		
Trimethoprim	Oral Suspension	Dilute with an equal volume of water.	Withhold feeds for 30 minutes before and 30 minutes after each dose.	Can also be administered via jejunal tube.

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
V				
Venlafaxine	Tablets	Crush and disperse the standard-release tablets in 10mL of water.	Where possible, administer dose after feed. A prolonged break in feeding is not required before/after administration.	Do NOT crush modified release preparations. If converting from modified release preparations, give same the total daily dose, but divided into more frequent doses. Can also be administered via jejunal tube.
	Oral Solution	Solution can be given undiluted.	A prolonged break in feeding is not required before/after administration.	Do NOT crush modified release preparations. If converting from modified release preparations, give the total daily dose in 3 divided doses. If administered via jejunal tube, monitor for loss of efficacy or increased side effects.
	Tablets	Crush and disperse the standard-release tablets in water.		
Vitamin B Co Strong	If vitamins are essential consider IV Pabrinex.			

Drug Administration via Enteral Feeding Tubes

Drug Name	Form	Instructions	Feed Directions	Additional Information
W				
Warfarin	Oral Suspension	Solution can be given undiluted.	Withhold feeds for 1-2 hours before and 1-2 hours after each dose. Avoid feeds containing soya protein. If using any enteral feeds with significant vitamin K content such as Ensure, Isocal, Nutrilite, Osmolite and Ensure Plus, monitor INR closely and adjust dose of warfarin accordingly.	Flush well. Monitor patient's clotting (INR) closely. Use the same preparation consistently. If dietary or feed intake changes significantly, this may affect the patient's INR. Risk of reduced absorption when given intrajejunally.
	Tablets	Crush and disperse in water.		
Z				
Zolpidem	Tablets	Crush and disperse in water.	A prolonged break in feeding is not required before/after administration	Can also be administered via jejunal tube.
Zopiclone	Tablets	Crushed zopiclone tablets thicken quickly and risk blocking the tube. Consider switching therapy to zolpidem. Zopiclone 3.75mg is approximately equivalent to zolpidem 5mg.		

Main references used:

NEWT Guidelines online, Wrexham Maelor Hospital Pharmacy Department (www.newtguidelines.com)
 Handbook of Drug Administration via Enteral Feeding Tubes, White R and Bradnam V, <https://about.medicinescomplete.com/>
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