

What injections can be given orally or via enteral feeding tubes?

Prepared by UK Medicines Information ([UKMi](#)) pharmacists for NHS healthcare professionals
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Background

Medicines are not always available in formulations which are suitable for patients with swallowing difficulties or patients with enteral feeding tubes. The alteration of medication formulations may therefore be necessary. However, this usually falls outside of the terms of the drug's product licence. When this happens, the manufacturer is no longer responsible for any adverse event or treatment failure. This has implications for the professionals responsible for prescribing, supplying and administering the drugs, as they become liable for any adverse event that the patient may experience (1). Therefore, it is important to ensure that, where a patient with an enteral feeding tube fitted or a patient with swallowing difficulties requires oral medication, alternative (licensed) routes of administration are sought (2). Only if these are not available should medications be given in an unlicensed manner.

Injections are sometimes administered orally or via enteral feeding tubes when no other formulations are available. However, they vary widely in their suitability for enteral administration (1). This Medicines Q&A aims to provide information on injections which may be administered either orally or via an enteral feeding tube.

Answer

Drug	Directions
Acetazolamide	The reconstituted injection solution can be given orally and via enteral feeding tubes (1, 2). The reconstituted injection can be stored in a refrigerator for up to 24 hours (1).
Acetylcysteine	The injection solution can be given orally and via enteral feeding tubes (1, 2). Orange or blackcurrant syrup, or orange or blackcurrant juice, or cola can be used to dilute the injection solution to 50mg/ml and mask the bitter taste (2, 3).
Aminophylline	The injection has been used enterally. As this is an immediate-release preparation, appropriate adjustment, such as splitting the total daily dose into 3 or 4 divided doses, should be made (1, 2) Levels should be checked and the dose adjusted accordingly (1).
Amoxicillin	Injection is preferred to the suspension when being given via enteral feeding tubes terminating in the jejunum. This is because the suspension has a high osmolality, which could lead to osmotic diarrhoea (2).
Arginine	Injection may be given orally (2).
Atropine	Injection may be given via enteral feeding tubes (2) or orally (2,3).
Benzatropine	Injection may be administered enterally (2).
Calcium folinate	Injection may be given orally or via enteral feeding tubes (2).

Chlorphenamine	Injection may be given orally or via enteral feeding tubes (2).
Clonazepam	Injection, no longer marketed in UK, if available it may be given orally or via enteral feeding tubes after dilution with 1ml water for injections (2).
Clonidine	The injection can be administered orally (1, 2) or enterally (2). It can either be given neat, or diluted with water prior to administration to give a suitable dose volume. The injection is tasteless, but if desired it can be mixed with fruit juice at the time of administration. The manufacturers have data to suggest that when prepared aseptically, the injection diluted with water is stable for 7 days (2).
Cyclizine	Injection has been given enterally (2).
Cyclophosphamide	Injection can be used to prepare a solution for use orally or via enteral feeding tubes (1).
Desferrioxamine	Injection can be given orally or via nasogastric tube in 50-100ml water. It has an unpleasant taste (2).
Dexamethasone	Injection can be given orally (2,3) or via enteral feeding tubes (2).
Diazepam	Injection has been given enterally. Drug loss may occur if diazepam is administered through long PVC tubes. Diazepam may also contribute towards blockage of tubes (2).
Digoxin	The injection has been given enterally in some centres, but this is not recommended as bioavailability is unpredictable (2).
Dinoprostone	Injection may be diluted with water for use enterally (2) or orally (3).
Dipyridamole	Injection may be given orally or enterally (1, 2). This would require a large number of ampoules and may be impractical (1, 2).
Disopyramide	Injection may be used orally or via enteral feeding tubes. It is very bitter and has a local anaesthetic effect in the mouth and therefore should be used with care if given to patients with swallowing difficulties (2).
Flecainide	Injection has been administered undiluted orally or via enteral feeding tubes. This should only be used in emergency situations, and the patient should be monitored for clinical/adverse effects. If giving via an enteral feeding tube, always flush with deionised water, and do not mix with alkali solutions, sulphate, phosphate, or chloride ions. Do not mix this drug with other medications prior to administration (2).
Flucloxacillin	Injection may be given via enteral feeding tubes terminating in the jejunum instead of suspension (1, 2). It can be used in patients who develop osmotic diarrhoea with the suspension (2).
Glycopyrronium	Injection solution has been used orally (2, 3) or via enteral feeding tubes(2).

Hydralazine	Reconstituted injection may be given orally (1, 3) or via enteral feeding tubes (2). The injection should only be reconstituted with water for injections as it interacts with metal ions found in other water sources (2).
Hydrocortisone	The injection may be given orally (3) or via enteral feeding tubes (Efcortisol® brand) (2). Consider the phosphate content of the injection (3).
Hyoscine butylbromide	Injection may be given orally (1, 3) or via enteral feeding tubes (2). Content of ampoule may be stored in a refrigerator for up to 24 hours after opening (3).
Hyoscine hydrobromide	Injection solution may be given orally (3) or via enteral feeding tubes (2).
Ketamine	The injection may be diluted for oral use with water for injection to produce an appropriate concentration, usually 50mg/5mls. This solution is extremely stable but usually assigned a 7 day refrigerated shelf life based on microbial concerns (1). Extemporaneously prepared solutions usually contain flavouring agents such as fruit cordial to mask the bitter taste (1, 2).
Labetalol	Injection may be given orally with fruit juice or squash to disguise the bitter taste (2, 3). It may also be given via enteral feeding tubes (2).
Levomepromazine	Injection may be given orally (1). It has also been given via enteral feeding tubes (2). Note that excipients degrade to products which theoretically may induce asthma attacks when given enterally. No such attacks have been recorded by the manufacturers and the risk is considered to be small (2).
Medroxyprogesterone	Depo-Provera® has been used orally, although little data are available on this (2).
Methotrexate	Injection may be diluted with water and administered orally. An extended expiry can be given if a preservative is used. The absorption from the injection gives a similar plasma concentration to the tablet formulation (1).
Methylprednisolone sodium succinate	The manufacturers are aware that Solu-Medrone® injection has been administered orally and have data to indicate that the bioavailability of the injection when used orally is similar to the tablets. Solu-Medrone injection has been added to 200ml orange cordial for oral administration (4).
Metoclopramide	The injection has been used orally and via enteral feeding tubes (2).
Metoprolol	The injection has been given orally or via enteral feeding tubes at some centres (2).
Mexiletine	Injection may be given orally or via enteral feeding tubes. It has a very unpleasant taste and has an anaesthetic effect on the mouth. When the injection is being given orally, it should be given at least 30

	minutes before food as it has a local anaesthetic effect (2).
Midazolam	Injection may be given orally. The injection may be diluted with apple or blackcurrant juice, chocolate sauce or cola (1, 3).
Mycophenolate mofetil	Reconstituted injection solution has been administered via enteral feeding tubes with a dextrose 5% flush before and after administration. Care should be taken when handling the powder (teratogenic risk). Contamination should be removed promptly by washing with soap and water (eyes – plain water) (2).
Ondansetron	Injection has been used orally or via enteral feeding tubes. This may be preferable for administration via enteral tubes terminating in the jejunum as the syrup contains sorbitol. The injection is acidic, so flush well before and after each dose to prevent precipitation of the drug when giving via enteral feeding tube. It is stable in apple juice (2).
Pentazocine	Injection mixed with orange juice immediately before administration has been given orally or via enteral feeding tubes. Monitor for increased clinical effects if administered directly to jejunum as this can cause increased absorption (2).
Pethidine	Injection may be given enterally (2).
Phytomenadione	Konakion® MM Paediatric is licensed for oral use (but not for administration via enteral feeding tubes). Flush well after each dose if giving via an enteral feeding tube. The 'MM' and 'MM paediatric' injections contain exactly the same solution therefore the product most appropriate to the dose prescribed should be used. (Note - only the 'MM Paediatric' formulation is supplied with oral pipettes) (2).
Procainamide	The injection has been diluted 1:1 with syrup and given orally or via enteral feeding tubes in some centres, (2).
Procyclidine	The injection has been orally or via enteral feeding tubes at some centres, (2).
Propranolol	The injection has been given orally or via enteral feeding tubes; it has been mixed in raspberry syrup when given orally. (2).
Ranitidine	Injection may be given via enteral feeding tubes (1, 2).
Sodium bicarbonate	Injection may be given orally or via enteral feeding tubes (2).
Sodium chloride	Injection may be given orally or via enteral feeding tubes (2).
Sodium phenylbutyrate	Injection may be given orally (2).
Tranexamic acid	Injection may be given orally (1) or via enteral feeding tubes immediately after dilution (2). Keep opened injection no longer than 24 hours in the fridge (1).
Vancomycin	Injection can be reconstituted for use orally (1, 3), or diluted with 30ml water for injection and given via enteral feeding tubes (2). Flavouring syrups may be added to the solution at the time of administration (5). The expiry of the reconstituted injection depends upon the brand and

	indications for vancomycin injection and enteral vancomycin are different (2).
Verapamil	Injection may be given orally (1) or via enteral feeding tubes (1, 2).

Limitations

- This Q&A does not provide a comprehensive list of injections which may be given enterally.
- The administration of injections enterally usually results in an unlicensed practice. The responsibility of health-care professionals is not considered in this Q&A.
- This Q&A only considers the enteral administration of injections in patients with swallowing difficulties or patients with enteral feeding tubes. Other preparations, which may be more suitable, are not considered.
- This Q&A only provides general information on each drug and therefore differences between brands are not considered. Information is included when available.
- This Q&A does not consider interactions between drugs and enteral feeds/plastics.
- The possible alteration of pharmacokinetic profiles when drugs are administered in an unlicensed manner is not considered in this Q&A.
- This Q&A does not consider other forms of enteral route e.g. sublingual, buccal and rectal administration.

References

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Search strategy

- In-house database/ resources –
 - MI Databank. Accessed 15/07/2020
 - NHS Evidence. Accessed 15/07/2020

- British National Formulary for Children (online) Accessed 15/07/2020
- White R, Bradnam V. Handbook of Drug Administration via Enteral Feeding Tubes. [www.medicinescomplete.com] Accessed 15/07/2020
- Smyth J, editor. The NEWT Guidelines. North East Wales NHS Trust. [<http://www.newtguidelines.com/>] Accessed 15/07/2020