Administration of medicines via an enteral feeding tube

In this article...
- Assessing needs of patients with enteral feeding tubes
- How to make sure medicine is given safely while avoiding interaction with other medicines, feed or the tube
- Delivering the correct dose at the right time

Patient assessment
There have been anecdotal reports of patients who have been able to take their medications orally, but have received it through their enteral feeding tube. This not only unnecessarily medicalises the patient’s care but also increases the nursing time that is required to give medication.

Nurses should be at the centre of the assessment and planning process for patients who require enteral tube support. This is crucial in determining how patients can take their medication in the most simple and risk-free way. Patients should always take medications through a naturally designated route – oral, sublingual, nasal – where this is possible (Lonergan et al, 2010).

Where medications must be given through an enteral feeding tube, the nurse needs to know if the distal tip of the tube is situated in the stomach or small intestine. Some medications are absorbed in the stomach and others in the small intestine; it is vital to recognise the site of absorption of any drug given this way.

In its guidance, Standards for Medicines Management, the NMC (2010) stipulates that nurses must be competent in their practice of medicine administration. Those who do not have the knowledge to support complex patients under their care must work closely with the multidisciplinary team and, in particular, pharmacists to ensure good practice and maintain patient safety.

One example of where administration of a medication via an enteral feeding tube may cause an issue is with digoxin, which is absorbed in the stomach (White and Bradnam, 2009); there is little point...
The small intestine so a jejunal tube can be used, on the other hand, is absorbed via giving it via a jejunal feeding tube. Furosemide, on the other hand, is absorbed in the small intestine so a jejunal tube can be used.

Drug interactions
As the number of medications a patient receives increases so does the risk of adverse effects or interactions between individual medicines (Hitchings et al, 2010). Patients taking multiple medications for different conditions are particularly at risk not only of adverse reactions but also readmission to hospital (Davies et al, 2009).

Medications should be reviewed regularly and their possible interactions should be given careful consideration when introducing an artificial enteral feeding regimen (Loneragan et al, 2010). For example:

- The absorption of carbamazepine is altered by the administration of rifampicin, leading to a reduction in the plasma concentration of carbamazepine (Joint Formulary Committee, 2011).
- Thyroxine plasma concentrations are affected by the administration of antacids, calcium supplements and antibacterials (White and Bradnam, 2009).

Drug–tube interactions
As the number of medications a patient receives increases so does the risk of adverse effects or interactions between individual medicines (Hitchings et al, 2010). For example, crushing a modified-release or enteric-coated tablet creates a build-up of feed and medication. This reduces the amount of drug absorbed and increases the risk of tube blockage. Thicker liquid preparations may require more frequent flushes of water as they may need more frequent flushes of water to avoid blockages. Clark-Schmidt et al (1990) recognised that when undiluted carbamazepine was given through a PVC enteral feeding tube, significant drug losses occurred. Table 3 gives examples of drugs that should be diluted.

Drug–feed interactions
Absorption of medication through an enteral feeding tube can be adversely affected by the type of feed or feeding regimen. To minimise disruption of the feeding regimen the timing of certain medications will need to be considered carefully. As a rule, medication should not be given while the enteral feed is in progress because the combination of feed and medication within the tube not only increases the risk of coagulation and tube blockage but may also reduce the level of drug absorbed (Best, 2008). In cases when a patient receiving feed needs to be given medication, the feed should be stopped and the enteral feeding tube flushed with at least 30ml of water (British Association for Parenteral and Enteral Nutrition and British Pharmaceutical Nutrition Group, 2004).

The absorption of some medications can be adversely affected by food, including antiepileptics and antibiotics. For some medications an extended resting period between stopping the feed and administering medication may be necessary (Table 2).

In some situations it may be necessary to give larger doses of some drugs to compensate for reduced absorption, but this should be done under guidance from the doctor and pharmacist (Best, 2008).

Drug–tube interactions
Some medications, if not given correctly, may bind to the inner lumen of the tube. This reduces the amount of drug absorbed and increases the risk of tube blockage. Thicker liquid preparations may require dilution to ensure the patient receives the required dose and to minimise the risk of blockages. Clark-Schmidt et al (1990) recognised that when undiluted

<table>
<thead>
<tr>
<th>TABLE 1. EFFECT OF CRUSHING MODIFIED-RELEASE TABLETS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Medication</strong></td>
</tr>
<tr>
<td>Gliclazide modified release</td>
</tr>
<tr>
<td>Nifedipine modified release</td>
</tr>
<tr>
<td>Non-steroidal anti-inflammatory drugs, eg diclofenac sodium EC</td>
</tr>
</tbody>
</table>

Source: Joint Formulary Committee (2011)

The form of drug being administered and the likelihood of a blockage. For example the granular content of capsules such as omeprazole can cause blockages when wet (Best, 2008). It is recommended that enteral feeding tubes are flushed before and on completion of feeds, as well as before, between and after each medication. Patients with smaller bore tubes (for example 6-10Fr) may need more frequent flushes of water built into their overall regimen. Flushes should be done using a plunger at least once a day with a “push/pause/pull” method to create turbulence within the lumen of the tube, removing debris and build-up of feed and medication.
TABLE 2. EXAMPLE REST PERIODS BETWEEN FEED AND DRUG ADMINISTRATION

<table>
<thead>
<tr>
<th>Drug</th>
<th>Before administration</th>
<th>After administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin</td>
<td>2 hours</td>
<td>1 hour</td>
</tr>
<tr>
<td>Phenytoin</td>
<td>2 hours</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

TABLE 3. DILUTING DRUGS FOR ENTERAL ADMINISTRATION

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dilution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbamazepine</td>
<td>Dilute in an equal volume of water</td>
</tr>
<tr>
<td>Baclofen</td>
<td>May be diluted with water (amount not specified)</td>
</tr>
</tbody>
</table>

Adapted from White and Bradnam (2009)

Tablets and capsules
If there is no alternative to crushed tablets or the contents of capsules, a pestle and mortar should be used and the powder mixed with plenty of water (10-30ml). Some compressed tablets can be dissolved using the following method:

- Remove the plunger from an enteral syringe;
- Place the tablet inside;
- Replace the plunger;
- Draw water up into the syringe and either place to one side or agitate the syringe gently (White and Bradnam, 2009).

Different tablets take different lengths of time to dissolve.

Working outside the product licence
Crushing tablets, opening capsules and giving medication via feeding tubes generally falls outside of a drug’s product licence (BAPEN and BPNG, 2004). In these circumstances the prescriber and the practitioner are accountable for their actions, including any adverse effects resulting from the prescription and administration of the drug. This issue arises because:

- Many of the medications in common use are not tested by the manufacturer for the effects of altering the original formulation;
- There is a large number of medications that do not have alternative soluble or liquid formulations;
- Nurses do not have access to alternative formulations due to their prohibitive cost (particularly an issue for patients who are fed enterally at home).

Wherever possible a formulation that may be given by a different route to achieve the same effect should be considered – for example, using glyceryl trinitrate patches rather than crushing immediate-release tablets. If a licensed drug must be administered via an unlicensed route, it is vital nurses minimise the risks to themselves and their patients by administering each medication separately and flushing the tube thoroughly after the last drug has been given.

Using the correct syringe
Any substances given through an enteral feeding tube must be via an enteral syringe or designated enteral feeding set (NPSA, 2007). The use of IV syringes to measure and administer medications through enteral feeding tubes has, in the past, led to fatalities due to the inadvertent IV administration of drugs meant for enteral feeding tubes (Hicks et al, 2008; Nevan et al, 2000). Enteral syringes are currently purple in colour and clearly labelled “for oral/enteral use” to distinguish them from IV syringes.

Three-way taps and syringe tip adaptors should not be used in enteral feeding systems because connection design safeguards can be bypassed (NPSA, 2007). All oral/enteral syringes containing oral liquid medicines must be labelled with the name and strength of the medicine, the patient’s name, and the date and time it was prepared and the person who did it, unless preparation and administration is one uninterrupted process and the unlabelled syringe does not leave the hands of the person who has prepared it. Only one unlabelled syringe should be handled at any one time (NPSA, 2007).

Conclusion
Giving medications through an enteral feeding tube is not risk free. Nurses have the same responsibility when administering medications enterally as they do when administering them orally. They should understand the purpose and action of the drug, its site of absorption and possible interactions. Careful patient assessment and planning is essential, as is accepting one’s own limitations and making use of the most appropriate resources to support best practice and promote safety.

References
Nursing and Midwifery Council (2010) Standards for Medicines Management. tinyurl.com/NMC-medicine-management

Posters and information booklets for nurses, patients and GPs on safe administration of medication via enteral tubes are available at www.bapen.org.uk/res_drugs.html

Forms of enteral administration

*Gastric tubes

- Administration may be given by a different route to achieve the same effect, for example, using glyceryl trinitrate patches.

*Enteral tubes

- Administration may not be given by a different route.

*Entry into an unlicensed route

- Administration may not be given by a different route. Formulation may be dissolved using the following method:
  - Remove the plunger from an enteral syringe.
  - Place the tablet inside.
  - Replace the plunger.
  - Draw water up into the syringe and either place to one side or agitate the syringe gently (White and Bradnam, 2009).

- Different tablets take different lengths of time to dissolve.

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See also: Guidelines for the use of feeding tubes in adults.

References