Medicines & Enteral Feeding Tubes

ADELA VIDICKI-MASTILOVICH
CLINICAL PHARMACIST
ROYAL CHILDREN’S HOSPITAL
Introduction

- Types of Tubes
- Choosing a formulation
- Crushing tablets/opening capsules
- Administration of medication
- Drug Interactions
Types of tubes

- **Gastric tubes** – end of the tube is in the stomach
  - Nasogastric (NG) tubes – pass through the nose
  - Percutaneous endoscopic gastrostomy (PEG) – passed through the abdominal wall

- **Jejunal tubes** - end of the tube is in the jejunum (part of the small intestine)
  - Nasojejunal (NJ) tube–passed through the nose
  - Percutaneous Endoscopic Jejunostomy (PEJ) – passed through the abdominal wall
Choosing a formulation

- Preferred formulations
  - Suspensions
  - Solutions
  - Soluble tablets

- Some suspensions or solutions might be too thick
  - Require dilution with water before putting down the tube

- Sometimes oral mixture is not available
  - Need to crush tablets and disperse in water
  - Need to open capsules and disperse in water
  - Need to use injection solution
Crushing Tablets

- Tablets can be crushed using a tablet crusher/pulveriser or a pestle and mortar
- Produces a fine powder and so a better dispersion although some drug may be lost
- There is no ideal way to crush tablets
- There are a number of preparations that should **never be crushed**
## Formulations not to be crushed

<table>
<thead>
<tr>
<th>Common Abbreviation</th>
<th>Meaning</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC, EN</td>
<td>Enteric Coat</td>
<td>Losec® granules</td>
</tr>
<tr>
<td>SR</td>
<td>Sustained Release</td>
<td>Nuelin SR®</td>
</tr>
<tr>
<td>PR</td>
<td>Prolonged Release</td>
<td>Pentasa®</td>
</tr>
<tr>
<td>ER</td>
<td>Extended Release</td>
<td>Felo ER®</td>
</tr>
<tr>
<td>CR</td>
<td>Controlled Release</td>
<td>Tegretol CR®</td>
</tr>
<tr>
<td>CD</td>
<td>Controlled Delivery</td>
<td>Cardizem CD®</td>
</tr>
<tr>
<td>Oros</td>
<td>Osmotic Release Oral System</td>
<td>Adalat Oros®</td>
</tr>
<tr>
<td>SL</td>
<td>Sublingual</td>
<td>Zofran Zydis®</td>
</tr>
<tr>
<td>Cyto</td>
<td>Cytotoxic / Chemotherapy</td>
<td>Methotrexate®</td>
</tr>
</tbody>
</table>

† With special handling, there may be exceptions
Medication should not be added directly to the feed – incompatibility risk

Only administer one medication at a time – Do not mix

Use *sterile water* when dispersing tablets and flushing a *jejunal tube*
If drug to be taken on an empty stomach

For gastric tubes
- Stop feed 30 minutes before dose and resume 30-60 minutes after (increase both times if gastric emptying poor)

NB this should be in consultation with a dietitian

These measures are not required for jejunal tubes
Stop the feed. Flush the tube with appropriate amount of water. Ensure the tube is clean.

Administer one medication at a time. Prepare all medicines and dilutions just before administration.

Draw up liquid formulations using a syringe for accurate dosing. Crush tablets or open capsules and disperse in a set amount of water according to pharmacist’s instructions and measure out the dose using a syringe.

Attach the syringe to the tube and apply gentle pressure.

Flush well with water between medications. Flush well after all the medications are administered. Ensure the tube is clean.
Administration requirements

- **Syringes**
  - Allow for accurate volume measurements
  - Not to be confused for IV use
    - In hospital syringes used for the purpose of administering oral medication are orange in colour – have adapters for connection

- **Water**
  - Tap water ok for gastric tubes
  - Sterile water
    - Jejunal tubes
    - Children < 6mths
    - ? Clinical state
Administration requirements

- All doses should be prepared and used immediately
  - Decreases error

- No information available on stability of
  - Dispersed tablets/capsules
  - Diluted mixtures

- Always use water as no information on mixing with other liquids

- Some medications may be affected by light or air
Flushing

- **Before and after AND between** medication administration

- Prevents/minimises blockages of tubes

- Causes of blockages
  - Interaction b/w feeds and medication
  - Viscosity of liquid medication
  - Binding of medication to the tube
  - Residue of tablet that has been crushed

- Minimum volume to flush is 2ml
- Maximum volume depends.....
Drug formulations and tubes

- Osmolality & sorbitol content of some mixtures
  - Osmotic diarrhoea
  - Need to dilute with as much water as possible

- Conversion tablets to mixtures etc
  - May need dose &/or frequency adjustment
Drug formulations and tubes

- High viscosity preparations
  - Tube blockage or caking
    - Medications may not completely disperse
  - Dilute with as much water as possible

- Difference in pH
  - Clumping of feeds

- Binding to tubing can occur
  - Dilute with as much water as possible
Location of the tube

- **Jejunal tubes – bypassing the stomach**
  - Absorption may be a problem for some medicines
  - Medications specifically affected by this e.g. digoxin and phenytoin

- **Sterility issues with jejunal tubes**
  - With jejunal tubes the acidic stomach is by-passed
  - Sterile water should always be used when dissolving tablets and flushing the tubes to prevent unnecessary contamination
Medication interactions with feeds &/or tubes

- A number of specific medication interactions can occur when medications are administered via enteral tubes.
- The most clinically important are with medications with narrow therapeutic ranges.
- Clinical response should be monitored and appropriate precautionary measures taken.
<table>
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<tr>
<th>Interaction</th>
<th>Medication</th>
<th>Preventative action</th>
</tr>
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<tbody>
<tr>
<td>Binding of medication to tube</td>
<td>Carbamazepine, Diazepam, Phenytoin</td>
<td>Dilute with water, flush well, monitor clinical response</td>
</tr>
<tr>
<td>Medication-feed interaction (coagulation in tube)</td>
<td>Acidic solution e.g promethazine</td>
<td>Alternative? Dilute and flush</td>
</tr>
<tr>
<td>Medication-feed incompatibility (affects medication absorption)</td>
<td>Phenytoin, carbamazepine, ciprofloxacin, warfarin</td>
<td>Stop feeds 1-2 hrs pre and post administering medication. Dilute and flush. Consult with dietitian</td>
</tr>
</tbody>
</table>
## The Interaction Table

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<tr>
<td>Medications requiring an empty stomach</td>
<td>Penicillins, ketoconazole</td>
<td>Balance risk of reduced absorption against practicality of stopping feeds (if jejunal tube no probs as bypasses stomach)</td>
</tr>
<tr>
<td>Medication-feed indirect interaction</td>
<td>Warfarin and vitamin K in feeds</td>
<td>Frequent INR monitoring</td>
</tr>
<tr>
<td>Medication – medication direct interaction</td>
<td>Iron, zinc and ciprofloxacin</td>
<td>Alter medication administration times by 1-2 hrs b/w meds</td>
</tr>
</tbody>
</table>
Make sure the tube is patent and working well before medication administration

Prepare equipment and medicines when ready to administer medications

Avoid mixing medicines together before administering

FLUSH, FLUSH, FLUSH

Be consistent with your technique

Seek help if you are unsure

Don’t be afraid to ask questions
Acknowledgements

- Soula Hrysoudis
- Maria Chan
References

- Kemp A., Medication administration in patients with swallowing difficulties or enteral tubes, Nottingham City Hospital, NHS, June 2005