Alert

Multiple forms of calcium exist with varying amounts of elemental calcium expressed in varying units. Therefore careful attention is required in prescription and administration of calcium to avoid over- or under-dosing. Conversion factor for elemental Ca: 1 mg = 0.025 mmol = 0.05 mEq. Do not give calcium solutions and sodium bicarbonate simultaneously by the same route to avoid precipitation. Do not mix with any medication that contains phosphates, carbonates, sulfates or tartrates. Separate doses of the following by at least 2 hours: phosphate, iron, thyroxine and phenytoin. CalSource Effervescent tablets were discontinued in 2019.

Indication

Oral calcium supplement to prevent / treat calcium deficiency. Asymptomatic hypocalcaemia.

Action

Calcium is essential for the functional integrity of the nervous, muscular, skeletal and cardiac systems and for clotting function.

Drug type

Mineral.

Trade name

Caltrate 600mg, Cal-600 tablets: Calcium carbonate 1500mg (contains elemental calcium 600mg) AUSPMAN 100mg/mL calcium carbonate suspension [1mmol/mL(40 mg/mL) of elemental calcium] If required: Calcium Gluconate Injection (Phebra) (calcium 0.22 mmol/mL). Calcium Chloride Injection (Phebra) 10% (calcium 0.68 mmol/mL). CalSource Effervescent tablets were discontinued in 2019, but SAS product (Calcium (SAS) (Sandoz Fortissimum) 1 g Effervescent tablet) is available.

Presentation

Caltrate 600, Cal-600: Calcium carbonate 1500mg (contains elemental calcium 600mg) AUSPMAN 40mg/mL (1mmol elemental calcium/mL) calcium (carbonate) suspension If required: Calcium gluconate 10% 10 mL vial contains 0.22 mmol/mL of elemental calcium. Calcium chloride 10% 10 mL vial contains 0.68 mmol/mL of elemental calcium.

Dose

Dose can vary. Estimate the calcium intake from all sources before prescribing oral calcium. Recommended total daily intake of elemental calcium from all sources: 120–200 mg/kg/day (3–5 mmol/kg/day). Usual starting oral calcium dose: 20 mg/kg/day (0.5 mmol/kg/day). Can increase up to 80 mg/kg/day (2.0 mmol/kg/day). Divide the daily dose into 2-4 doses mixed with feeds (Do not mix with Phosphate – See Drug Interactions).

Dose – Special scenarios

Not applicable.

Maximum dose

Oral – 5.5 mmol/kg

Total cumulative dose

Oral

Route

Preparation

AUSPMAN suspension – no further dilution necessary Caltrate, Cal-600: Calcium carbonate 1500mg (contains elemental calcium 600mg) Crush and dissolve one tablet in 30 mL of water. This will give a solution containing 0.5 mmol/mL (20mg/mL). The relevant dose should be calculated and withdrawn by oral syringe immediately on complete dispersion of tablet (so as not to let dispersed liquid settle). Any remaining liquid should be discarded. Please refer to Appendix A. Calcium Effervescent tablet: Dissolve one calcium 1000 mg effervescent tablet in 10 mL of sterile water to make a 2.5 mmol/mL solution.

Administration

Administer with feeds. If required, calcium IV vials may be given orally (must be diluted at least 1:4 with sterile water).

Monitoring

Monitor calcium, phosphate and magnesium. Measurement of ionised calcium preferred over total calcium. Correct hypomagnesaemia if present.
Contraindications
Caution in patients with renal or cardiac impairment.

Precautions
Do not mix with any medication that contains phosphates, carbonates, sulfates or tartrates.

Drug interactions
Do not mix with any medication that contains phosphates, carbonates, sulfates or tartrates. Separate doses of the following by at least 2 hours: Phosphate, iron, thyroxine and phenytoin. Digoxin (serious risk of arrhythmia and cardiovascular collapse), thiazide diuretics (increased risk of hypercalcaemia), ketoconazole (decreased ketoconazole effect).

Adverse reactions
Nephrolithiasis with long term use. Gastric irritation, diarrhoea and NEC have occurred during oral therapy with hyperosmolar preparations (must dilute with water).

Compatibility
Do not mix with any medication that contains phosphates, carbonates, sulfates or tartrates.

Stability
Oral solution: Discard remaining after use. Calcium gluconate is a supersaturated solution and may precipitate in the vial at room temperature. Inspect the vial before use.

Storage

Excipients
Caltrate tablets: Excipients not listed. Cal-600 tablets: Excipients not listed. AUSTRMAN suspension: Hydroxybenzoate. Calcium Gluconate Injection (Phebra) (calcium 0.22 mmol/mL): Excipients not listed. Calcium Chloride Injection (Phebra) 10%: Sodium hydroxide and/or hydrochloric acid may be used for pH adjustment.

Special comments
Hypocalcaemia defined as a serum total calcium concentration below 1.875 mol/L [7.5 mg/dL] or ionized calcium less than 1.2 mmol/L. [1]

Blood gas machines measure ionised calcium directly and are more accurate than the main pathology laboratory which calculates the ionised calcium from a complex formula. Corrected calcium is calculated (when albumin < 40 or > 45) by the formula:

\[
\text{Corrected Calcium (mmol/L)} = \text{Measured Ca (mmol/L)} + (40 - \text{albumin (g/L)} \times 0.025)
\]

Calcium salt equivalents of elemental calcium

<table>
<thead>
<tr>
<th>Salt</th>
<th>Elemental Ca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium chloride 10% 1 mL</td>
<td>1.36 mEq</td>
</tr>
<tr>
<td></td>
<td>Calcium gluconate 10% 1 mL</td>
</tr>
</tbody>
</table>

Salt 1g

<table>
<thead>
<tr>
<th>Salt</th>
<th>Elemental Ca</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Acetate</td>
<td>12.6 mEq</td>
</tr>
<tr>
<td>Calcium Carbonate</td>
<td>19.9 mEq</td>
</tr>
<tr>
<td>Calcium Citrate</td>
<td>10.5 mEq</td>
</tr>
<tr>
<td>Calcium Chloride</td>
<td>13.6 mEq</td>
</tr>
<tr>
<td>Calcium Glubionate</td>
<td>3.29 mEq</td>
</tr>
<tr>
<td>Calcium Gluceptate</td>
<td>4.08 mEq</td>
</tr>
<tr>
<td>Calcium Gluconate</td>
<td>4.65 mEq</td>
</tr>
</tbody>
</table>

Evidence
Refer to full version.

Practice points
Refer to full version.

References
Refer to full version.
APPENDIX A
ORAL Calcium preparation

Calcium is widely available as Caltrate® OR Cal-600®. Both contain 600mg elemental calcium. The tablet can be dissolved in freshly boiled but cooled water. Ensure you check the expiry date on the bottle.

1. Using a tablet crusher, finely crush one tablet.

2. In a 30 mL measuring cup, mix the crushed tablet with 30 mL of freshly boiled but cooled water. This will result in a solution containing 20mg elemental calcium per 1 mL. Note that the solution will be cloudy and the tablet may not fully dissolve.

3. Immediately draw up the required dose in an oral syringe and administer to the baby with feeds (do not give at the same time as phosphate, separate by at least 2 hours). The dose will be prescribed by the doctor, depending on the baby’s need. A guide of the different doses (mg) and amount (mL) of solution to give is in the tablet below.

<table>
<thead>
<tr>
<th>Dose</th>
<th>Amount of solution (mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 mg (0.25 mmol)</td>
<td>0.5</td>
</tr>
<tr>
<td>15 mg (0.38 mmol)</td>
<td>0.75</td>
</tr>
<tr>
<td>20 mg (0.5 mmol)</td>
<td>1</td>
</tr>
<tr>
<td>25 mg (0.63 mmol)</td>
<td>1.25</td>
</tr>
<tr>
<td>30 mg (0.75 mmol)</td>
<td>1.5</td>
</tr>
</tbody>
</table>

4. Discard the remainder of the solution. Always use a new tablet for each dose.