

RGH Pharmacy E-Bulletin

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A joint initiative of the Patient Services Section and the Drug and Therapeutics Information Service of the Pharmacy Department, Repatriation General Hospital, Daw Park, South Australia. The RGH Pharmacy E-Bulletin is distributed in electronic format on a weekly basis, and aims to present concise, factual information on issues of current interest in therapeutics, drug safety and cost-effective use of medications.

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Management of hypercalcaemia

In many laboratories the reference range for normal, corrected plasma calcium is between 2.10 - 2.55mmol/L, influenced by the serum albumin concentration because of the variable extent of protein binding. The clinical presentation of hypercalcaemia is variable: while a chronic elevation to 3.0-3.5mmol/L may present with mild symptoms or be asymptomatic, an acute rise to the same level may present with symptoms including fatigue, muscle weakness, confusion, thirst, polyuria, anorexia and constipation. Treatment strategies for hypercalcaemia depend on the extent of elevation, whether the patient is symptomatic, and whether the underlying cause is known.

Mild asymptomatic hypercalcaemia:

Initial treatment is to increase fluid orally and treat any underlying disease. If hypercalcaemia is more severe and prompt correction is required, rehydration with IV sodium chloride 0.9% will usually restore intravascular volume and promote the renal excretion of calcium. Intravenous therapy also increases urinary calcium excretion by inhibiting proximal and loop sodium reabsorption and reducing the passive reabsorption of calcium. Loop diuretics may be given once rehydration has been achieved (to prevent fluid overload and also enhance calcium excretion).

Symptomatic hypercalcaemia:

Hypercalcaemia associated with malignancy is the most common cause of elevated serum calcium requiring immediate treatment. Bisphosphonates are recommended as initial treatment, and are active in inhibiting bone resorption and thus reducing serum calcium. Unfortunately these drugs are slow acting, with a maximal effect observed after 3 - 7 days. Calcitonin is a calcium-lowering agent which works within 4 - 6 hours, however it only has a moderate effect and a generally short-lived action. Calcitonin inhibits osteoclast action and increases renal calcium excretion, and may be used in combination with a bisphosphonate to provide a faster response. Other inhibitors of osteoclast function include mithramycin (no longer licensed in Australia, but available under the SAS scheme) and gallium nitrate (not licensed in Australia), however these agents are associated with significant toxicity. Glucocorticoids are another option and are particularly useful in hypercalcaemia associated with lymphoma or associated with vitamin D toxicity (for example granulomatous disorders). Phosphates given orally at doses of 2 - 3g per day have been used to physically bind calcium and work within hours, however are often poorly tolerated and may not be appropriate if serum phosphate is already raised.

Other considerations:

While treatment strategies will depend on the underlying cause and severity of hypercalcaemia, other factors must also be considered. Clinical considerations include the patient's co-morbidities, especially cardiovascular disease, as hydration must be monitored carefully if the patient has a history (or is at increased risk of) heart failure. The patient's renal function is also of importance as bisphosphonates are not recommended for those with significant renal impairment. While correcting serum calcium levels are of importance in the short-term, correcting the underlying cause of hypercalcaemia should not be forgotten, as otherwise the patient will not be able to maintain stable calcium levels without long-term pharmacological intervention.

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FOR FURTHER INFORMATION – CONTACT THE PHARMACY DEPARTMENT ON 82751763 or email: chris.alderman@rgh.sa.gov.au
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