Hypercalcemia Treatments

The treatment of hypercalcemia depends on the cause, severity, and comorbid conditions of the patient. It should be aimed at lowering the calcium level as well as correcting the underlying cause where possible. The level of plasma calcium and the rate of rise are both important in determining severity of hypercalcemia and the need for treatment. Patients with asymptomatic mild hypercalcemia (<12 mg/dL) do not need immediate treatment. Adequate oral hydration is often sufficient for control, and can be tried initially. A calcium level of 12-14 mg/dL warrants intervention if the elevation was acute or the patient is symptomatic. Patients with severe hypercalcemia of >14 mg/dL need emergent intervention to lower their plasma calcium. The initial treatment for severe hypercalcemia is a combination of volume expansion with normal saline, calcitonin, and a bisphosphonate. Definitive treatment often involves treating the underlying cause.



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Treat Underlying Disorder

Underlying Diseased-guy

Most cases of hypercalcemia occur secondary to an underlying disease state. For these cases, the preferred approach is treatment of the underlying condition. Where primary hyperparathyroidism is the cause, surgical parathyroidectomy can be curative. In cases of hypercalcemia of malignancy, tumor resection is the most effective treatment.

Hydration

Hydrating with water

Volume expansion with a normal saline (NS) bolus is given to correct any volume depletion that may exist secondary to calcium-induced renal salt wasting and restore euvolemia. An initial rate of 200-300 mL/hr via IV should be started on all patients with symptomatic moderate hypercalcemia or severe hypercalcemia in the absence of underlying cardiac or renal disease.

Dialysis

Dial-machine

As a last resort, dialysis can be used in patients with severe hypercalcemia refractory to treatment, or patients with renal or heart failure.

Calcium Restriction

Calcium-cow with Restricting-belt

Dietary calcium restriction to less than 1,000 mg/day can be effective in controlling plasma calcium levels in patients with mild hypercalcemia. It generally must be combined with other lifestyle modifications such as adequate hydration and avoidance of inactivity to have a significant effect.

Bisphosphonates

Bike-phosphate-P

Bisphosphonates are used to treat any hypercalcemia caused by excessive bone resorption. As phosphate analogs, they bind to bone and inhibit the resorptive action of osteoclasts. Commonly used preparations are intravenous zoledronate and pamidronate. Although generally well tolerated, they can be nephrotoxic.

Calcitonin

Cow-throne

Calcitonin decreases plasma calcium in two ways. Its major effects come from inhibition of osteoclast function, decreasing bone resorption and the subsequent release of calcium. Secondarily, it inhibits renal reabsorption of calcium and phosphate.

Cinacalcet

Sink-calcium-cow

The calcimimetic agent cinacalcet is a treatment option for patients with hypercalcemia secondary to primary or secondary hyperparathyroidism. It works by activating the calcium-sensing receptors on chief cells within the parathyroid gland so that less PTH is released and serum calcium levels can normalize. It is often used in patients with parathyroid carcinoma, and dialysis patients with secondary hyperparathyroidism.

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Glucocorticosteroids

Glue-quarter-on-steroids

Patients with lymphomas or chronic granulomatous diseases such as sarcoidosis have hypercalcemia that is caused by excess calcitriol production. Glucocorticoids inhibit calcitriol production by activated mononuclear cells. Prednisone 20 - 40 mg per day is generally effective to decrease serum calcium within one week.

Denosumab

Dino-sumo

A monoclonal antibody against RANKL, denosumab binds to RANKL and inhibits the activation of osteoclasts leading to decreased bone resorption. It is often used in patients with hypercalcemia of malignancy that is resistant to bisphosphonate use. As it is not renally excreted, it is safe for use in those with kidney disease.

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