

WHAT IS HYPERCALCEMIA?

Hypercalcemia refers to an excessive amount of ionized calcium in the blood.¹ Up to 30 percent of patients with cancer develop hypercalcemia. Approximately 50% of those patients die within 30 days of hypercalcemia diagnosis, even if the hypercalcemia is corrected, which suggests that hypercalcemia is a sign of hormonally advanced cancer. It is most associated with squamous cell cancer of the lungs, head and neck cancer, esophageal cancer, breast cancer, renal cell carcinoma, lymphomas, and multiple myeloma.²

SIGNS & SYMPTOMS

Symptoms of hypercalcemia may be easily overlooked, as the signs are insidious and nonspecific and vary from patient to patient. Assessment of a patient's ionized calcium concentration is the most important laboratory test in the diagnosis of hypercalcemia and the most accurate indicator of blood calcium level. If the ionized calcium concentration is not available, a corrected serum calcium level may be used.

Mild or Moderate Hypercalcemia	Severe Hypercalcemia	Most Common Symptoms	Rare Symptoms
Mild serum calcium: < 12 mg/dL Moderate serum calcium: 12–14 mg/dL	Severe serum calcium: > 14 mg/dL		
Fatigue and lethargy Mental dullness Weakness Dehydration Anorexia Increased thirst Polyuria Constipation	Drowsiness Delirium Nausea Vomiting Confusion Dehydration Coma	Nausea Vomiting Anorexia Constipation (ileus possible) Polyuria Polydipsia	Bradycardia QTc interval shortening Wide T waves Cardiac arrhythmias Prolonged PR Interval

INTERVENTIONS

Management of hypercalcemia includes nonpharmacological, pharmacological, interventional, behavioral, and complementary treatments. Identifying underlying etiologies and reviewing laboratory and diagnostic data help establish the proper course of treatment. The active treatment goal should be alleviating distressing symptoms for the patient. Interventions are warranted for patients with symptomatic hypercalcemia if such treatments will not exacerbate existing symptoms and are aligned with the patient's and family's goals of care.

Review the goals of care with the patient and family, taking into consideration the extent of the disease, other symptoms, whether palliative treatment is still in process, age, developmental and emotional status, and physical location. In advanced illness, when optimization of treatments for underlying etiologies is not achievable, discuss, as culturally appropriate, shifting goals of care to reduce symptom burden and improve the patient's functional status and quality of life. Prior to implementing an intervention, ensure that the patient and family can safely and effectively manage and administer medications and therapy.

NONPHARMACOLOGICAL INTERVENTIONS	PHARMACOLOGICAL INTERVENTIONS
<p>Promote patient mobilization to the greatest extent possible.</p> <ul style="list-style-type: none"> • Closely monitor electrolyte values: serum calcium (ionized or corrected), potassium, magnesium, albumin, and bicarbonate levels (in accordance with patient's goals of care). • Closely monitor renal function tests: blood urea nitrogen and creatinine. • Dialysis may be considered in rare cases to remove excess calcium from the blood. Its cost may be prohibitive in hospice settings. 	<ul style="list-style-type: none"> • Deprescribe medications that can increase serum calcium (e.g., lithium, vitamin D, supplements containing calcitriol, thiazides, calcium antacids).² • Consider saline hydration with IV fluids to increase urinary calcium excretion. • Antitumor therapy treatment of the underlying malignancy with systemic therapy (e.g., chemotherapy) is essential for long-term management. In cases where further antineoplastic therapy is not feasible, the decision to treat or not treat hypercalcemia should be made after careful exploration of the patient's goals of care. In advanced, untreatable cancer, the decision to not treat hypercalcemia may be appropriate.²

	<ul style="list-style-type: none"> • Loop diuretics (e.g., furosemide) block calcium resorption in the loop of Henle. Note: Use diuretics only after dehydration has been corrected. • Consider bisphosphonates to inhibit osteoclast activity. Careful assessment of the severity of hypercalcemia, fluid volume status, renal function, and disease status should guide potential use of bisphosphonates. Another consideration is the cost of such treatments if the patient is in a hospice setting. • Denosumab is a monoclonal antibody leading to inhibition of osteoclast differentiation and bone resorption. Consider cost if the patient is in a hospice setting. • Consider calcitonin to inhibit calcium resorption.
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FAMILY & TEAM DISCUSSIONS

Patient and Family Education and Support:

- Facilitate education on appropriate nonpharmacological strategies.
- Provide education on the underlying etiology of hypercalcemia, treatment options, benefits and burdens of hypercalcemia management, adverse reactions to medications, and indicators for reporting response to therapy.
- Consider the patient's and family's goals and wishes, as well as their definition of quality of life, when evaluating treatment options.
- Treatments are to be aligned with the patient's and family's goals of care.

Interprofessional Team:

Successful interventions in caring for patients with hypercalcemia benefit from multiple perspectives to anticipate, prevent, and treat physical, psychological, social, and spiritual needs.

Consider social work, psychology, counseling, and spiritual care specialists for palliative and hospice support and interventions to address concerns regarding caregiver support, fear, anxiety, guilt, depression, spiritual and cultural rituals, and financial concerns as culturally appropriate.

SYMPTOM DOCUMENTATION EXAMPLE

An 63 yr old male with stage 4 non-small cell lung cancer (NSCLC), current PPS (Palliative Performance Scale) of 40% with progressive functional decline over three months. Over the past two weeks, the patient has experienced worsening nausea, vomiting, and constipation. Recent lab work revealed a corrected serum calcium level of 14 mg/dL. Patient received IV hydration and bisphosphonate therapy, which corrected serum calcium and resulted in alleviation of symptoms. Ongoing discussions about goals of care related to NSCLC disease progression and hypercalcemia emergency interventions and management were held with patient and surrogate decision maker. Patient and family agreed to hospice referral to evaluate options. Hospice referral made. Family meeting scheduled in three days. Plan of care updated to reflect hospice evaluation.

DESIRED NURSING OUTCOMES

- Promote informed, shared decision-making regarding treatment interventions for hypercalcemia.
- Improve the physical, psychological, social, and spiritual well-being of patients and caregivers who are suffering from the distressing symptoms of hypercalcemia.
- Promote ongoing conversations about the goals of care relating to disease progression and emergency interventions and management.

REFERENCES

1. Robertson Q & Gershon K. Urgent syndromes at the end of life. In: Ferrell B & Paice J. (Eds.), Oxford Textbook of Palliative Nursing (5th ed.). New York, NY: Oxford University Press; 2019.
2. Siddiqui F & Weissman D. Fast Facts and Concepts #151 Hypercalcemia of Malignancy. Available at: <https://www.mypcnow.org/wp-content/uploads/2019/02/FF-151-Hypercalcemia-of-malignancy.-3rd-Ed.pdf>. Accessed July 20, 2020.