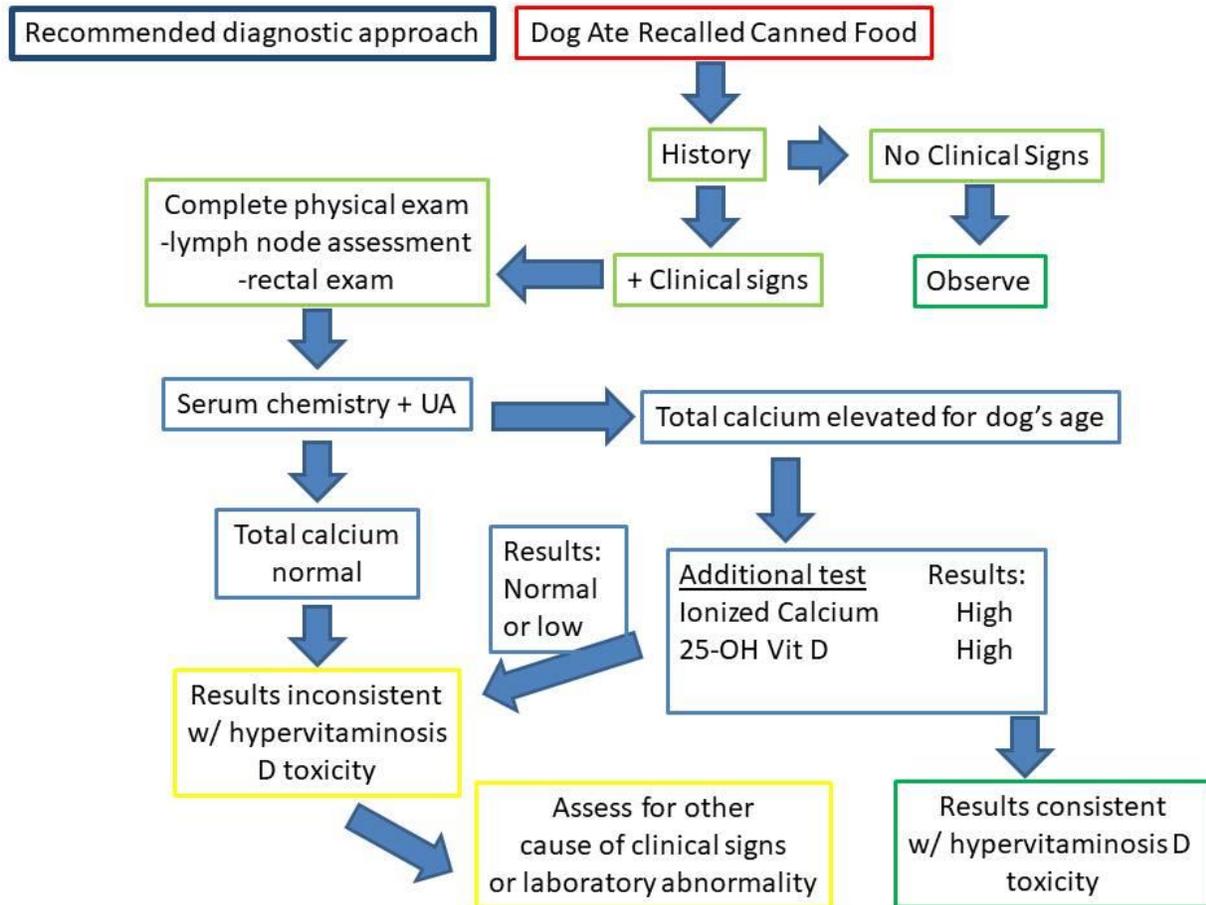


Diagnosis and Treatment for Hypervitaminosis D



Diagnostic Approach

Minimum recommendation for dogs that have consumed recalled canned product:

- Always recommend **discontinuing** recalled canned canine product
- History - perform a nutritional assessment and ask questions to identify potential clinical signs associated with excessive vitamin D intake including lethargy, inappetence, anorexia, vomiting, diarrhea, polyuria/polydipsia. See link for brief diet history from: <https://www.wsava.org/Guidelines/Global-Nutrition-Guidelines>
- Physical examination - a thorough physical examination to include hydration status, joint pain (growing puppies), and other associated findings that may occur in dogs with hypercalcemia
- Serum chemistries - to detect hypercalcemia and/or azotemia and determine serum phosphorus
- Urinalysis - to detect hyposthenuria [urine specific gravity (USG) < 1.008] or inappropriately concentrated USG (< 1.030) with concomitant azotemia

If results of initial screening (items above) are normal, have the owner continue to observe and contact you if there are any abnormal findings.

If hypercalcemia exists (total serum calcium above upper reference range for the dog's age), we suggest measuring ionized calcium in the fasting dog and considering all potential causes (excessive vitamin D intake; neoplasia - lymphoma, anal gland adenocarcinoma, others; primary hyperparathyroidism; hypoadrenocorticism, etc.) and performing appropriate tests to exclude concurrent primary diseases. Younger dogs (generally < 1 year) will have higher total calcium concentrations than older dogs.

If you suspect **dietary-induced hypercalcemia** (high ionized calcium), we recommend submitting serum or plasma (according to laboratory guidelines) for measurement of 25-hydroxyvitamin D

Findings consistent with excessive vitamin D intake include the following changes in serum concentrations:

- Increased total and ionized calcium considering the dog's age
- Increased 25-OH vitamin D (expect results in 7 days)

Treatment Recommendations

If the Ca x P product is > 70 for mature dogs or > 80 for young growing dogs, begin treatment to protect against soft tissue mineralization. This calculation is unlikely to be beneficial in acute vitamin D ingestion.

In dogs with increased serum ionized calcium or if excessive vitamin D intake is confirmed and there are clinical signs, start treatment as described below.

Be cognizant for 'over' treatment in dogs without clinical signs that are eating normally and have mildly increased total or ionized calcium concentrations. Discontinuation of feeding recalled canine product and close observation is recommended for those patients. There is significant individual dose-response/sensitivity to Vitamin D₃, even amongst healthy dogs. Likewise, there can be notable variation in response to treatment. Therefore, consultation with a veterinary toxicologist, internist, or other expert is recommended, especially during the early stages of toxicosis.

Suggested Therapeutic Approach

- The goal of treatment is to enhance urinary excretion of calcium and prevent calcium resorption from bone.
- If cardiac function and blood pressure are normal, begin intravenous treatment with 0.9% sodium chloride at 100-125 ml/kg/day to correct dehydration and provide moderate volume expansion.
- Reassess serum calcium concentration every 24 hours to evaluate the effectiveness of fluid therapy and adjust the fluid rate based on hydration status, including PCV and TPP, and serum electrolyte concentrations.

- If serum calcium does not decrease and the patient is well hydrated, administer a bisphosphonate such as pamidronate disodium. Pamidronate is dosed at 1.3 – 2.2 mg/kg IV diluted in 0.9% sodium chloride over 2-4 hours and may be repeated in 3-4 days in non-responsive patients.
- Depending on the degree of hypercalcemia, consider adding a glucocorticoid such as prednisone (1 mg/kg BW orally every 12 hours) when the bisphosphonate is administered. This may work as an adjunct or provide additional protection until the bisphosphonate effects are apparent.
- The use of furosemide is currently reserved for severe hypercalcemia as dehydration may become pronounced.
- If calcium levels normalize, IV fluids can be weaned. Oral prednisone should be continued for an additional 1-2 weeks and can be slowly weaned at that time. Calcium levels should be monitored daily for 96 hours (4 days) after fluid cessation. It is recommended to continue monitoring serum calcium every 2-3 days during the prednisone weaning process to ensure calcium levels remain normal.

References

Professional consultation with board-certified veterinary internists and toxicologists at Pet Poison Helpline. Jen/Feb, 2019. www.petpoisonhelpline.com

<https://www.merckvetmanual.com/endocrine-system/the-parathyroid-glands-and-disorders-of-calcium-metabolism/hypercalcemia-in-dogs-and-cats>