

Izzy's Mineral Mishap

Chris Deignan

Mississippi State University College of Veterinary Medicine

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Advisors: Dr. Juli Gunter, Dr. Seth Kettleman

### ***Introduction:***

Calcinosis circumscripta is an uncommon lesion characterized by ectopic deposition of calcium salts in soft tissues, consisting primarily of hydroxyapatite crystals or amorphous calcium phosphate<sup>1</sup>. Etiologies responsible for lesion development can be metastatic, dystrophic, iatrogenic, or idiopathic, and clinical signs are dependent upon underlying cause and location<sup>1,5</sup>. Previous studies have shown a predilection for these lesions to occur at pressure points such as: the lateral aspect of the cubital joint, footpads, metatarsal, and metacarpal regions. Other uncommon sites of occurrence include the thoracic wall, spinal cord, salivary glands, and the tongue. Some breed predilection has been determined, particularly in German Shepherd Dogs<sup>2</sup>. Lingual calcinosis circumscripta was first described in canine patients in the 1960s, and the exact mechanism for dystrophic lesion development remains unclear<sup>2</sup>.

### ***History and Presentation:***

An approximately 1-year-old female spayed border collie presented to the MSU-CVM dermatology service for multiple raised lesions on the lateral and ventral surfaces of her tongue. Izzy had a history of being an aggressive chewer and had been receiving chew bones on a daily basis for the majority of her life. The lesions were initially noticed after the patient was found to be chewing on a plastic coat hanger and were thought to be an injury secondary to self-trauma from chewing. The patient was taken to her primary veterinarian where she was treated with oral clindamycin and prednisone. The owner reported that the initial lesion did improve with treatment; however, it had since grown in size and a second lesion developed in the months following its discovery.

On initial presentation, Izzy was anxious though bright alert and responsive, had a BCS of 7/9 and weighed 19 kg. Her vitals were mildly abnormal with a rectal temperature of 104.2 F respiratory rate of 100 breaths per minute, and a pulse rate of 88 beats per minute. No murmurs, arrhythmias, crackles, or wheezes were appreciated on cardiopulmonary auscultation. Upon oral examination, two firm nodular masses were noted on the left and right lateral margins of the tongue measuring ~2cm and 3cm, respectively, and occupying the full thickness of the tongue. The lesions were mildly ulcerated and not grossly inflamed, and no pain response could be elicited on palpation.

***Diagnostic Approach and Considerations:***

While the lesions on the tongue were characteristic of calcinosis circumscripta, incisional biopsy was indicated to definitively diagnose the lesion. Due to multiple etiologies responsible for the abnormal deposition of calcium salts in soft tissues, diagnostics such as blood chemistry are important in ruling out more severe causes of the lesions at hand. In the absence of abnormal serum calcium and phosphorus levels, dystrophic, iatrogenic, and idiopathic causes were of a higher index of suspicion. In this case, there was no history of a surgical procedure or exposure to toxic chemicals; however, there was a history of chronic and aggressive chewing.

A complete blood count revealed no abnormalities; however, a chemistry panel showed mild elevations in BUN (27 mg/dL – normal range 8-24) and creatinine (1.54 mg/dL – normal range 0.5 – 1.4) in addition to mild elevations in sodium and chloride levels. Calcium and phosphorus within normal limits. A urinalysis was performed to rule out renal and post-renal causes of azotemia, though urine specific gravity (USG) was 1.017. This level of USG is still considered hypersthenuric, though was below what would be considered normal for pre-renal

azotemia – a USG >1.030 is considered normal for pre-renal azotemia. Further evaluation of the aforementioned values was recommended.

A punch biopsy of the lesion was performed 7 days after initial visit using a circular punch, and two cruciate sutures were placed in the resulting defect. During the procedure a moderate amount of sheer white fluid exuded from the lesion upon puncture, and the sample was submitted for histopathology. The patient was prescribed 5 days of oral carprofen at 2 mg/kg twice daily to relieve any pain and inflammation associated with the procedure. Histopathology results revealed a focal expansion and replacement of normal lingual skeletal muscle with irregular foci of deeply basophilic mineral material with rare trabeculae of mature bone containing medullary spaces. Low magnification images display the expansile nature of this lesion (Fig. 1). The mineral deposits were surrounded by dense regions of epithelioid macrophages and multinucleate giant cells, further surrounded by fibrous connective tissue infiltrated by low numbers of lymphocytes and plasma cells as seen on high magnification images (Fig. 2). Myocytes within the sample exhibited varying degrees of degeneration, necrosis, and regeneration. On pathologic review, this biopsy was determined to be consistent with calcinosis circumscripta and believed to be a result of dystrophic mineralization at sites of previous chronic trauma. The presence of mature trabeculae indicated severity and chronicity of the lesion, and there was no evidence of active infectious or neoplastic processes occurring. Surgical excision was deemed to be curative; however, due to the nature of the lesion, recurrence is possible.

***Treatment and outcome:***

With histopathologic diagnosis of dystrophic calcinosis circumscripta, surgical excision was deemed to be the treatment of choice and would be curative, though the potential for recurrence would remain.

The patient was anesthetized and placed in sternal recumbency with the head slightly obliqued. The mouth was prepped with a dilute betadine wash. Two lesions were identified on the tongue, one along the left lateral apex and one along the right caudal body of the tongue. Wedge shaped incisions were made along the borders of the lesions using a #15 blade, and the surrounding lingual muscle was incised with Metzenbaum scissors to allow en bloc excision. Hemostasis was controlled by placing a Doyen forceps caudal to the lesions. The lingual muscle was apposed with 3-0 Monocryl in cruciate pattern for the rostral lesion and simple continuous pattern for the caudal lesion. The lingual surface was apposed with 4-0 Monocryl in cruciate pattern for the rostral lesion and simple continuous pattern for the caudal lesion. The patient recovered from anesthesia uneventfully.

The patient did return 4 days later after reporting incisional dehiscence of both surgical sites, though owner compliance was suspected to be sub-par as she was allowed access to chew toys post-operatively. On examination, there was complete dehiscence of both surgical sites (Fig. 3 and Fig. 4); however, they were not deemed to need revisional surgery and were allowed to heal by second intention.

***Pathophysiology:***

As mentioned above, calcinosis circumscripta has multiple etiologies, though dystrophic lesions are considered the most common cause. Lesions can be staged 1-3, depending on the

degree of infiltration by inflammatory cells<sup>1</sup>. Dystrophic lesions are most often present at pressure points and areas with a previous history of acute or chronic trauma<sup>1</sup>. The mechanism for development of dystrophic lesions is not fully understood, though it is thought to be secondary to collagen abnormalities, a release of alkaline phosphatase from damaged tissues, or an increase in tissue pH<sup>3</sup>. Iatrogenic lesions arise secondary to treatments or surgical procedures at the lesion site, though are also considered a dystrophic manifestation. Metastatic lesions are uncommon and occur mostly in humans, though have been reported to occur in the presence of abnormally high calcium or phosphate levels due to vitamin D toxicosis, chronic renal failure, or end-stage kidney disease<sup>1</sup>. In canine patients, metastatic mineralization of tissues is known to occur once Ca x P reaches >60 - 70<sup>4</sup>. In one case of metastatic calcinosis circumscripta, lesions were reported to have resolved after the underlying calcium and phosphorus abnormalities were corrected with treatment using an oral charcoal adsorbent. The resolution of the lesions was unexpected, and it is thought that use of this drug allowed excretion from affected tissue and prevention of further deposition, allowing normal tissue to be restored<sup>3</sup>.

Surgical excision remains the treatment of choice, but the aforementioned example presents the potential for other treatments to become available with future research. Overall, calcinosis circumscripta is considered a benign lesion, though the etiology must be elucidated to avoid further mineralization and potentially fatal consequences.

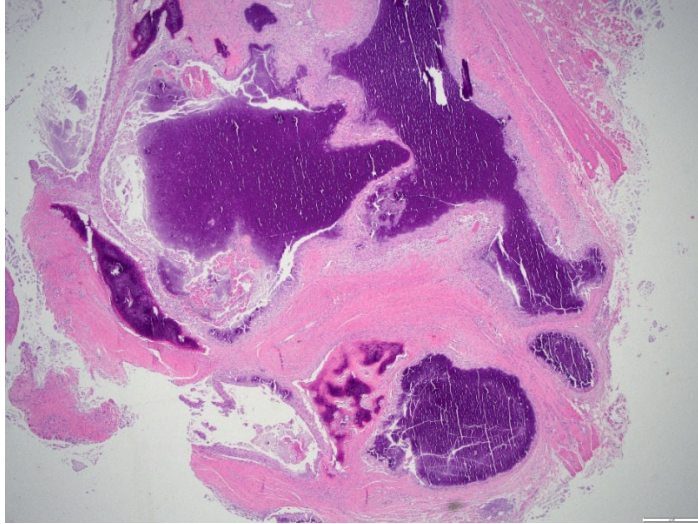


Figure 1

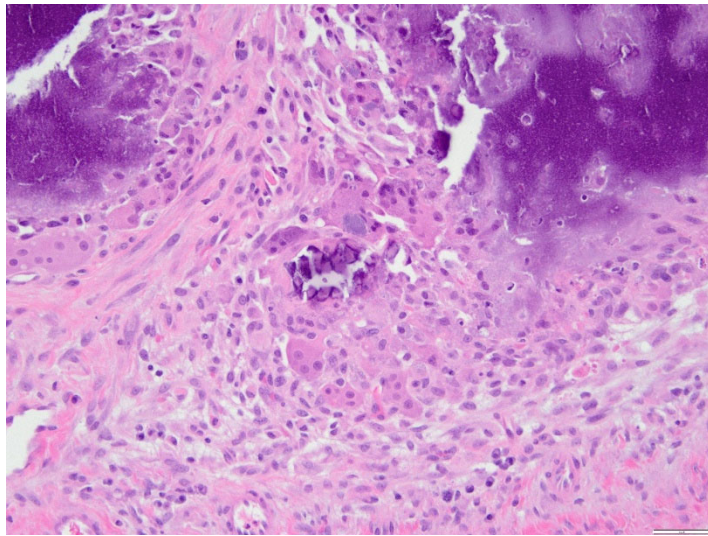


Figure 2

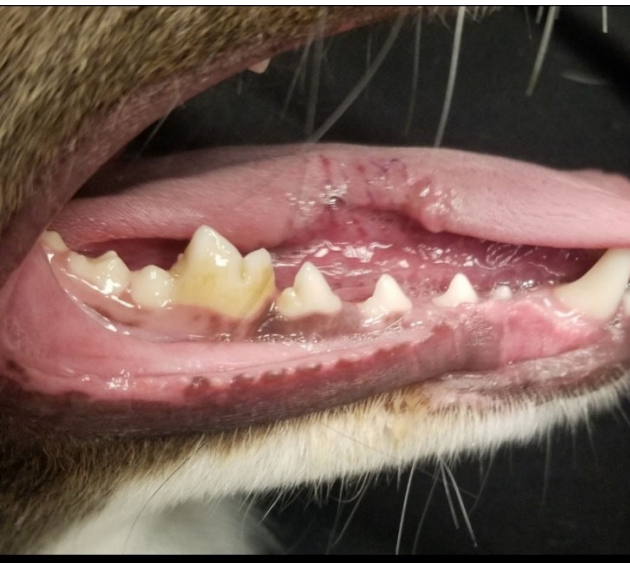


Figure 3



Figure 4



Figure 5: Lesion on the right lateral aspect of the tongue on initial presentation



## References

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