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Case Report

Calcinosis Circumscripta in Lingual Muscles of a Dog

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Abstract

Calcinosis Circumscripta (CC) is an uncommon disorder characterized by calcium deposits in soft tissue. It occurs rarely in dogs and cats, especially in oral cavity. Prompt diagnosis is essential as this condition is surgically curable. This case report describes the diagnosis and management of lingual CC in a Rottweiler dog. A one-year-old intact/male dog was presented with 4 weeks' history of whitish masses located in the ventral portion of the tongue. The differential diagnosis based on physical and oral examinations, laboratory tests, and the patient's response to antibiotic treatment, from most likely to least probable included: abscess, foreign body, candidiasis, chronic inflammation of unknown etiology, eosinophilic granuloma, calcinosis circumscripta, uremia and neoplasia. Blood was analyzed for complete count, blood urea nitrogen, creatinine, creatine phosphokinase (CPK), serum calcium and cortisol. A wedge-shaped incision was made on the ventral surface and smooth muscle was incised in order to remove the masses. Culture swabs was processed. Tissue was fixed immediately in 10% neutral buffered formalin for light microscopy, processed routinely and embedded in paraffin. Four mm thickness sections were cut and stained with Hematoxylin and Eosin. Histological examination revealed a normal stratified epithelium with underlying submucosa containing multifocal amorphous calcifications without tissue reaction. The appearances were consistent with calcinosis circumscripta. The analysis of blood sample showed that the dog had normal activities of enzymes and mineral contents. Especially, CPK and serum calcium, which are known as indicators of nutritional myopathy and metastatic calcification respectively, were within normal range. These lesions may mimic neoplastic growths emphasizing the importance of histopathological evaluation. This condition is surgically curable if cuff of healthy tissue is removed with the lesion and recurrence is rare. Even though the precise cause of calcification could not be determined, this case might be valuable information to veterinary practitioners likely to encounter cases of calcium deposition at unusual sites in dogs.

Keywords: *Calcinosis Circumscripta; Histopathology; Lingual Tissue; Dog*

Introduction

Calcinosis Circumscripta (CC) is an uncommon disorder characterized by calcium deposits in soft tissues in both human and animal [1-3]. These calcium salts consist of hydroxyapatite crystals or amorphous calcium phosphate. The condition is characterized by formation of nodules on sites of previous trauma, pressure points, and bony prominences. However, there are several unusual anatomic locations for CC were identified including the thoracic wall, thoracic spinal cord, salivary glands and tongue [1-7]. The disease occurs most often in large breed dogs, under two years of age with higher incidence in German shepherd, Rottweiler and Labrador retrievers [4,7]. The etiology and pathogenesis of the disorder have still remained undetermined [7], prompt diagnosis is essential as this condition is surgically curable. Calcinosis Circumscripta is categorized in to three major groups, such as: dystrophic, metastatic, and idiopathic calcinosis [7,8].

Dystrophic calcinosis occurs in a specific area of tissue damage, which may be due to injury, necrosis, inflammation, or neoplasia. Serum calcium and phosphate levels are normal in this type. Metastatic calcinosis is associated with abnormal calcium or phosphate metabolism, such as hypercalcemia or hyperphosphatemia derived from chronic renal failure, end-stage renal disease, or vitamin D toxicosis. Idiopathic calcinosis occurs without identifiable causative factors. In small animals, dystrophic and idiopathic calcinosis occurs more frequently than metastatic calcinosis [7]. Herein, we describe the diagnosis, histopathologic features and surgical management of calcinosis circumscripta in the tongue of a Rottweiler.

Case Report

A one-year-old intact male Rottweiler dog presented with the complaint of lumps under the tongue noticed by the trainer for 1 month. The patient's appetite and general state of health were found to be normal and the vaccination was up to date. A calcium supplement had been administered for the first 6 months of the puppyhood.

The dog was submitted to detailed clinical examinations. The dog was bright and alert and responsive with normal behavior and was in a good nutritional status. Capillary refill time was less than 2 seconds and mucous membrane was pink in color. Regional lymph nodes including, retropharyngeal and mandibular lymph nodes were normal in size. Cardiac and pulmonary auscultation and abdominal palpation reveled no abnormalities. Rectal temperature was 101.7°F, pulse rate was 112 bpm with good volume and respiratory rate was 40/min.

Oral examination revealed that multifocal small (0.5 - 1 cm) white nodular masses under the tongue with normal rest of the oral cavity (Figure 1). The differential diagnosis based on physical and oral examinations, laboratory tests and the patient's response to antibiotic treatment, from most likely to least probable included: abscess/foreign body, candidiasis, chronic inflammation of unknown etiology, eosinophilic granuloma, calcinosis circumscripta, uremia, and neoplasia.

Biochemical tests including creatinine, blood urea nitrogen, white blood cell count, red blood cell count, calcium levels, phosphorus levels, creatinine phosphokinase and cortisol levels were requested. However, analysis of blood samples showed that the dog had normal activities of enzymes and mineral contents. Especially, CPK (creatine phosphokinase) and serum calcium, which are known as indicators of nutritional myopathy and metastatic calcification, respectively, were within normal ranges (Table 1). Moreover, these lesions were not generalized but limited only to the tongue.

Parameter	Value	Reference Range
White blood cell count	16.62 $\times 10^3$/µl	5 - 21/µl
Red blood cell count	6.65 $\times 10^6$/µl	3.40 - 7.60/µl
Platelets	721 $\times 10^3$/µl	200 - 500 $\times 10^3$/µl
Creatinine	1.10 mg/dl	0.5 - 1.5 mg/dl
Blood Urea	15.03 mg/dl	10 - 28 mg/dl
Serum Calcium	10.01 mg/dl	8.9 - 11.4 mg/dl
Creatinine Kinase	225 U/L	59 - 895 mg/dl
Serum Phosphorus	5.89 mg/dl	2.4 - 8.2 mg/dl

Table 1: *Blood chemistry profiles of a dog with calcinosis circumscripta on lingual muscles. All the blood parameters were withing the normal range except slightly elevated platelet count.*

Patients underwent a surgical resection of the lesions after assessed by certified veterinarians. After its surgical excision, the sections and swabs of the lesion were directed to histopathology and culture tests. Prophylactic antibiotic, Amoxicillin 20 mg/kg IV, (Swiss Parenterals Pvt. Ltd, Gujarat, India) was administered and the dog was pre-medicated using chlorpromazine 2 mg/kg IV, (Verve Human Care

Laboratories, Pharma City, India.), meloxicam 0.15 ml SC (7.5 mg/ml, Alina Combine Pharmaceuticals Pvt Ltd, Karachi, Pakistan). The induction of anesthesia was done using propofol 4 mg/kg IV (Aculife Healthcare Pvt. Ltd, Gujarat, India).

An incision was made in the mucosal surface of the dorsal tongue, maintaining a one-centimeter margin of grossly normal tissue reaching the smooth muscles of the tongue. The wedge-shaped incision was made on the ventral surface, and smooth muscle was incised in order to remove the mass. This procedure was done to all the masses and bleeding points were cauterized.

The patient was discharged after the 6-hours following surgery and postoperatively the dog received Amoxicillin (20 mg/kg PO TID) and Meloxicam (0.2 mg/kg PO SID) therapy. The patient had no signs of pain or discomfort during this period. The same antimicrobial therapy and bland diet were prescribed for 7-days following surgery. Oral examination performed 2-weeks following surgery indicated appropriate satisfactory wound healing. There were no signs of recurrence at 4 months following surgery.

The excised tissue was fixed immediately in 10% neutral buffered formalin, processed routinely and embedded in paraffin. Sections were cut to 4 mm in thickness and stained with Hematoxylin and Eosin. Macroscopic examination of the dorsal surface of the lesion included a whitish-yellow, ulcerated mucosal mass, ranging from 0.2 to 0.5-cm in diameter, composed of numerous confluent gritty, chalky nodules (Figure 1). Histological examination of masses revealed a normal stratified epithelium with underlying submucosa containing multifocal amorphous calcifications without tissue reaction. The appearances were consistent with calcinosis circumscripta (Figure 2). Microbiology culture test was negative for presence of bacteria or fungi.

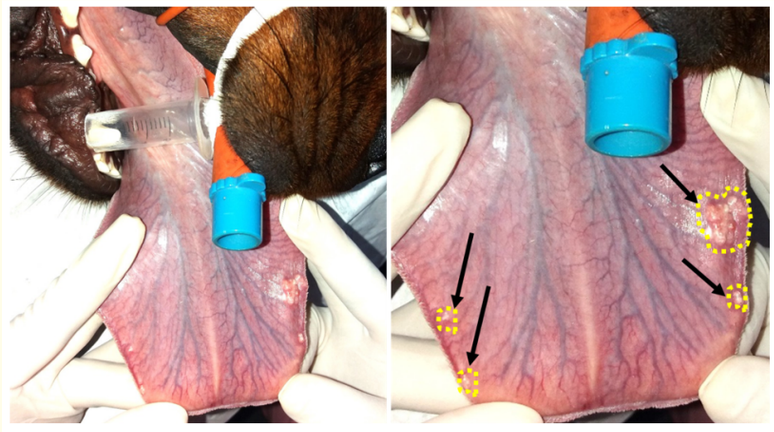

Figure 1: *Photographic view of ventral aspect of tongue in a one-year-old, intact/male Rottweiler indicating lingual calcinosis circumscripta. Irregular, 0.2 - 0.5 cm in diameter (Arrow, yellow dotted margin) white masses were on ventral surface of the tongue demonstrated after anesthetizing the dog.*

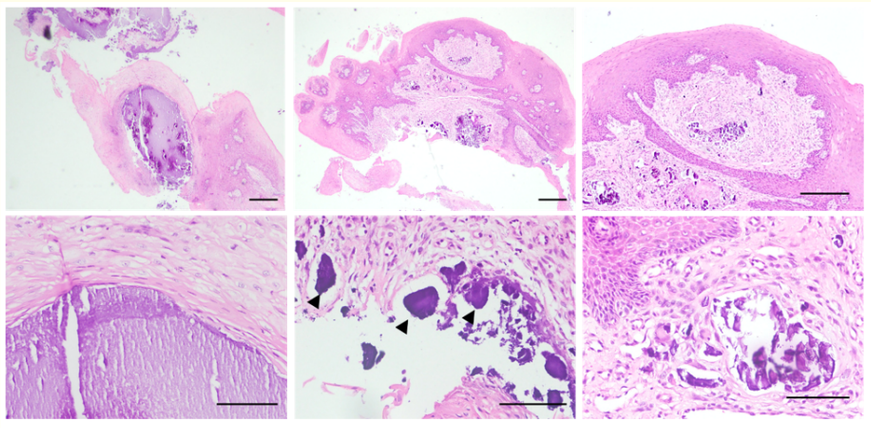

Figure 2: *Histopathological image of lingual calcinosis circumscripta. The tongue biopsies reveal mucosal stratified squamous epithelial lining with acanthosis. The underlying submucosa shows multifocal amorphous calcifications without tissue reaction. Deposition of dense, amorphous granular basophilic calcium salt (arrow) were separated by thin fibrous connective tissue containing a mild scattered mononuclear cell infiltrate. Bar = 10 µm.*

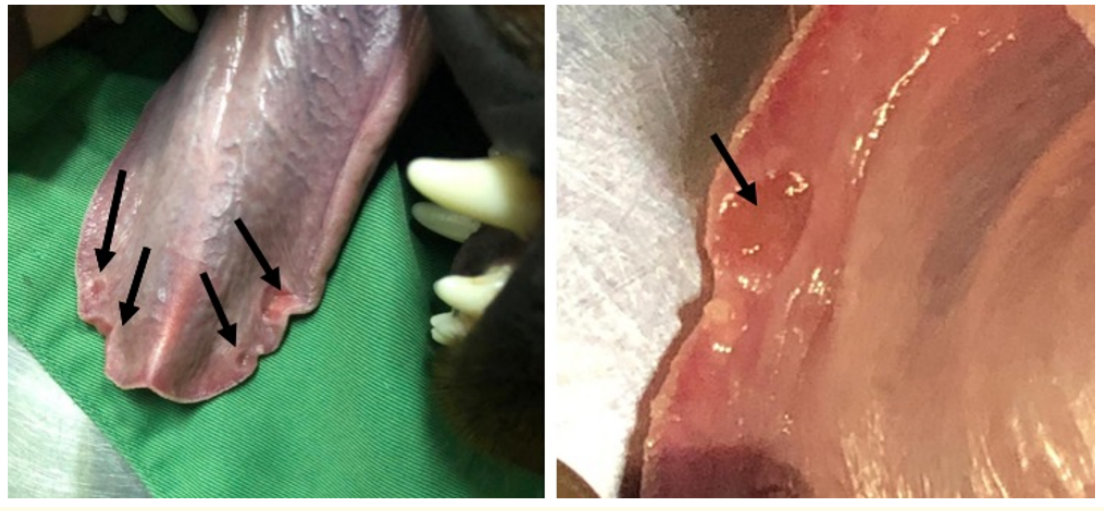

Figure 3: *Two weeks after surgical removal of masses. Wounds are healthy and no residual masses or new lesions were found.*

Discussion and Conclusion

Calcinosis circumscripta is a rare condition encountered among both humans and various species of animals [3]. Even though, CC is defined as small mineralized foci formed within the subcutaneous tissue, bigger lesions located in the connective tissue are called tumoral calcinosis [5,9]. Repeated trauma or inflammation may lead to tissue necrosis and subsequent dystrophic calcification. It has been postulated that calcinosis circumscripta of the oral cavity occurs when the apocrine gland of the oral mucosa degenerates producing a focal area of calcification due to necrosis [6]. It is most commonly found in young, large-breed dogs [6]. This abnormal calcium deposition will result in slightly raised, nodular, white-to-grey areas on the lingual and/or buccal tissues. These lesions can occur on the dermis as well [10].

There was no clear indication that the dog reported here had been in contact with caustic agents or received lingual trauma, making this case appear as idiopathic calcinosis circumscripta. Although calcium diet supplementation may contribute to a higher incidence of calcinosis circumscripta in some large-breeds such as German shepherd dogs, the etiology in this case may have been multifactorial based on the dog's breed, age, calcium supplementation history, and possibility of trauma. Microscopically, no other lesions were detected besides calcium deposition on the lingual muscle similar to those in calcium circumscripta. While the precise cause of calcification could not be determined in our case, we speculated that deposition of calcium is likely to be idiopathic.

Taken together with gross and serological examinations and history, there were no evidence of traumatic, metastatic and nutritional calcification on the tongue. In this report, we described gross, hematological and microscopical finding about calcinosis circumscripta on the lingual muscles in a dog. A surgical resection of the lesions is likely to produce a cure. The recurrence of the pathological process is reported only occasionally. As the specific cause for CC development is still unknown, upon the occurrence of generalized mineralized depositions an animal should be examined for the presence of an underlying disease process.

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Competing Interests

The authors declare that they have no conflict of interest.

Consent to Publish

The authors guarantee that the contribution to the work has not been previously published elsewhere and that any person named as a co-author of this work is aware of the fact and have agreed to be so named.

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