

Calcinosis circumscripta in the popliteal fossa of a young dog



An 18-month-old, male, Italian Pointer was presented with the history of a gradually growing skin tumour-like lesion in the popliteal fossa. Cytology was not definitive but calcinosis circumscripta was suspected based on imaging (mainly X-rays and CT); the final diagnosis was made by histological examination. Surgical excision of the calcified structure led to complete remission of symptoms with no recurrence of the disease within the next 12 months. Several cases of ectopic mineralisation, mainly involving the hind limbs and tongue of young, large-size dogs, are reported in the literature, but, to the Authors' knowledge, this is the first case of calcinosis circumscripta in a dog's popliteal fossa.

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INTRODUCTION

Calcinosis circumscripta is an uncommon disorder characterised by ectopic soft tissue mineralisation. The disorder can be classified as idiopathic, dystrophic, metastatic or iatrogenic^{1,2}. In both the dog and - more rarely - in the cat, the most commonly described form is the idiopathic one, characterised by the absence of clinical signs and by the presence of metabolic disorders which are considered the primary cause of the disease; localised traumas are instead considered the main cause of dystrophic forms. Cases of iatrogenic nodular mineralisation have been described in the literature in both dogs and cats following the administration (SC) of progestin derivatives^{3,4}.

Idiopathic and dystrophic *calcinosis circumscripta* mostly affects medium-large, fast growing young dogs (under the age of two), in particular the German Shepherd, Rottweiler and Labrador Retriever⁵. Conversely, metastatic calcifications resulting from chronic renal failure mainly affect older subjects, on the footpads, although cases of young subjects with renal dysplasia or congenital kidney failure⁶ are reported in the literature. Neither gender nor breed predisposition⁷ have been identified for any of the forms.

The lesions are typically solitary, 0.5-7 cm in size, arising mostly at the level of the hind limbs or on the tongue, although cases of *calcinosis circumscripta* have also been reported at the level of the jejunum wall⁷, the C1-C2 intervertebral space⁸, the atlantoaxial joint⁹ and the dorsal lamina T2-T3¹⁰. To the Authors' knowledge, to date, no cases of *calcinosis circumscripta* located in the popliteal fossa have been described in the literature.

***Calcinosis circumscripta* is a form of dystrophic mineralisation which affects the dog and, more rarely, the cat. The disorder can be classified as idiopathic, dystrophic, metastatic or iatrogenic.**

DESCRIPTION OF THE CLINICAL CASE

Clinical history

An 18-month-old, male, Italian Pointer was referred to the emergency service for a sudden swelling of the left hind limb. A small irregular formation of approximately 3 cm in diameter at the level of the left popliteal fossa

had been detected on palpation during a previous physical examination, performed when the dog was six months old for a respiratory tract disorder which was resolved with medical therapy. The cytological examination performed at the time had not been diagnostic and the decision was taken to treat and cure the existing pneumonia and to postpone any further diagnostic investigation regarding the popliteal neoformation. However, upon curing the pneumonia, the owners decided not to proceed with any additional investigation.

Current clinical picture

Twelve months later the dog was brought back to the clinic, for lameness and swelling of the left hind limb. At physical examination, the subject exhibited hyperthermia, tachycardia and the affected limb was oedematous, hot, painful and much larger in size compared to the contralateral limb and to the previous examination. The compact structure identified during the examination performed when the dog was 6 months old was still detectable upon palpation.

Differential diagnosis

Given the clinical picture compatible with overt inflammation, the age of the patient and the evolution of the lesion, the differential diagnoses included infectious and immune-mediated disorders, diseases of unknown aetiology and neoplastic lesions.

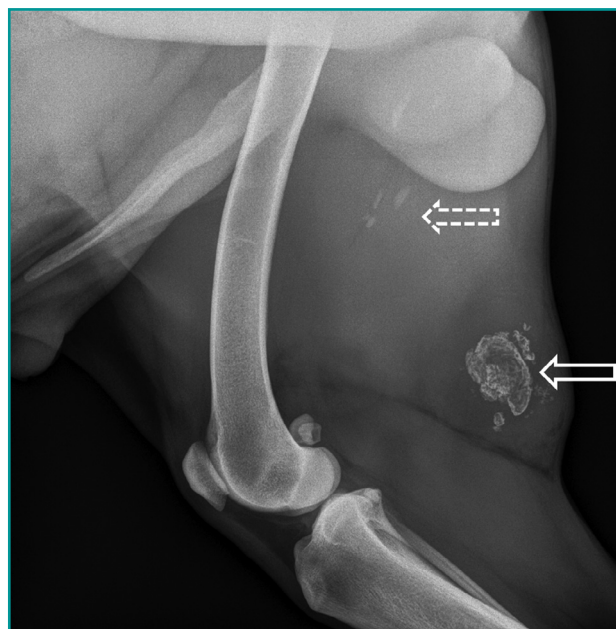


Figure 1 - X-rays of the left hind limb of a dog. The continuous arrow indicates the presence of a radiopaque uneven nodular lesion, with jagged and irregular margins, in anatomical contiguity with some small radiopaque areas. The dashed arrow shows the presence of smaller radiopaque areas along the course of lymphatic vessels, at the level of the proximal medial third of the left thigh.

Diagnostic procedures

In agreement with the owners, complete blood tests, X-rays and a cytological examination were performed in order to characterise the lesion detected.

Blood and biochemistry results were within the normal range, except for neutrophilia (19.95 K/uL, range 2.95-11.64 K/uL), with an elevated band count on the blood smear, confirming an ongoing inflammation.

X-rays showed the presence of a calcified area at the level of the popliteal fossa of the left hind limb (Figure 1). The fine-needle aspiration cytological preparation, treated with May-Grunwald staining, revealed poor cellularity, with a limited number of multinucleated cells and rare spindle cells with marked pleomorphism. The features were indicative of a chronic lesion with associated fibroplasia due to benign or neoplastic proliferation; however, the paucity of cells present made the sample of poor diagnostic value.

At this stage the owners agreed to proceed with the surgical removal of the lesion, with subsequent histological examination; the excision was preceded by a CT scan to rule out a possible secondary nature of the lesion given the abundant pleomorphic component of the cytological sample.

The CT scan confirmed the presence of a 45x38x79 mm neoformation, with undefined margins and heterogeneous presentation due to the presence of extensive calcified areas located at the level of the left popliteal fossa and closely contiguous with the popliteal lymph node station and the loco-regional muscles (Figure 2 and Figure 3).

Also evident were a moderate swelling of the perilesional and subcutaneous adipose tissue, extended proximodistally from the foot to the middle third of the thigh, the presence of areas of calcific density along the course of lymphatic vessels, at the level of the medial plate of the thigh, and mild lymphadenopathy involving the left

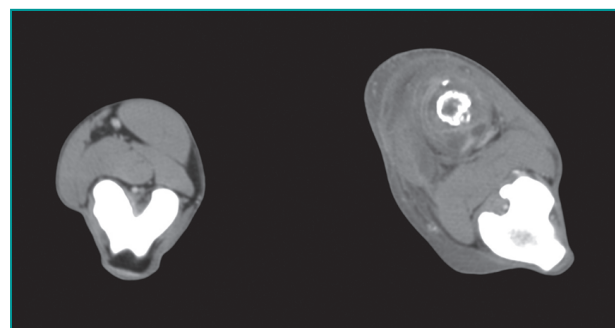


Figure 2 - Transverse CT scan, after intravenous administration of a contrast medium, at the level of the right popliteal fossa (standard algorithm, soft tissue window). The swelling of locoregional muscles is easily recognisable due to the presence of an undefined, calcific density area in its structure; the left limb is relatively normal.



Figure 3 - MIP (Maximum Intensity Projection) reconstruction of the hind limbs following intravenous administration of a contrast medium. At the level of the left popliteal fossa there is an undefined calcific density area located in the locoregional muscles.

hypogastric, medial iliac and inguinal, left superficial and deep lymph node stations.

Therapy and evolution

A marginal surgical excision of the lesion was performed, together with the corresponding left popliteal lymph node; after the procedure, an active drain was inserted in the incision site. The excised specimen was sent to the laboratory for histopathological investigation. Postoperative treatment included the administration of amoxicillin and clavulanic acid (20 mg/kg BID) and Meloxicam® (0.2 mg/kg/day for 3 days) as a pain management therapy and to reduce limb oedema. Already on the second postoperative day the dog exhibited a visible decrease of the limb oedema. On day

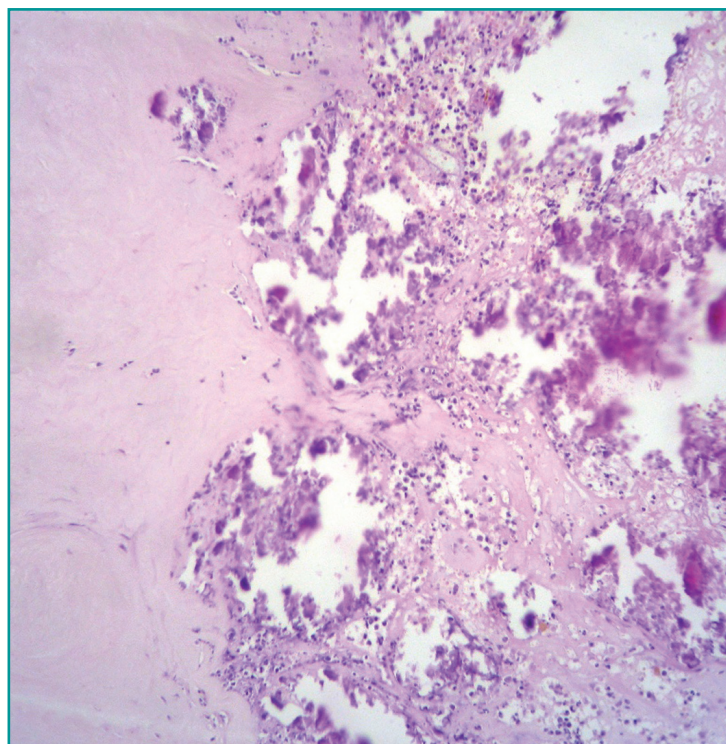


Figure 4 - Histopathological examination of the structure removed from the popliteal fossa of a dog. Note the presence of basophilic material due to the deposition of calcium salts, surrounded by predominantly pyogranulomatous inflammatory infiltrate and by extensive fibrosis. Isolated phenomena of bone metaplasia. Hematoxylin-Eosin. 20X magnification.

four, the drain was removed. At one week after surgery the clinical picture was completely resolved. At the one-year follow-up, no signs of recurrence were present. The histological examination revealed suppurative inflammation infiltrating the subcutaneous soft tissues and the presence of fibrous-necrotic-haemorrhagic areas. The tissue fragment also presented some basophilic material attributable to the deposition of calcium salts surrounded by inflammatory infiltrate. The histomorphological features were therefore indicative of *calcinosis circumscripta* associated with severe suppurative inflammatory infiltrate (Figure 4).

DISCUSSION

Calcinosis circumscripta, resulting from the deposit of calcium salts, is characterised by the presence of tumour-like skin lesions that usually affect the subcutis. It is an uncommon disease in the dog, and rare in the cat. Lesions develop more frequently in young, large-size and therefore fast-growing¹¹ dogs, such as German Shepherds, Boston Terriers and Boxers¹², and in areas subject to repeated traumas such as pressure points, footpads or lesion sites¹³.

The majority of dogs with *calcinosis circumscripta* do not present hypercalcemia. The specific pathogenic mechanisms underlying the deposition of calcium salts in ec-

topic sites have not yet been fully identified.

The case here examined differs from those reported in the veterinary literature because of the location of the lesion: *calcinosis circumscripta* is in fact typically found at the level of pressure points, such as footpads, or on the tongue. The lesion could also have been caused by a parasitic inflammatory granuloma (i.e. demodicosis, although the site is atypical), by a migratory foreign body, a bite or a non-reabsorbed haematoma. A possible nodular lesion of different origin (congenital cyst, pyodermitis or neoplasia, i.e. pilomatricoma or trichoepithelioma) was

The idiopathic form affects large-size and fast-growing dogs under 2 years of age, affecting areas of the deep derma or the subcutis of pressure points, joints, areas subject to repeated trauma or the tongue.

also not excluded.

In our case, the fact that the lesion was located in the popliteal fossa made us suspect a granuloma caused by a foreign body or parasites, although the latter hypothesis was considered less likely in view of the absence of other detectable clinical signs. Among the possible differential diagnoses, neoplasia was considered as a remote possibility, given the young age of the subject. For the same reason, and in view of the location, metastatic cutaneous calcinosis secondary to chronic renal failure, which especially affects the footpads and the interdigital spaces, was also rejected; similarly, a chronic skin calcification secondary to hyperparathyroidism or to the pseudogout of elderly dogs was considered unlikely. The change in the nodule's appearance at the second examination, with an increased volume and the presence of pain, made us highly suspicious of a foreign body granuloma.

In the literature, *calcinosis circumscripta* is usually described as a painless condition, with the exception of the form affecting plantar areas, in which granular or ceruminous discharge from the lesion may be present¹¹. In more extensive lesions, or after repeated traumas, ulcerations may be present.

In the reported case, the cytological examination was not able to confirm the suspected diagnosis. The first cytological exam was qualitatively inadequate (excessively haematic) and therefore not definitive. The second cytological exam, still not diagnostic, raised the suspicion of an inflammatory or neoplastic lesion. The contrast CT revealed the progression of the mineralisation along the lymphatic vessels, but to date this has not resulted in clinical signs and/or recurrence.

The clinical case described underlines the importance of including *calcinosis circumscripta* in the differential diagnosis whenever skin neoformations are detected, especially

The diagnosis is based on the histopathological examination of the nodules and the treatment is surgical. Recurrences are not typically observed.

when signs of mineralisation are present. This is the first case of idiopathic *calcinosis circumscripta* located in the popliteal fossa of a dog.

KEY POINTS

- *Calcinosis circumscripta* is an uncommon disorder, characterised by the ectopic mineralisation of soft tissues
- It can be classified as idiopathic, dystrophic, metastatic or iatrogenic: in the dog, the most frequent form is the idiopathic one
- It mostly affects young, medium- and large-size dogs, with no breed predisposition
- The definitive diagnosis is based on histopathology
- The treatment is surgical and is based on total mass excision

Calcinosis circumscripta nel cavo popliteo di un cane giovane

Un cane di razza Bracco Italiano, maschio di 18 mesi è stato portato in visita per una neoformazione cutanea a crescita progressiva a livello del cavo popliteo. In assenza di esame citologico risolutivo, la diagnostica per immagini (esame radiografico e tomografia computerizzata) ha generato un sospetto clinico di calcinosi circumscripta che è stato in seguito confermato dall'esame istologico. L'asportazione chirurgica della struttura calcificata ha portato alla completa remissione della sintomatologia ed il cane a controllo dopo 12 mesi non ha presentato segni di recidiva. Nonostante in letteratura siano riportati diversi casi di mineralizzazione ectopica, principalmente a livello degli arti posteriori e della lingua di cani giovani di taglia grande, questo è il primo caso, a conoscenza degli autori, di localizzazione a livello del cavo popliteo.

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