

## CASE REPORT

### Granulomatous Osteomyelitis in a Dog

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#### ABSTRACT

A 10-year-old male Golden Retriever was presented to the clinics with a history of lameness. The radiography revealed granulomatous proliferation on caput femoris. Therefore, caput femoris was surgically removed and samples taken from the excised area were histologically examined. Histologically, osteomyelitis was the prominent picture accompanied by large areas of granulomatous inflammatory cells expanding from the articular cartilage into the epiphysis of the bone and at these inflammatory areas cryptococci were visible within the macrophages.

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#### INTRODUCTION

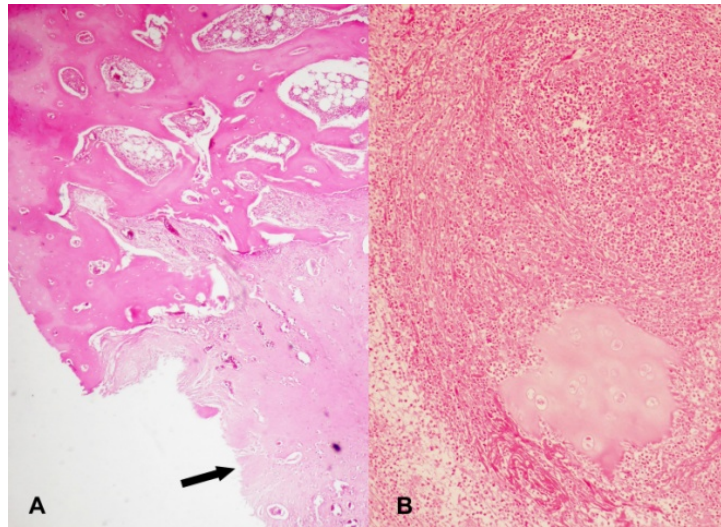
Osteomyelitis, inflammation and infection of medullary cavity, cortex, and periosteum of bone is a destructive disease, which may be acute or chronic (Weisbrode, 2007). Osteomyelitis is of bacterial, fungal, or possibly viral origin. Mycotic infections of bone are less common than those caused by bacteria but certain pathogenic fungi, in particular the yeasts *Cryptococcus*, *Coccidioides*, *Blastomyces*, *Histoplasma*, and *Aspergillus* may cause osteomyelitis following inhalation of spores, open fractures, surgery, bite wounds, foreign-body penetration, gunshot injury, extension from soft tissue, and hematogenous dissemination (Kwiatkowska, 2011). *Cryptococcus* is an important opportunistic fungal pathogen of men and animals, which is acquired via the respiratory tract. It is a disseminating infection caused by *Cryptococcus neoformans*. The infection is most common in cats but can also be seen in dogs, cattle, horses, sheep, goats, birds, and wild animals, in which the respiratory tract (especially the nasal cavity), CNS, eyes, skin, and rarely bones may be affected (Malik, 1995; Viglietti, 2007; Castella, 2008; McGill, 2009; Lester, 2011). Dogs are not infected by *C. neoformans* as often as their feline counterparts. The prevalence in dogs is 0.00013%, as compared to cats that are 7-10 folds more likely to be infected. It is believed that the infection generally emerges from soil contaminated with excrete of pigeon or other birds. Various predisposing conditions have also been implicated in canine cryptococcosis including prolonged corticosteroid treatment, immunosuppressive diseases such as ehrlichiosis and concurrent malignancies. Animals may have lameness, pain, and abscess formation at the

wound site, fever, anorexia, and depression (Weisbrode, 2007). The purpose of this study is to present a case and review literature to discuss the diagnosis of granulomatous osteomyelitis caused by *Cryptococcus* in a dog.

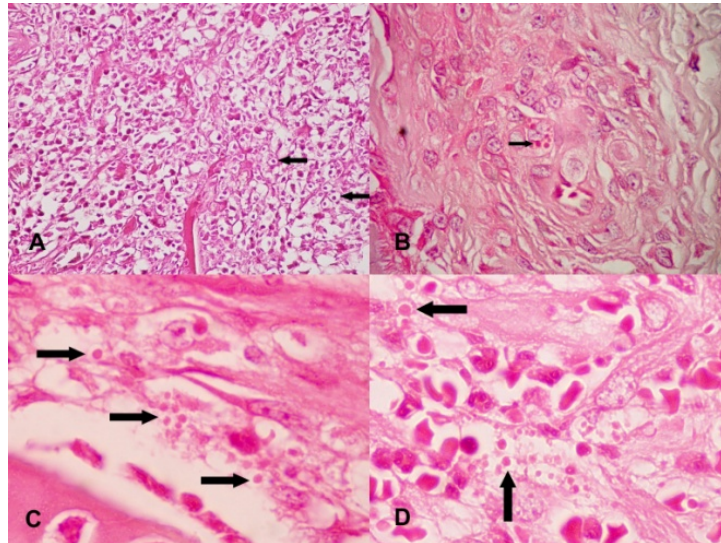
**Case History and handling:** A 10-year-old male Golden Retriever was presented to the department of surgery. Surgically removed samples taken from the left femoral head of the dog were sent to our department in 10% neutral buffered formalin. After it was fixed, it was immersed in 5% nitric acid solution for decalcification. The specimens were routinely processed, and embedded in paraffin. Paraffin-embedded tissues were cut at 5 µm,



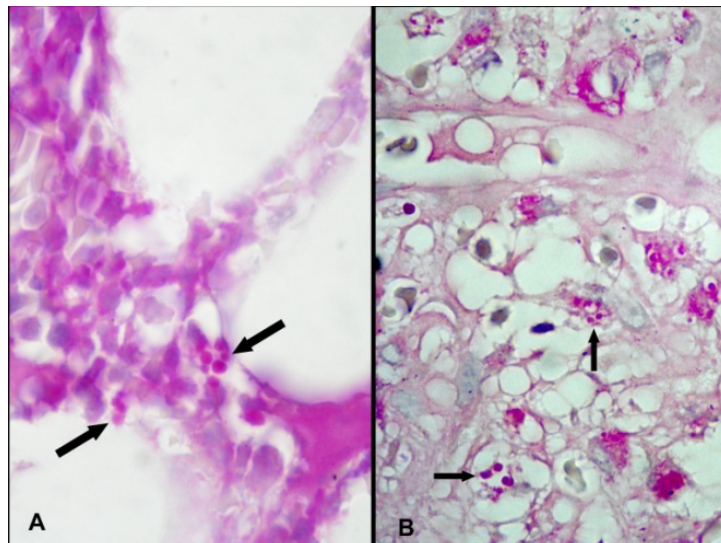
**Fig. 1:** Radiography of the femur. A) Lysis in the bone involving the left femoral head and B) Femoral head replaced by prosthesis



**Fig. 2:** A) Osteolytic areas in femoral epiphysis (H&E, x40) and B) Granulomatous inflammatory reaction in bone (H&E, x100).



**Fig. 3:** Numerous clusters of organisms (yeast bodies form) with characteristic thick capsule (arrows) in the bone marrow of a dog. H&E stain. (A to D x400, x600, x1000 and x1000, respectively).



**Fig. 4:** Cryptococcal organisms (yeast bodies form) (arrows) in the bone marrow of a dog. PAS stain. A x100; B x100.

stained with haematoxylin and eosin, and examined by light microscopy. Sections of the bone with lesions were treated with periodic acid-Schiff stain (PAS) for the demonstration of fungi. Because the samples were sent in formalin solution microbiologic evaluations could not be performed.

## RESULTS

A 10-year-old male Golden Retriever had a long lasting complaint of lameness. Radiological examination revealed marked deformation characterized with osteolytic areas and atrophy, observed on the left proximal femoral epiphysis (Fig. 1A). Based on both the history of the case and radiographic findings, considering the advanced age of the patient the initial clinical diagnosis was osteoarthritis caused by tumoral changes. Therefore no fungal infection was suspected. The femoral head was removed and then replaced by prosthesis (Fig. 1B). The samples were submitted to pathology department with suspicion of tumoral growth within formalin solution and histopathologically examined.

On the basis of microscopic evaluations, it has been observed as granulomatous osteomyelitis, which was the prominent picture accompanied by large areas of granulomatous inflammatory reaction expanding from the articular cartilage into the epiphysis of the bone (Fig. 2A & B). Abundant histiocytes, lymphocytes, plasma cells and cryptococcal organisms (yeast bodies form) were observed in the granulomatous inflammatory areas and within the macrophages in the bone marrow as well on the slides stained with both H.E. stain (Fig. 3A to D) and PAS stain (Fig. 4A & B).

In postoperative period, following the implantation of femoral hip prosthesis oral intracanazole 5mg/kg/day (Itraspor 100mg capsule ®) was used for 3 weeks to treat cryptococcus infection. Certain side effects were known to have been reported due to the administration of Intracanazole. Inappetence and slightly increased liver functions were detected in this patient at the third week of treatment. The clinical outcome of the dog was monitored postoperatively for 2 years and no recurrence was noted. Then it was reported to be dead due to ehrlichiosis, which was known to be included among the predisposing factors of fungal infections. No data was available whether the dog had suffered from ehrlichiosis prior to or at the time of its initial presentation to our clinics.

## DISCUSSION

Cryptococcosis is a systemic infection of mammalian species, which is more frequent in cats, but uncommonly

seen in dogs with the involvement of skin, respiratory tract, CNS and rarely the bones (Malik, 1995; McGill, 2009; Lester, 2011). The disease generally affects immunodeficient hosts. Bone involvement is reported to 10% of disseminated cases. It is reported that lesions in bones might sometimes be overlooked (Liu, 1998; Lenard *et al.*, 2007). Isolated agent in osteomyelitis is very uncommon. Clinical signs are usually connected to lesion location. So far cases with isolated osteomyelitis have been three reported in dogs. One of them was located in the sphenoid bone, another in the metatarsal bone and the other in the distal tibia (Brearly and Jeffery, 1992; Viglietti *et al.*, 2007; Kwiatkowska, 2011). Kwiatkowska *et al.* (2011) inform that *Cryptococcus* infection which located in the sphenoid bone was originated from sinonasal infection. In this case, fungal lesions were observed only in the femoral head which we thought had a previous traumatic femoral injury. Histopathologic examination confirmed cryptococcal organisms with characteristic thick capsula in the bone marrow. The dog responded successfully to the surgical procedure and recovered. Isolated cryptococcal osteomyelitis is rarely observed and this presentation was aimed to be the first reported case in dogs in Turkey and thus it was considered to be a contribution to veterinary literature.

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