

Case Report

Eosinophilia due to osteomyelitis in a dog

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A dog with a lesion in the left elbow area and presence of purulent materials was referred to hospital; history, clinical examination, laboratory test and radiological evaluation of the dog proved the presence of osteomyelitis. Eosinophilia was evident by haematologic test. Intensive antibiotic, anti-inflammatory medication, local wound management and restricted physical activity, improved osteomyelitis condition and reduced eosinophil number. Therefore it seemed that osteomyelitis was the cause of eosinophilia in this dog.

Key words: dog, elbow, eosinophilia, osteomyelitis

Osteomyelitis is an inflammation of the bone marrow and adjacent bone. The process may involve any bone in the body. Although generally it results from infection, osteomyelitis may occur following radiation therapy, implant corrosion, or trauma [5]. Most cases of osteomyelitis in the dog are related to the open reduction of fractures. Contamination of the surgical site may occur either at the time of surgery or in the case of compound fractures or fractures caused by gunshot injuries and contamination may occur before surgery. Bacteria can also reach the bone by extension of an adjacent soft tissue infection or cellulitis. Osteomyelitis may also arise as an extension of septic arthritis or from infected intervertebral discs. Most cases of discospondylitis in the dog are presumed to be of haematogenous origin although a primary focus of infection is not always apparent. Acute haematogenous osteomyelitis has been described in humans and to a lesser extent, in large animals. Reports of the condition in small animals are relatively rare [6]. Haematogenous osteomyelitis is not associated with trauma or surgery. The source of the organism can be presence of infection elsewhere in the body. Unlike post-traumatic osteomyelitis, haematogenous osteomyelitis is a systemic disease. The animals often have signs of systemic illness, such as fever and anorexia. Post-traumatic osteomyelitis is an infection

(inflammation) of the bone after trauma or surgery to the bone [1]. Chronic osteomyelitis usually results from inadequate treatment of acute osteomyelitis [3]. In dogs, the only osteomyelitis that frequently has a haematogenous route is spondylitis or discospondylitis, although epiphysitis has been described as well [11]. Diagnosis of osteomyelitis is based on clinical signs, microbiologic culture, and radiographic findings [8]. Eosinophilia due to osteomyelitis has not been reported. Therefore the present report describes clinical, paraclinical and radiological findings of an osteomyelitis condition and eosinophilia in a dog.

Case history and clinical findings

An eight-month-old male Doberman pinscher dog, weighing 19 kg, was referred to the Veterinary Teaching Hospital of the Shiraz University, with a five-day history of lethargy, anorexia and persistent pyrexia associated with a left forelimb lameness. The cause of the lameness had not been established but it was thought to be associated with the presence of a lesion on the elbow of the left forelimb. The pup had received its first vaccination 3 months earlier and was dewormed. Before referral the pup had not received any medication. On initial physical examination the dog was found to be thin with a draining tract evident on the left olecranon tuberosity along with soft tissue swelling of the elbow. The rectal temperature was 40.5°C and the dog was in a tonic state and extremely reluctant to stand. Pain was evident on deep palpation of left forelimb, especially over the proximal extremities of the radius and ulna. Full flexion of the elbow joint was resented.

Radiological and laboratory findings

Radiographic examination of the forelimbs showed diffuse osteolytic lesions in the proximal metaphysis and epiphysis of the radius and ulna and in the distal epiphysis of the radius. In addition there was evidence of thinning and lysis of the cortical bone surrounding the radius, and the left forelimb's bone revealed an overall loss of density. The proximal left radius showed a moderately severe periosteal reaction that extended distally. The draining tract and a sequestration were identified. The radius growth plate was open and appeared unaffected. Spinal, thoracic and abdominal

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radiographs were unremarkable. Aerobic and anaerobic culture of blood were negative but bacteria isolated from the cancellous bone aspirate by aerobic culture was staphylococcus aureus sensitive to cephalosporins. Routine haematological examination revealed a pronounced leukocytosis (40,400/ μ l), a mature neutrophilia (segmented neutrophils 33,572/ml, no bands), eosinophilia (6×10^3 /ml) and a mild anemia (haemoglobin 10.9 g/dl) and packed cell volume of (31%). Plasma fibrinogen (7.5 g/l) was increased, consistent with a severe acute inflammatory process. Cytological examination of synovial fluid aspirated from the left elbow revealed only a few moderately reactive synovial cells and macrophages, there was no evidence of the inflammatory process in the area having extended in to the joint.

Treatment

The dog was sedated by combination of acepromazine (0.02 mg/kg) and morphine (0.5 mg/kg), intramuscularly, and anaesthetized with combination of ketamine (5 mg/kg) and diazepam (0.25 mg/kg) intravenously [7]. The surgical approach was directly over the lesion of the elbow. The cavity containing the lesion and its surrounding area was flushed with a saline povidone iodine Solution. All visible exudates, necrotic tissues, sequestra and fluids were aspirated and debrided from the wound. A few holes were drilled in several directions through the infected bone. The area was lavaged continuously until the irrigating solution drained clearly. The wound was then packed open using povidone iodine impregnated umbilical tape. The bandage and dressings was changed daily until wound exudation was diminished. Wound dressing was discontinued 14 days following operation and was allowed to heal by granulation. Medical treatment consisted of cephalexin (22 mg/kg, PO, t.i.d.) for six weeks and phenylbutazone (20 mg/kg, IV) for 3 days. A six week period of restricted exercise was advised. After five weeks there was complete resolution of clinical signs in dog. Radiographically, the lytic areas in the metaphysis and epiphysis were not longer visible and there was evidence of bone remodeling. The growth plates remained open and growth disturbances were not observed. Neutrophils and eosinophils were within normal range values, with no more leukocytosis. Acute haematogenous osteomyelitis has been described in humans. In large animals, infection is frequently preceded by, or associated with, omphalophlebitis, tail- bite abscess formation (piglets), pneumonia or some other systemic infection [6]. In foals, extension of infection from the metaphyseal regions of the long bones into the physes, epiphyses, and ultimately into the joints, is common [9]. In both human and animals, the metaphyseal vessels from capillary loops expand and ramify into the dilated venous sinusoids on the metaphyseal side of the growth plate. Blood flow through these sinusoids is sluggish and presents an ideal environment for bacterial proliferation. Following a bacteremic episode, preferential

seeding of infection to the metaphyses of the long bones may occur. As the infection spreads, the formation of septic thrombi may further interfere with blood flow within the metaphyses. Untreated infection spreads from the metaphyses via the Haversian and Volkmann canals to the periosteum, soft tissues and adjacent joints. In small animals, the epiphyseal plate effectively isolates the epiphysis from the metaphysis [6]. Therefore the present case was a post traumatic osteomyelitis that both metaphysis and epiphysis had been involved. Osteomyelitis had been described, extensively [1,3,12,13]. The resolution of the clinical signs and radiographic lesions was accompanied by a remarkable decrease in eosinophilia in this animal. Eosinophilia is defined as more than 1,300 eosinophils/ml of blood in dogs. Some causes of eosinophilia in dogs are parasitism, inflammation or hypersensitivity reactions, hypereosinophilic syndrome and tumorassociated eosinophilia [8]; that non of them proved to be associated with this dog. A slight eosinophilia was reported in rhinitis and sinusitis in a dog [4]. Canine panosteitis is a cause of eosinophilia [2]. Tissue protein break down in chronic suppurative processes may cause eosinophilia in rare cases through the release of histamine or eosinophilic chemotactic factor of anaphylaxis from mast cell [10]. The clinical conditions of this dog, response to treatment, and reduction of eosinophil counts showed that osteomyelitis was the cause of eosinophilia in the referred dog.

References

1. **Braden TD.** Post-traumatic osteomyelitis. *Vet Clin North Am Small Anim Practice* 1991, **21**,781- 812.
2. **Bruyere P.** Clinical and radiographic features of canine eosinophilic panosteitis. *Ann Med Vet* 1974, **118**, 9- 20.
3. **Bubenik LJ, Smith MM.** Orthopaedic infections. In: Slatter D (ed.). *Textbook of Small Animal Surgery*. 3rd ed. pp. 1866-1868, Saunders, Philadelphia, 2003.
4. **Cadwallader JA, Goulden BE, Maxter M, Wybrun RS, Alley MR.** Rhinitis and Sinusitis involving *Aspergillus Fumigatus* in a dog. *N Z Vet J* 1973, **21**, 229- 233.
5. **Caywood DD.** Osteomyelitis. *Vet Clin North Am Small Anim Practice* 1983, **13**, 43- 53.
6. **Dunn JK, Dennis R, Houlton JEF.** Successful treatment of two cases of metaphyseal osteomyelitis in the dog. *J Small Anim Pract* 1992, **33**, 85- 89.
7. **Hall LW, Clarke KW, Trim CM.** *Veterinary Anaesthesia*. 10th ed. pp. 425, Saunders, London, 2001.
8. **Latimer KS.** leukocytes in health and disease. In: Ettinger SJ, Feldman EC (eds.). *Textbook of Veterinary Internal Medicine*. 4th ed. pp. 1920-1921, Saunders, Philadelphia, 1995.
9. **Martens RJ, Auer JA, Carter K.** Equine pediatrics: Septic arthritis and osteomyelitis. *J Am. Vet Med Assoc* 1986, **188**, 582- 585.
10. **Morris DD.** Alterations in the leukogram In: Smith BP (ed.).

- Large Animal Internal Medicine. 2nd ed. pp. 480-488, Mosby, St. Louis, 1996.
11. **Peter K, Shires PK.** Osteomyelitis In: Bojrab M J, Gray W E, Barclay S (eds.). Current Techniques in Small Animal Surgery. 4th ed. pp. 967-972, Williams & Wilkins, Baltimore, 1998.
 12. **Read RA, Corlisle CH, Bate M.** Generalized osteomyelitis in a dog: a case report. J Small Anim Pract 1983, **24**, 687-693.
 13. **Stead AC.** Osteomyelitis in the dog and cat. J Small Anim Pract. 1984, **25**, 1-13.