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Likhitha GN

M.V.Sc. Scholar, Department of
Veterinary Surgery and
Radiology, Veterinary College,
Hebbal, Bengaluru, Karnataka,
India

Gurudev Karajagi

Assistant Professor (on contract
basis), Department of Veterinary
Surgery and Radiology,
Veterinary College, Hebbal,
Bengaluru, Karnataka, India

V Mahesh

Associate Professor, Department
of Veterinary Surgery and
Radiology, Veterinary College,
Hebbal, Bengaluru, Karnataka,
India

BN Nagaraja

Senior Professor and Head,
Department of Veterinary
Surgery and Radiology,
Veterinary College, Hebbal,
Bengaluru, Karnataka, India

Corresponding Author:

Likhitha GN

M.V.Sc. Scholar, Department of
Veterinary Surgery and
Radiology, Veterinary College,
Hebbal, Bengaluru, Karnataka,
India

Hypertrophic osteopathy (Marie's Disease) in a German shepherd dog: A case report

Likhitha GN, Gurudev Karajagi, V Mahesh and BN Nagaraja

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Abstract

A German shepherd female dog, ten-year-old, was presented to the Department of Veterinary Surgery and Radiology, Veterinary College, Hebbal, Bangalore with the complaint of anorexia, lethargy, loss of body condition, limb weakness, difficulty in walking, and swelling in all limbs. Upon physical examination, there was no pain, non-oedematous swelling, and all limbs were warm to touch. Radiography of both forelimbs revealed the presence of periosteal proliferation in distal phalanges, metacarpal, metatarsal, radius, ulna, tibia and fibula bones. Radiography of lateral thorax revealed the presence of multiple radiodense lesions suggestive of pulmonary metastasis. These led to the diagnosis of hypertrophic osteopathy as a result of metastatic lung tumor. It might be due to chronic anoxia, obscure toxins and autonomic neural vascular reflex mechanisms mediated by afferent branches of the vagus or intercostal nerves. Removal of inciting cause may or may not bring about regression of signs. Animal was managed with steroids for some days. Animal collapsed after two months of diagnosis.

Keywords: Hypertrophic osteopathy, Marie's disease, periosteal proliferation, malignant tumor

Introduction

Hypertrophic osteopathy (HO) also known as Hypertrophic pulmonary osteoarthropathy (HPOA), Hypertrophic pulmonary osteopathy (HPO), Hypertrophic osteoarthropathy (HOP). Marie's disease is a diffuse proliferative disorder that affects the periosteum of the long bones caused by infectious or malignant tumors in the thoracic cavity. It is a progressive, bilateral, and symmetrical pathologic periosteal new bone formation (PNBF) (Martinez *et al.*, 1997) [7]. It is more common in humans and dogs and also reported in other species (Lenahan *et al.*, 2012) [6]. It is categorized as pulmonary, non-pulmonary, intra-thoracic, and extra-thoracic, and it occurs mostly as a result of different underlying diseases (Janevski *et al.*, 2023) [4]. Dogs are more susceptible to this illness (Craig *et al.*, 2015) [1], and large and giant dog breeds are typically affected. Although the etiology of hypertrophic osteopathy is varied, little is known about the pathogenesis. Neurovascular reflex mechanism is one of the most frequently accepted theories to cause HO (Pachamé *et al.*, 2017) [10]. This may be due to Vascular Endothelial Growth factor (VEGF) induction which promotes angiogenesis and osteoblast differentiation (Midy and Plouet, 1994; Thomas, 1996) [8, 12]. Metastatic lung tumors from mammary carcinomas can result in hypertrophic osteopathy, hence it is more common in female than in male (Ezzeldine *et al.*, 2022) [3]. The German shepherd dog's instance of hypertrophic osteopathy is discussed in this paper.

Materials and Methods

A ten-year-old German shepherd female dog was presented to the Department of Veterinary Surgery and Radiology, Veterinary college, Hebbal, Bengaluru with the complaint of anorexia, lethargy, dullness, loss of body condition, limb weakness, difficulty in walking, and swelling in all limbs. The dog underwent a comprehensive clinical examination, which included limb palpation and an analysis of the animal's posture and movement. Additionally, respiration rate, mucous membrane colour, and rectal temperature were noted. Anteroposterior and mediolateral radiographs of limbs and right lateral thoracic radiographs of the lungs were

obtained. Radiographs of the limbs were examined for any periosteal reactivity of the long bone, and radiograph of the thorax was examined for intrathoracic radio-opacity and lung diseases.

Results and Discussion

Diagnosis of hypertrophic osteopathy was based on its medical history, radiography, and clinical observations. The dog's forelimb and hindlimb was normally warm to touch upon clinical examination; there were no pain and non oedematous swelling affecting the lower limbs (Fig. 1), and there were no respiratory symptoms, such as abnormal lung sounds. Severe periosteal growth was seen on radiography of both forelimbs in the metacarpal region as well as at the radius and ulna region (Fig. 2). Numerous sizable radiodense lesions in the lung field on the thoracic radiograph revealed the presence of metastatic tumor (Fig. 3).



Fig 1: Dog with non oedematous swelling of all limbs



Fig 2: Radiograph of forelimb showing periosteal reaction.



Fig 3: Thoracic radiograph showing several large radiodense masses

A uncommon pathologic condition known as hypertrophic osteopathy develops as a result of infectious or malignant tumors in the thoracic cavity. Breed, age, and sex of the animal was less important because it was subsequent to neoplastic diseases. However, it was usually observed in female dogs and in canines older than eight years. The athophysiology of HO is multifaceted (Elhamiani *et al.*,

2020^[2]. Theories suggest that vagal nerve stimulation triggers peripheral vasodilation, leading to periosteal changes. Additionally, chronic hypoxemia or the failure of the lungs to inactivate certain growth factors may increase peripheral levels of vasodilators and VEGF (Midy and Plouet 1994; Thomas 1996)^[8, 12]. Megakaryocytes or macroplatelets, normally fragmented in the lungs, may shunt directly into systemic circulation, releasing VEGF at distal sites and promoting bone growth. (Mohle *et al.*, 1997; Silveira *et al.*, 2000; Martinez *et al.*, 2007)^[9, 11, 7].

The prognosis for HO depends heavily on the treatability of the primary lesion. While surgical removal (e.g., lobectomy) can lead to the rapid regression of pain and eventual bone remodeling, the prognosis in metastatic cases remains guarded to poor (Kealy *et al.*, 2005; Thompson, 2007; Lenehan *et al.*, 2012)^[5, 13, 6]. In this case, palliative steroid therapy was used to manage edema, but the underlying malignancy led to the animal's collapse two months later.

Conclusion

Hypertrophic osteopathy serves as a significant clinical indicator of underlying thoracic or extra-thoracic neoplasia. Early diagnosis via multi-modal imaging is essential for managing the condition and potentially extending the animal's life. However, the survival rate remains dependent on the stage and severity of the primary diseases.

Conflict of Interest

Not available

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Not available

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