THE SCIENTIFIC FRONTIERS

Popular Article

OPEN ACCESS

Canine Osteosarcoma: Anatomical Distribution and Breed Predisposition in a Five-Year Retrospective Study

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ARTICLE HISTORY

Received: March 10, 2026
Accepted: March 10, 2026
Published: April 1, 2026

Abstract

Osteosarcoma is the most common primary malignant bone tumor in dogs and predominantly affects large and giant breeds. A five-year retrospective study was conducted to evaluate the anatomical distribution and breed predisposition of osteosarcoma cases presented to a Referral Veterinary polyclinic cum TVCC of the Indian Veterinary Research Institute (IVRI). A total of 48 cases were recorded during the study period (2020-25). The distal femur was the most frequently affected site (16 cases; 33.3%), followed by the distal radius/ulna (13 cases; 27.1%), proximal humerus (11 cases; 22.9%), and distal tibia (6 cases; 12.5%), while other skeletal locations accounted for 2 cases (4.2%). Breed-wise distribution revealed a predominance in Rottweilers (13 cases; 27.1%), followed by Golden Retrievers (10 cases; 20.8%) and Labrador Retrievers (9 cases; 18.8%). Other affected breeds included Saint Bernard (3 cases), German Shepherd Dog (3 cases), American Bully (2 cases), and Great Dane (2 cases), while other breeds accounted for 6 cases. The findings indicate that osteosarcoma occurs predominantly in the metaphyseal regions of long bones and shows a higher prevalence in large and giant breed dogs.

DOI: https://doi.org/10.5281/zenodo.19481459

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KEYWORDS: canine osteosarcoma, bone tumor, breed predisposition, distal femur, retrospective study

INTRODUCTION

Osteosarcoma is the most common primary malignant bone tumor in dogs, accounting for approximately 80–85% of all skeletal tumors (Thamm *et al.,* 2007). The disease is characterized by aggressive local bone destruction and a high metastatic potential, particularly to the lungs (Thamm *et al.,* 2007 and Liptak *et al.,* 2004).In dogs, osteosarcoma predominantly affects the metaphyseal regions of long bones, where active bone growth and remodeling occur (Thrall, 2018). The most commonly affected sites include the distal radius, proximal humerus, distal femur and proximal tibia (Thrall, 2018 and Liptak *et al.,* 2004).Several epidemiological studies have also demonstrated a strong breed predisposition in large and giant breed dogs, including Rottweilers, Labrador Retrievers, Golden Retrievers, Great Danes and Saint Bernards (Cooley *et al.,* 2002). Increased body mass, rapid skeletal growth and genetic factors are believed to contribute to the development of the disease (Cooley *et al.,* 2002).Retrospective clinical studies are useful for understanding the epidemiological distribution of osteosarcoma and identifying patterns related to anatomical location and breed predisposition. Therefore, the present study was conducted to evaluate the frequency, anatomical distribution and breed prevalence of osteosarcoma in dogs presented to a tertiary veterinary referral hospital over a five-year period.

MATERIALS AND METHODS

A retrospective analysis was conducted using clinical records of dogs diagnosed with osteosarcoma over a five-year period (2020-25). at the Referral Veterinary polyclinic cum TVCC, ICAR-Indian Veterinary Research Institute (IVRI), Izatnagar, Bareilly, India.

Information retrieved from hospital records included:

- Anatomical location of the tumor
- Breed of affected dogs
- Total number of cases

Cases were included in the study when the diagnosis of osteosarcoma was supported by clinical

examination, radiographic findings and histopathological confirmation where available (2).The collected data were tabulated and analyzed descriptively to determine the distribution of osteosarcoma according to anatomical site and breed.

RESULTS

During the five-year (2020-25) study period, 48 cases of canine osteosarcoma were recorded.

Anatomical distribution

The distal femur was the most frequently affected site with 16 cases (33.3%). The distal radius and ulna accounted for 13 cases (27.1%), followed by the proximal humerus with 11 cases (22.9%) and the distal tibia with 6 cases (12.5%). Other skeletal locations accounted for 2 cases (4.2%) (Table.1)

Table.1 Anatomical distribution of osteosarcoma in dogs presented during the five-year study period.

Site of Tumor	Number of Cases	Percentage (%)
Distal Femur	16	33.33%
Distal Radius/Ulna	13	27.08%
Proximal Humerus	11	22.92%
Distal Tibia	6	12.50%
Other Bones	2	4.17%
Total	**48**	**100%**

Breed distribution

The Rottweiler was the most frequently affected breed (27.1%), followed by Golden Retriever (20.8%) and Labrador Retriever (18.8%). Other affected breeds included Saint Bernard and German Shepherd Dog (6.3% each), while American Bully and Great Dane accounted for 4.2% each. Dogs belonging to other breeds represented 12.5% of cases (Table. 2)

Table 2. Breed-wise distribution of osteosarcoma cases in dogs during the five-year study period.

Breed	Number of Cases	Percentage (%)
Rottweiler	13	27.1
Golden Retriever	10	20.8
Labrador Retriever	9	18.8
Saint Bernard	3	6.3
German Shepherd Dog	3	6.3
American Bully	2	4.2
Great Dane	2	4.2
Other breeds	6	12.5
Total	**48**	**100**

DISCUSSION

The findings of the present study demonstrate that osteosarcoma most frequently involved the distal femur, followed by the distal radius/ulna, which supports previous reports indicating that osteosarcoma commonly affects the metaphyseal regions of long bones (Thrall, 2018 and Liptak *et al.,* 2004).The predominance of cases in large breed dogs such as Rottweilers, Labrador Retrievers and Golden Retrievers observed in this study is consistent with earlier epidemiological studies that reported increased susceptibility in large and giant breed dogs (Cooley *et al.,* 2002 and Boston *et al.,* 2006). Increased body weight, rapid skeletal growth and genetic predisposition are considered major risk factors for the development of osteosarcoma in these breeds (Cooley *et al.,* 2002).

CONCLUSION

This five-year retrospective study revealed that osteosarcoma in dogs was most frequently observed in the distal femur and distal radius/ulna. The disease predominantly affected large and giant breed dogs, particularly Rottweilers, Labrador Retrievers and Golden Retrievers. Early clinical and radiographic evaluation of bone swelling or persistent lameness in predisposed breeds is essential for timely diagnosis and management.

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