CASE REPORT

Carpal Joint Chondrogenic Osteosarcoma in Young Dog and its Successful Surgical Management

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Osteosarcoma is the most prevalent bone tumour in dogs, accounting for almost 80% of malignant bone tumours (Meuten, 2002). Morello *et al.* (2011) stated that it usually appears in dogs between the ages of 6 and 10 years and primarily affects large and gigantic breeds including Rottweilers, German Shepherds, Boxers, Doberman Pinschers, and Irish Setters. The tumour is most commonly seen in the appendicular skeleton (64% of cases), followed by the axial skeleton (28.5%), which includes the skull and ribs, and extra-skeletal muscles (7.5%) (Trost *et al.,* 2012). Appendicular osteosarcoma is predominantly located in the forelimbs rather than the hind limbs. Diagnosis depends on physical examination, lesion radiography, and fine needle biopsy to ascertain tumour type (Thompson and Pool, 2002). A chest X-ray is advised as a supplementary diagnostic tool because of the increased likelihood of metastasis. Selvarajah and Kirpenstejin (2010) asserted that amputation is the principal intervention, improving survival rates, reducing suffering, and hence postponing euthanasia. The current study describes the detailed diagnosis of osteosarcoma variant in young dog and its surgical management shortening anaesthetic duration, and decreasing costs relative to limb-sparing techniques (Jehn *et al.,* 2007).

Case History and Observations

The present case was brought to Clinical Complex at College of Veterinary Science, GADVASU, Rampura Phul (India) with a complaint of progressively increasing swelling on the right carpal joint for 20 days. Clinical examination revealed symptoms of lameness in the right forelimb and pain on palpation of the affected limb, and the area was also warm to touch.

Haematological analysis for complete blood count using automatic Haemanalyser (ADVIA 2120 Hematology System, Siemens Healthcare Diagnostics Inc. Deerfield, IL, USA) revealed all the parameters under the normal range, except for thrombocytopenia and activated platelets. Differential Leukocyte count (DLC) done manually after stained blood smears with Leishman stain revealed absolute neutrophilia with mild shift to left suggestive of an inflammatory response.

Fine needle aspiration cytology (FNAC) taken using 22G needle from the growth aseptically and stained with Leishman staining revealed neoplastic osteoblasts varied from round to fusiform shaped. The cells having basophilic and vacuolated cytoplasm that contained pink cytoplasmic material along with numerous cytological characteristics of malignancy, including karyomegaly, anisokaryosis, anisocytosis, mitotic figures and numerous nucleoli of varying sizes were observed in neoplastic osteoblasts suggesting osteosarcoma (Fig. 1).

Radiographic examination of affected limb and thorax carried out to rule out bony changes along with pulmonary metastasis indicated soft tissue swelling and bone lysis in the affected limb with signs of metastasis in the thoracic X-ray (Fig. 2). Therefore, based on the test reports, the surgery was performed to amputate the right limb from the elbow joint.

Surgical Treatment and Discussion

For surgical procedure, the animal was kept on fasting for 12 h prior to surgery, and the site was prepared for aseptic surgery. Atropine sulphate @ 0.04 mg/kg and Butorphanol @ 0.2 mg/kg were used intramuscularly as a preanaesthetic. For induction, Xylazine @ 1 mg/kg and Ketamine @ 5 mg/kg were given intramuscularly. Isoflurane @ 2.5-3% was used for maintenance. The animal was kept in left lateral recumbency and after all aseptic preparation, right forelimb was amputated from elbow joint. Muscles were sutured in lock and stitch manner using Polyglactin 910 (Vicryl No. 1). Polyamide (Nylon No. 1) was used to close skin incision by simple interrupted suture pattern (Fig. 3). Broad spectrum antibiotics (Ceftriaxone @ 15 mg/kg) and NSAIDs (Meloxicam @ 0.3 mg/kg) were advised intramuscularly for 5 days. Antiseptic dressing was recommended daily with liquid povidone iodine solution till healing.

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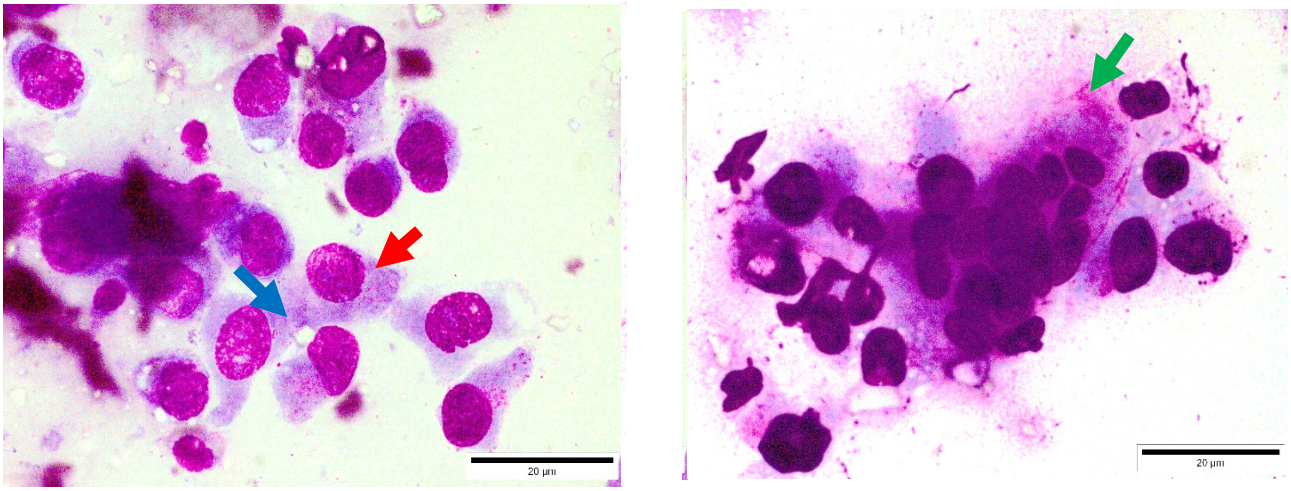

Fig. 1: FNAC revealed neoplastic osteoblasts varying from round to fusiform-shaped with basophilic cytoplasm (red arrow) having vacuoles (blue arrow) and pinkish cytoplasmic matrix (green arrow) suggesting osteosarcoma.

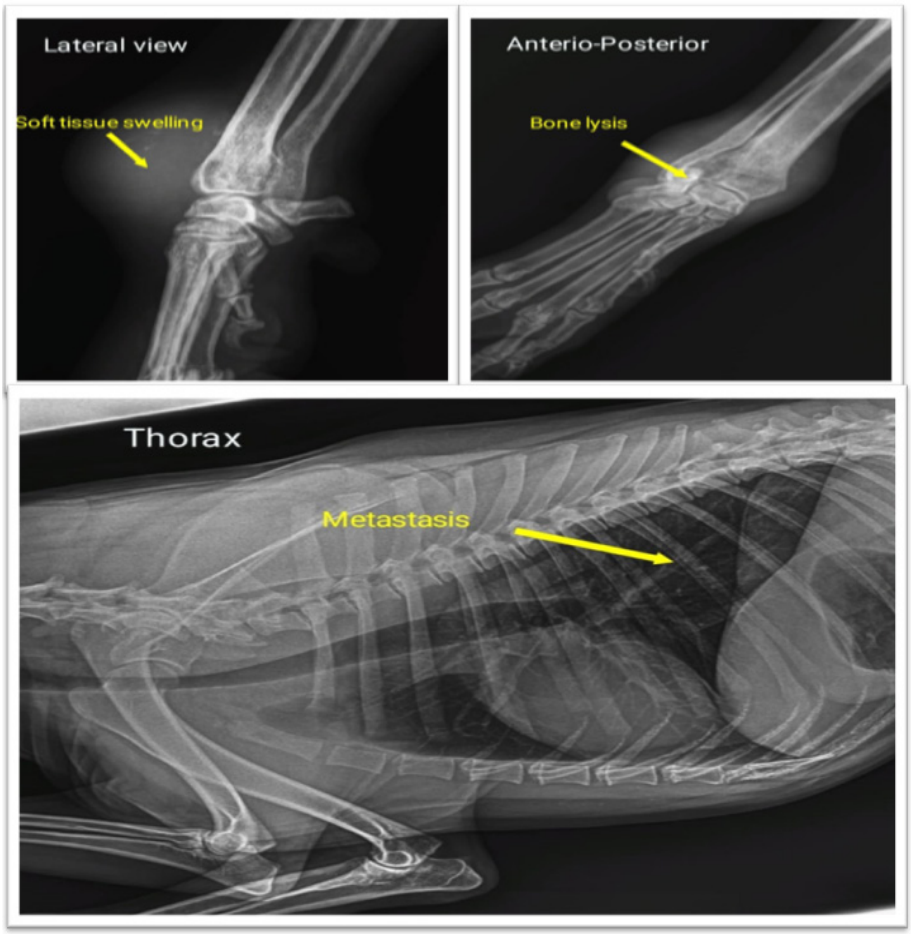

Fig. 2: Radiographs showing soft tissue swelling, signs of bone lysis and pulmonary metastasis.

The tissue sample from the affected region was fixed in 10% formalin and decalcified in 5% Nitric acid. Routine tissue processing was done and stained with Hematoxylin & Eosin (Luna, 1968). Histopathological examination revealed proliferation of irregular osseous and cartilaginous tissues with polyhedral and pleomorphic neoplastic cells. Predominantly neoplastic spindle shaped cells were observed along with areas of osteoid trabeculae's or irregularly formed bone suggesting osteosarcoma that confirmed the diagnosis based on cytopathological studies (Fig. 4). Mitotic figures were frequently observed. Skin sutures were cut on 14th day post-operative day. Dog recovered uneventfully.

Fig. 3: Showing amputation of affected limb from elbow joint.

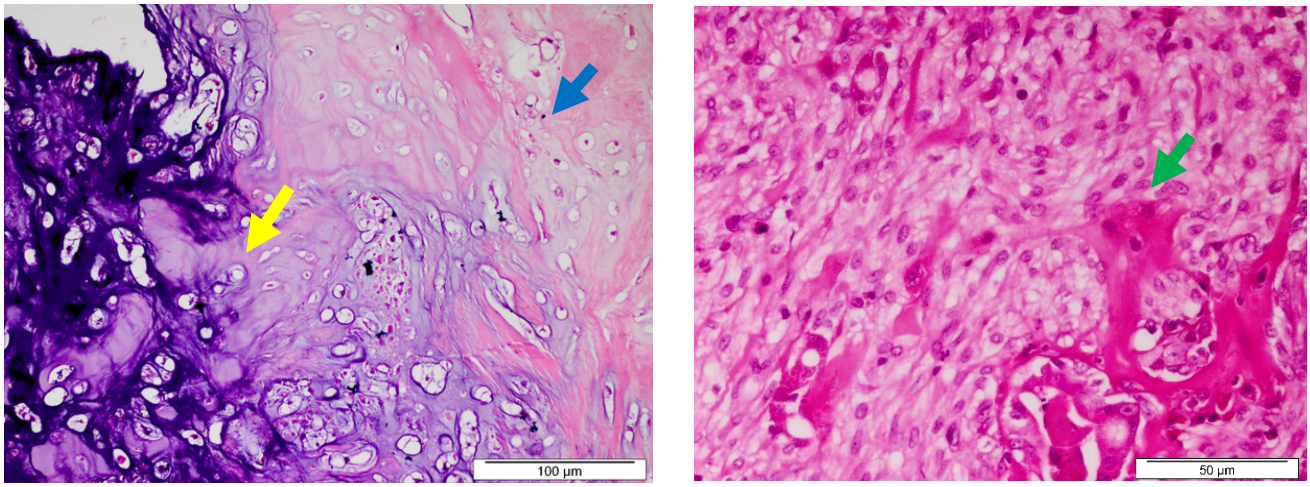

Fig. 4: Histopathological examination revealed neoplastic osseous (blue arrow) and cartilaginous tissues (yellow arrow) with pleomorphic spindle shaped neoplastic cells and areas of osteoid trabeculae's (green arrow) or irregularly formed bone suggesting chondroblastic osteosarcoma.

Histologically, among the three forms of osteosarcoma, the most common type is osteoblastic followed by chondroblastic and fibroblastic osteosarcoma (Rothzerg *et al.,* 2023). In the present case, the chondrogenic subtype of osteosarcoma seen was difficult to differentiate from osteogenic osteosarcoma due to similar morphological characteristics of osteoblastic cells and malignant chondrocytes, *i.e.,* round to oval eccentric nucleus with prominent nucleoli, and modest to substantial cytoplasm on cytological evaluation. The interpretation was further complicated by the possibility of pleomorphism and hyperchromasia. The chondrogenic subtype of osteosarcoma is distinguished by the formation of malignant chondroid matrix that is challenging to distinguish from osteoid matrix produced in osteogenic osteosarcoma (Kim and Lee, 2023). In contrast to cytology, histology makes it easier to see and distinguish between the chondroid and osteoid matrices, which are essential for confirmatory diagnosis. One of the hallmarks of osteosarcoma is the thick, eosinophilic, amorphous osteoid matrix, which is frequently closely linked to malignant osteoblasts. On the other hand, malignant chondrocytes typically form the chondroid matrix, which has a more basophilic, lacelike, or cartilaginous appearance as seen in the present case report (Greenwood and Shaikh, 2024).

Osteosarcoma in canines continues to be a major issue owing to its commonality, aggressive characteristics, and tendency for metastasis. The present case study contributed to the existing understanding regarding this debilitating condition, especially in juvenile canine patients. The typical age range of osteosarcoma in dogs generally impacts middle-aged individuals, specifically those between 6 and 10 years old (Cavalcanti *et al.,* 2004). However, in this instance, the

affected dog was only one year old. Although osteosarcoma is rare in young dogs, our patient's case highlights the importance of assessing neoplastic conditions in young animals with limb swelling and lameness.

In general, surgical amputation is the primary treatment for appendicular osteosarcoma, intended to relieve discomfort and excise the major tumour mass. Our case study enhances the comprehension of osteosarcoma in canines, emphasizing critical clinical characteristics, diagnostic methodologies, and therapeutic concerns.

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References

Cavalcanti, J.N., Amstalden, E.M.I., Guerra, J.L., & Magna, L.C. (2004). Osteosarcoma in dogs: clinical-morphological study and prognostic correlation. *Brazilian Journal of Veterinary Research and Animal Science, 41, 299-305.*

Greenwood, A., & Shaikh, H. (2024). Osteosarcoma (Osteogenic Sarcoma). StatPearls.

Jehn, C.T., Lewis, D.D., Farese, J.P., Ferrell, E.A., Conley, W.G., & Ehrhart, N. (2007). Transverse ulnar bone transport osteogenesis: a new technique for limb salvage for the treatment of distal radial osteosarcoma in dogs. *Veterinary Surgery, 36*(4), 324-334.

Kim, J.H., & Lee, S.K. (2023). Classification of chondrosarcoma: From characteristic to challenging imaging findings. *Cancers*, *15*(6), 1703.

Luna, L.G. (1968). *Manual of Histologic Staining Methods of the Armed Forces Institute of Pathology*. 3rd ed., McGraw-Hill, New York, pp. 32-39.

Meuten, D.J. (2002). Tumours of bones. In: *Tumours in Domestic Animals*. Thompson, K.G. and Pool, R.R., 4th ed., Iowa State Press, Ames, Iowa, USA, pp. 245-317.

Morello, E., Martano, M., & Buracco, P. (2011). Biology, diagnosis and treatment of canine appendicular osteosarcoma: Similarities and differences with human osteosarcoma. *The Veterinary Journal, 189*(3), 268-277.

Rothzerg, E., Xu, J., & Wood, D. (2023). Different subtypes of osteosarcoma: Histopathological patterns and clinical behaviour. *Journal of Molecular Pathology, 4*(2), 99-108.

Selvarajah, G.T., & Kirpensteijn, J. (2010). Prognostic and predictive biomarkers of canine osteosarcoma. *The Veterinary Journal, 185*(1), 28-35.

Thompson, K.G., & Pool R.R. (2002). Tumours of bones. In: *Tumours in Domestic Animals*. Thompson, K.G. and Pool, R.R., 4th ed., Iowa State Press, Ames, Iowa, USA, pp. 245-317.

Trost, M.E., Kommers, G.D., Brown, C.C., Barros, C.S., Irigoyen, L.F., Fighera, R.A., & Silva, T.M.D. (2012). Primary bone neoplasms in dogs: 90 cases. *Pesquisa Veterinaria Brasileira, 32,* 1329-1335.