The Pharma Innovation Journal 2022; SP-11(3): 1457-1459

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(3): 1457-1459

www.thepharmajournal.com
Received: 18-12-2021
Accepted: 07-02-2022

Abhijit Deka
Assistant Professor, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Mridusmrita Buragohain
Assistant Professor, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Mousumi Hazorika
Assistant Professor, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Pallavi Devi
Assistant Professor, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Sushanta Goswami
Assistant Professor, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Arup Das
Assistant Professor, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Utpal Barman
Assistant Professor, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Dhrubajyoti Borpujari
Assistant Professor, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Corresponding Author
Abhijit Deka
Assistant Professor, College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati, Assam, India

Clinicopathological diagnosis of osteosarcoma in a Dog

Abhijit Deka, Mridusmrita Buragohain, Mousumi Hazorika, Pallavi Devi, Sushanta Goswami, Arup Das, Utpal Barman and Dhrubajyoti Borpujari

Abstract
This report includes a case of axial osteosarcoma on the nasal bone of a 5 years old male Labrador dog. The dog was presented to TVCC, CVSc with a history of swollen nose for last 3 months which finally leads to ulcer formation. Clinically the dog is having dyspnea and poor health condition. The radiographic details of soft tissue mass and ossification had given the primary diagnosis of osteosarcoma. Which was later supported by paraneoplastic haemato-biochemical alterations. Which includes leukocytosis, neutrophilia, lymphocytosis, anemia and decreased platelet count in blood work. In biochemical analysis there were increase in BUN, creatinine, ALT, AST and alkaline phosphatase. The cytological examination revealed presence of high numbers of neutrophil, osteoblast cells and vacuolated cytoplasm. The nuclei were hyperchromatic, with densely clustered chromatin, contain prominent single to multiple nucleoli and multiple mitotic figures.

Keywords: Dog, osteosarcoma, haemato-biochemical, FNAC

Introduction
Cancer is the exhibition of uncontrolled cell growth and proliferation, and occurs as a result of genetic damage and/or changes in a cell [7, 11]. Bone tumours are among the different significant tumours of the pets. In primary bone tumours, Osteosarcoma is the most commonly diagnosed one, accounting for over 95% and represents 3 to 4% of all tumors that occur in these animals [1, 3]. Commonly Osteosarcoma affects the long bone metaphysis [6, 12]. In case of dogs from middle to elderly age and middle to large size, the appendicular skeleton is most commonly affected [3]. On the other hand, in 25% of the cases axial bones such as head, ribs, and pelvis are affected [2]. Diagnostic tests such as radiographs, bloodwork, FNAC and biopsy are helpful to determine the type of cancer [8]. In the treatment of cancer pain control is one of the important aspects. In treatment of cancer carboplatin, a second-generation platinum compound is used as chemotherapeutic agent. Which can be used in the restriction of tumour progression, and has proven as effective in prolonging the life span in dogs of osteosarcoma. According to literature, only 40 to 50%, 20 to 30% animals survive after chemotherapy within one and two years respectively. In long term, only 10 to 20% of cancer cases show diminutions [15]. Medium survival life time after osteosarcoma diagnosis has been reported to be 120 days, with local recurrence being the most common cause of death [5]. The purpose of this report to present the case of an osteosarcoma occurred in the nasal bones of a male Labrador. In the present case, authors tried to describe the clinical picture, radiological appearance, cytological finding and change in the haematological parameters in axioskeletal osteosarcoma.

Case Presentation
A 5-year-old male Labrador dog was presented to Teaching Veterinary Clinical Complex, CVSc, AAU with a history of progressive swelling over the nasal bone in the last 3 months. The swelling develops ulcers from last one month and has secretion of serosanguinous fluid. The animal was showing respiratory distress, particularly in inspiration and poor health condition. Results from the CBC (Table 1) shows rise in TLC, Neutrophil counts, Lymphocyte along with mild anemia. The anemia was reflected by the decrease in the values of RBC, MCV, MCH and Hemoglobin. The thrombocyte count has also decreased. Further the Serum biochemical analysis (Table 2) revealed increased BUN, Creatinine, alanine aminotransferase, aspartate aminotransaminase and alkaline phosphatase.

Table 1: Haematological values by the time of first presentation

Parameters	Unit	Value	Reference Range[11]
Total Leukocyte Count	$\times 10^3/\mu L$	53.36	5-14.1
Lymphocyte	$\times 10^3/\mu L$	4.96	0.4-2.9
Monocyte	$\times 10^3/\mu L$	0.80	0.1-1.4
Neutorphil	$\times 10^3/\mu L$	47.06	2.9-12
Eosinophil	$\times 10^3/\mu L$	0.43	0.0-1.3
Basophil	$\times 10^3/\mu L$	0.11	0.0–0.14
Red Blood cell	$\times 10^6/\mu L$	4.65	4.95–7.87
Mean Corpuscular Volume	(Femtolitre)	61.3	66–77
Haematocrit	(%)	28.5	35–57
Mean Corpuscular Haemoglobin	(Picogram)	20.4	21.0–26.2
Mean Corpuscular Haemoglobin Concentration	(gram/decilitre)	33.3	32.0–36.3
Haemoglobin	(gram/decilitre)	9.5	11.9–18.9
Thrombocyte	$\times 10^6/\mu L$	178	211–621

Table 2: Serum biochemical values by the time of first presentation

Parameters	Unit	Value	Reference range [11]
BUN	milligram/decilitre	33	7 to 28
Creatinine	µmol/L	2.1	0.5 to 1.7
ALT	Units/Litre	137	10 to 120
AST	Units/Litre	43	16 to 40
Alkaline phosphatase	Units/Litre	188	8 to 141

The radiographic results reflected infiltration of cells, periostitis, shows soft tissue mass and ossification of the region. Based on the radiographic results, primary bone neoplasm was suspected. The pathological interpretation from the from the FNAC taken from the hard mass shows presence of high numbers of neutrophil, osteoblast cells round to oval central nuclei, displaying marked anisokaryosis moderate anisocytosis. The nuclei were hyperchromatic, with densely clustered chromatin and contain prominent single to multiple nucleoli, some of which are quite large and that are variable in size. Furthermore, multiple mitotic figures, wide and vacuolated cytoplasm also seen (Fig: A-D).

Discussion

Dog presented in this case was having dyspnea which may be due to swollen nasal bone disturbing the air pathway which can also cause the poor health condition, also a common finding in neoplastic condition. The most common haematological finding in dogs with cancer is anemia as mentioned by Pavel and Manolescu, which is a similar finding with report. There was an insignificant decrease in values of RBC, PCV, MCV, MCH and MCH, found in case of canine tumour. In leukogram there was an increase in TLC, Lymphocyte and neutrophil, which indicated an ongoing inflammatory reaction and possible bacterial infection in the tumour affected dogs [10]. The decrease platelet value is in agreement with the finding of Pavel and Manolescu in different tumour cases of dog [15]. In serum biochemical analysis there were non-significant increase in BUN, ALT, AST and significant increase in alkaline phosphatase. The findings were found to be similar with other authors working in different malignant tumours of dog [4, 9, 10]. The cytological findings were with the characteristic alterations with malignant tumour comprising of marked anisokaryosis moderate anisocytosis, single to multiple nucleoli, multiple mitotic figures, wide and vacuolated cytoplasm also seen. The similar findings were also reported by different authors working with osteosarcoma [4, 13, 15].

Conclusion

The axial canine axial osteosarcoma is a common tumour of dogs amomg different bone tumours. Which can be diagnosed with the help Radiographic evaluation, Haemato-biochemical alterations and FNAC methods.

Acknowledgements

The authors would like to acknowledge the Dean, College of Veterinary Science, AAU, Khanapara and Head, Veterinary Clinical Complex, College of Veterinary Science, AAU, Khanapara, Assam for providing the laboratories and devices during this research work

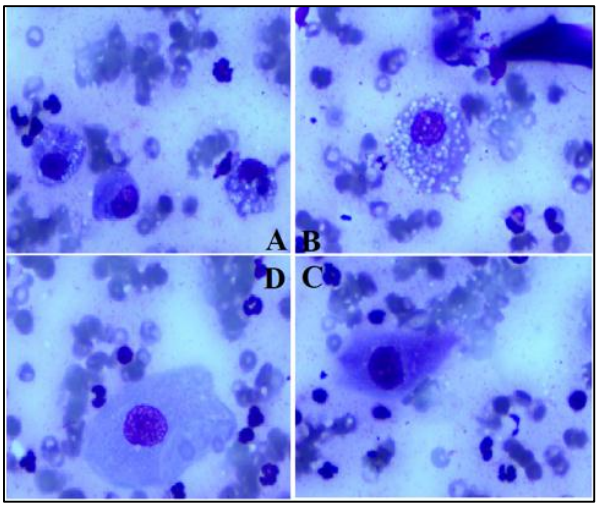

Fig (A-D): High numbers of neutrophil, osteoblast cells round to oval central nuclei, pleomorphism and vacuolated cytoplasm.

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