



P-ISSN: 2349-8528
 E-ISSN: 2321-4902
 IJCS 2017; 5(6): 1569-1571
 © 2017 IJCS
 Received: 03-09-2017
 Accepted: 04-10-2017

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International Journal of Chemical Studies

Immunohistochemical diagnosis of metastatic myxoid chondrosarcoma in dogs

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Abstract

An 11 year old female Doberman was presented with the mass on the left forelimb. The animal was having clinical signs of lethargy, weight loss and decreased appetite for the past two weeks. Physical examination revealed hard painful swelling on the left humerus head region and the skin over the mass was normal. Radiographic examination of the head region of left humerus revealed irregular calcified areas and osteolytic changes. On necropsy, spherical, greyish-white, hard, varying sized (0.5-3.5cm) multiple nodules were noticed on the lungs, bronchial lymphnodes, heart, liver, spleen and kidney. Cytological examination demonstrated that round neoplastic chondroblasts with high variable nuclear to cytoplasmic ratios. Anisocytosis and anisokaryosis were marked. Histopathologically, tumor mass present in humerus revealed pleomorphic cartilage lobules were separated by anaplastic spindle cells and vascularized fibro-connective stroma. Neoplastic cells revealed approximately 90% of positive cytoplasmic immunoreactivity with antibodies against vimentin and negative for cytokeratin.

Keywords: Dog, chondrosarcoma, cartilage, immunohistochemistry

Introduction

Chondrosarcomas are the second most common primary tumor of the bone in both humans and dogs, and account for approximately 5-10% of all canine primary bone tumors [1, 2]. Primary chondrosarcomas in dogs were mainly found in the appendicular skeleton, mammary gland, digit, tongue, kidney, omentum, trachea, synovium, larynx, lung, pericardium, right atrium, aorta, spleen, penile urethra, liver and retroperitoneum [1, 3-8]. Chondrosarcomas most commonly arise from cartilage or chondroid precursors from skeletal origin [1, 9]. However they may arise in locations as extraskeletal chondrosarcoma where cartilage is not normally found as within the soft tissues which may be the result of primitive mesenchymal cell differentiation [1, 9, 10]. Canine chondrosarcomas tend to grow slowly and have limited metastatic potential ranging from 0-20.5% [9, 11, 12].

Case history and Observation

An 11 year old female Doberman was presented with the mass on the left forelimb. The owner reported that the mass was found six months before and it had slowly enlarged and the animal was showing the symptoms of forelimb lameness for the past four months. The animal was also showing lethargy, weight loss and decreased appetite for the past two weeks. Physical examination revealed hard painful swelling on the left humerus head region and the skin over the mass was normal. Radiographic examination of the head region of left humerus revealed irregular calcified areas and osteolytic changes. Haematological values showed anaemic changes (Haemoglobin-8.4g%, PCV- 25.4%, RBC- 4.35x10⁶/dl) and serum biochemistry values revealed elevated BUN (54.14 mg/dl), creatinine (9.95 mg/dl) and phosphorus level (11.2 mg/dl). Animal was treated with prednisolone, tramadol and pantaprazole. Animal did not respond to the treatment and collapsed.

Result and Discussion

The mean age of diagnosis for canine appendicular chondrosarcoma is 6 years and there is no sex predilection [2, 13]. But in this case dog age was of 11 years. Clinical signs of chondrosarcoma vary according to the site of involvement. In primary bone tumours due to involvement of bone there were signs of lameness, swelling of the lesion site and pain on palpation due to periosteal stretching as observed in this case.

Humerus head was enlarged (8x6cm), porous and brittle. The cut surface of the mass was lobulated, firm and greyish white in colour. Some calcified areas were appeared as chalky white deposits. On necropsy examination grossly, spherical, greyish-white, hard, varying sized (0.5-3.5cm) multiple nodules were noticed on the lungs, bronchial lymphnodes, heart, liver, spleen and kidney.

Tumour mass was aspirated for cytological examination and stained using May-Grunwald Giemsa stain. Cytological examination demonstrated that round neoplastic chondroblasts with high variable nuclear to cytoplasmic ratios. Anisocytosis and anisokaryosis were marked. Cell margins were typically distinct.

Chondrosarcomas are the malignant neoplasms which produces cartilaginous matrix [14, 15]. Histopathological examination of the tumor mass present in humerus revealed pleomorphic cartilage lobules were separated by anaplastic spindle cells and vascularized fibro-connective stroma (Figure: 1). Neoplastic cells were hyperchromatic, round to

oval nuclei and variable prominent nuclei and contained multinucleated giant cells (Figure: 2). It was metastasized to visceral organs like lungs, heart, liver, spleen and kidneys were also reported [6, 7, 16]. There was presence of irregularly shaped cartilaginous lobules which were well demarcated from the parenchyma of liver [7]. Nodule from the kidney was multilobular margined by fibrous connective tissue (Figure: 3). Tubules were degenerated, areas of congestion, calcification and neovascularisation were noticed. Spleen contained poorly differentiated irregularly arranged, pleomorphic spindle cell chondroblasts [6]. The tumor cells contained eosinophilic cytoplasm and had a round appearance. Multiple nucleoli were noticed.

Additional sections were subjected to immunohistochemistry using mouse monoclonal antibody against cytokeratin and vimentin. It was revealed approximately 90% of the neoplastic cells demonstrated positive cytoplasmic immunoreactivity with antibodies against vimentin (Figure: 4) and negative for cytokeratin [17, 18].

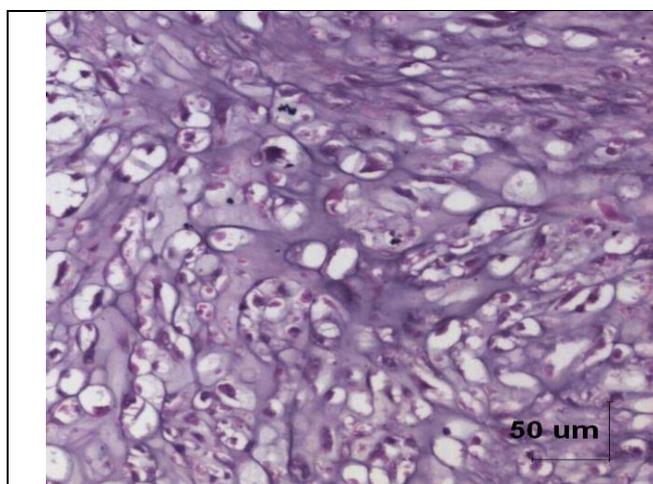


Fig 1: Chondrosarcoma: Humerus- H&E- Bar=50μm

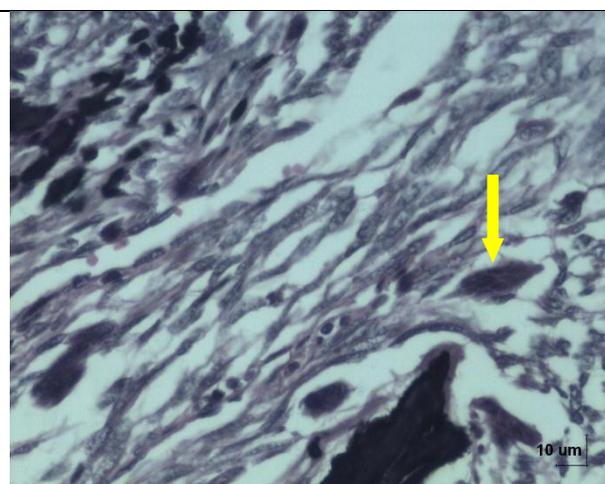


Fig 2: Chondrosarcoma-Giant cell (arrow): H&E- Bar=10μm

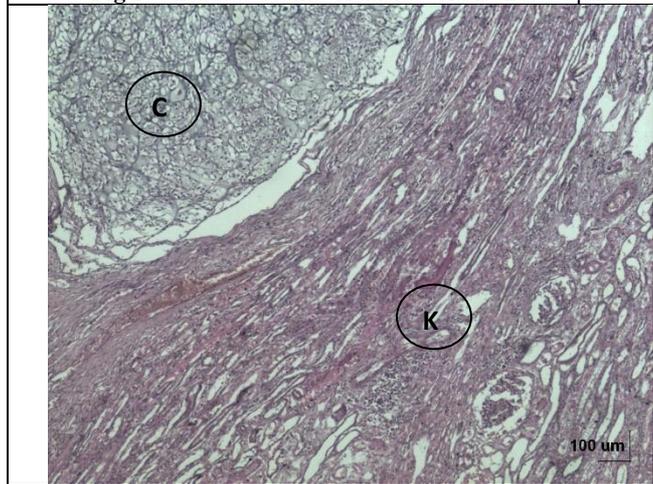


Fig 3: Kidney (K) - Presence of metastatic chondrosarcoma (C). H&E- Bar=100μm

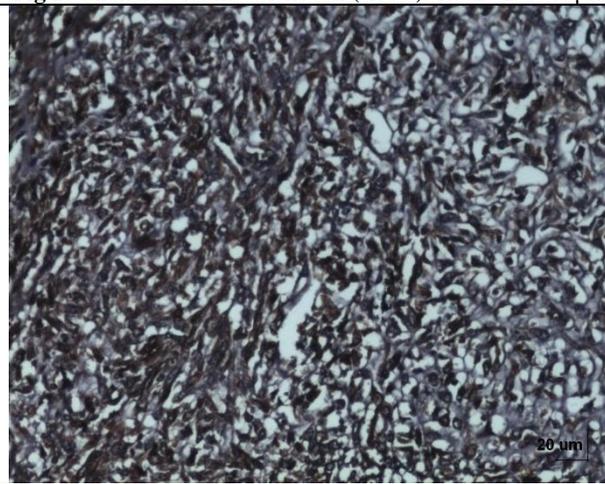


Fig 4: IHC: Vimentin: Intense cytoplasmic positive signals. DAB-Brown- Bar= 20μm

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