TRADITION AND MODERNITY IN VETERINARY MEDICINE, 2024, vol. 9, No 1(16): 88–93

FIBROSARCOMA IN A DOG – A CASE REPORT

I. I. Kalkanov*, V. S. Nedev

Department of General and Clinical Pathology, Department of Veterinary Surgery, Faculty of Veterinary Medicine, Trakia University, Stara Zagora, Bulgaria
E-mail: ismet.fortex@abv.bg
ORCID: 0000-0003-2094-0369 I.K.; 0009-0006-9096-9203 V.N.
(Submitted: 22 March 2024; Accepted: 7 April 2024; Published: 25 June 2024)

ABSTRACT

Sarcomas and fibrosarcoma are malignant mesenchymal tumours originating from connective tissue, most frequently detected on the skin and subcutaneous connective tissue. Fibrosarcoma is a highly invasive malignant soft tissue tumour originating from connective tissue cells, and fibroblasts. Primary canine fibrosarcoma is a rare tumour that and accounts for less than 5% of all primary tumours. Macroscopically, fibrosarcoma has a various manifestation, depending on its size and location. On inspection, it appears like a subcutaneous bump or a confined oval formation under the skin. It is more commonly seen in cats than in dogs. The presented clinical case describes the observed clinical, blood laboratory, gross pathology and histopathological findings in a dog with invasive fibrosarcoma.

Key words: Fibrosarcoma, histopathology, dog, gross pathology.

Introduction

Malignant oncological diseases are commonly encountered and responsible for about one-quarter of deaths in elderly dogs (Augsburger *et al.,* 2017). Sarcomas and fibrosarcoma are malignant mesenchymal tumours originating from connective tissue, most frequently detected on the skin and subcutaneous connective tissue. Common sarcomas are: fibrosarcoma, liposarcoma, lymphosarcoma and haemangiosarcoma (Baisan *et al.,* 2018). Fibrosarcoma is a highly invasive malignant soft tissue tumour originating from connective tissue cells, and fibroblasts. It is more prevalent in cats than in dogs (Vegad, 2007). Primary canine fibrosarcoma is a rare tumour that and accounts for less than 5% of all primary tumours in this species (Nicole and Ehrhart, 2020). Macroscopically, fibrosarcoma has a various manifestation, depending on its size and location. (Erik *et al.,* 2017). On inspection, it appears like a subcutaneous bump or a confined oval formation under the skin. Neoplastic tissue cross section resembles fat tissue as it is pale and sometimes, haemorrhagically imbibed and similar to haemangioma. In some cases, fibrosarcomas may bleed or become infected with microorganisms (Hamali and Ashrafihelan, 2010). Diagnosed fibrosarcomas in the dog demonstrate cellular pleomorphism and are also classified as undifferentiated pleomorphic sarcomas. Fibrosarcomas containing a myxoid component are considered myxofibrosarcomas. Necrosis, which is a sign of high-grade malignancy of fibrosarcoma, is often present (Andrew and Folpe, 2009). Fibrosarcoma can occur anywhere in the body where there is connective tissue (Kumar *et al.,* 2018). There are also periosteal fibrosarcomas originating from the periosteal connective tissue. Primary fibrosarcomas must be differentiated macroscopically and microscopically from osteosarcomas. In general, fibrosarcomas grow more slowly, are accompanied by formation of lower amount of periosteal tissue, and metastasize more rarely than osteosarcomas (Erik *et al.,* 2017).

The present report presents a case of fibrosarcoma in a n11-year-old dog, diagnosed on the basis of gross anatomy and histopathological examinations.

Case description

The article presents a clinical case of an invasive fibrosarcoma in the head region of a female Bulgarian Shepherd dog, 11 years of age. The dog has been fed dry food and beef, treated against internal and external parasites on a monthly basis and vaccinated on a yearly basis.

Two mounths ago, the animal experienced episodes of ataxia which progressed to seizures, so it was to the University Veterinary Hospital (Faculty of veterinary medicine, Stara Zagora, Bulgaria) for examination. Round egg-sized subcutaneous formation of the head of hard-elastic consistency was detected.

Due to financial issues, the owners refused radiography of the head, but agreed only to perform blood analysis. The haematology and biochemistry analyses were without changes and phenobarbital (Epytil 60 mg, Richer Pharma) tablets at a daily dose of 2 mg/kg were prescribed. With this therapy, the dog improved but only for one mounth. The daily phenobarbital dose was increased to 4 mg/kg but without effect. The growth in the region of the head has increased intensively in size so the owners referred the dog to the hospital for examination. The physical examination showed normal body temperature, pale rose mucous coats and decreased skin elasticity. The inspection findings were inability to stand up, mydriasis of both pupils, seizure episodes unresponsive to diazepam. Computed tomography examination was suggested but the owners refused due to financial reasons. Blood analysis revealed alkaline phosphatase activity of 750 U/I (normal values 1-85 U/I) and total leukocyte counts of 35 G/L (normal values 6-17G/L). The owners requested euthanasia followed by necropsy. The euthanasia (protocol No. 1283) was performed with 8 mg/kg propofol (Propomitor 10 mg/ml Orion Corporation) and 0.4 mg/kg combination of embutramide, mebezonium iodide, tetracaine hydrochloride dimethylformamide (T61, MSD animal health). After the euthanasia, the dog body was submitted to gross anatomy examination following the standard necropsy protocol. After analysis of gross anatomy changes in all organs and systems, specimens for histopathological examination were collected from different areas of the neoplastic growth in the region of the head, regional (mandibular) lymph nodes, the brain and lungs. Histopathological specimens were fixed in 10% neutral formalin and processed by routine histological technique (Dzhurov *et al.*, 1989; Dyakov *et al.*, 1989).

Results and discussion

External inspection

The external inspection of the body demonstrated pale conjunctivae and buccal mucous coats. There was extensive dental tartar with gingival involvement. The gums were highly hyperaemic, bleeding, oedematous and detached from the dental alveoli – periodontosis, the roots of the teeth: incisors, premolars and molars were exposed. Bilaterally in the temporal area, as well as the back of the head, a subcutaneous formation the size of an orange was detected. On palpation, it was immobile, of hard-elastic consistency and a round shape (Fig. 1). On abdominal dissection, the spleen was reduced in size and of pale colour. The liver colour was yellow-brown, with a flaccid crumbly texture. The blood vessels of the stomach, small and large intestines were hyperemic, and the mesenteric lymph nodes - enlarged.

Figure 1: Fibrosarcoma in the temporal skull area (arrow).

The medullary part of the kidneys was pale and the cortical surface was rough. The lung colour was purple-red in, dense on palpation, and spattered with multiple masses with a size from a millet grain to a pea. The heart had a rounded appearance and its walls were thinned and flaccid. Mandibular lymph nodes were bilaterally enlarged to the size of a walnut. The sagittal section of the head demonstrated a 15/15 cm formation bilaterally in the temporal region, affecting the soft tissues (muscles and fascia) and the frontal sinus (Fig. 2). The cut surface of the formation had a soft pale pink, at some loci haemorrhagic heterogeneous structure and numerous lacunae as a result of the necrotic tissue processes. The neoplastic process has reached attaining the intracranial space, with lysis of skull bones affecting the cerebellum and the brain (Fig. 3). The cerebellum was significantly reduced in size, as well as the caudal lobes of the brain hemispheres, due to the pressure atrophy caused by the neoplasm. The intracranial space volume was reduced, and the skull bones showed osteolysis. There were no visible changes in the other organs and systems.

Figure 2: Sagittal section, fibrosarcoma involving soft tissue of the skull region and the frontal sinus (arrows).

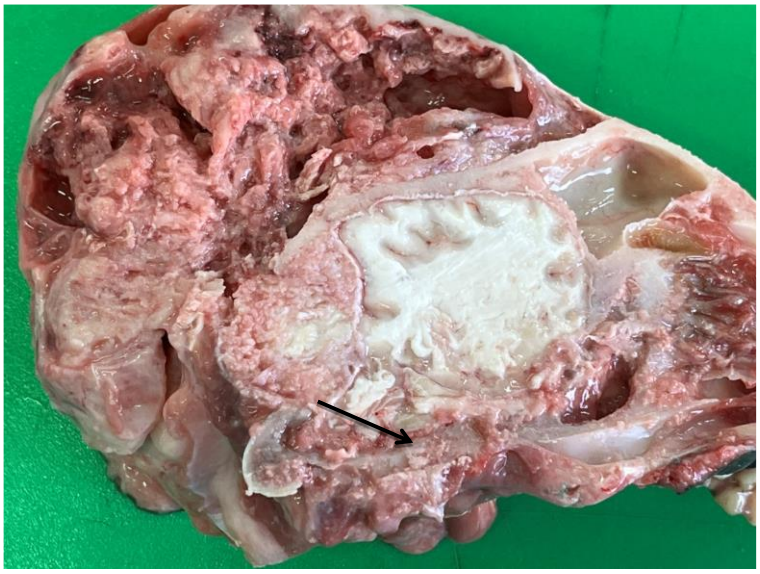

Figure 3: Head sagittal section, pressure atrophy of the cerebellum and the brain caused by invasive fibrosarcoma growth (arrow).

Histopathological changes

Histopathological changes in studied organs (various areas of the tumour in the head region, regional /mandibular/ lymph nodes, brain and lungs) consisted in hyperaemia, degenerative and necrobiotic processes and neoplastic growths.

The established histopathological changes of the neoplastic formation in the head region consisted in low-differentiated and atypical fibroblasts arranged in groups of different shape and size, intertwined by collagen fibres, with clear signs of malignancy such as atypism, pleomorphism and polymorphism. Cell mitoses were also observed in some areas. The tumour stroma was composed

of delicate collagenous, connective tissue fibres and capillaries. The registered histopathological changes in the examined neoplastic tissues suggested the diagnosis - Fibrosarcoma (Fig. 4) The microscopic changes largely coincide with those of (Erik *et al.,* 2017), described as histopathological changes in 25% of dogs affected with fibrosarcoma. Microlesions similar to those in this study were described in 11 dogs by Nicole and Ehrhart, (2020). Andrew and Folpe, (2009) also describe necrosis in some of the cells, as sign of high-grade fibrosarcoma malignancy.

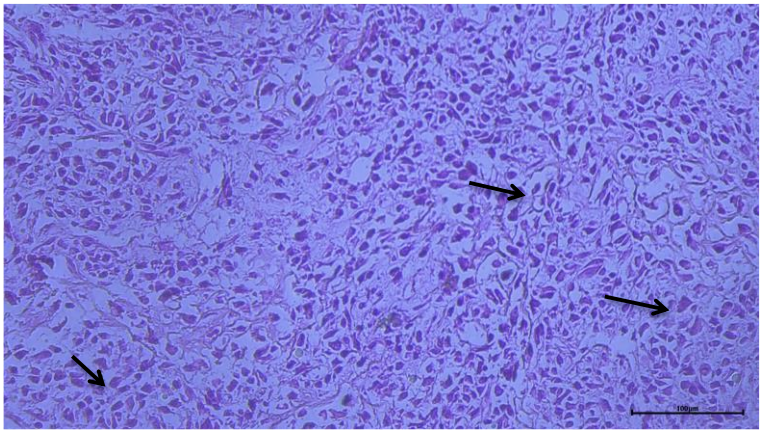

Figure 4: Low-differentiated and atypical fibroblasts arranged in clusters of various shape and size (arrows). Fibrosarcoma in the region of the head of a dog, H/E, bar=10 µm

The observed microscopic changes in the brain comprised degenerative necrobiotic processes as pyknotic nuclei and glial cells, plasmolysis, tigrolysis and karyolysis of ganglion cells with intense hyperaemia of vessels. At some loci, the brain tissue had a spider-like, pale loose histostructure, resulting from occurring necrobiotic processes (Fig. 5).

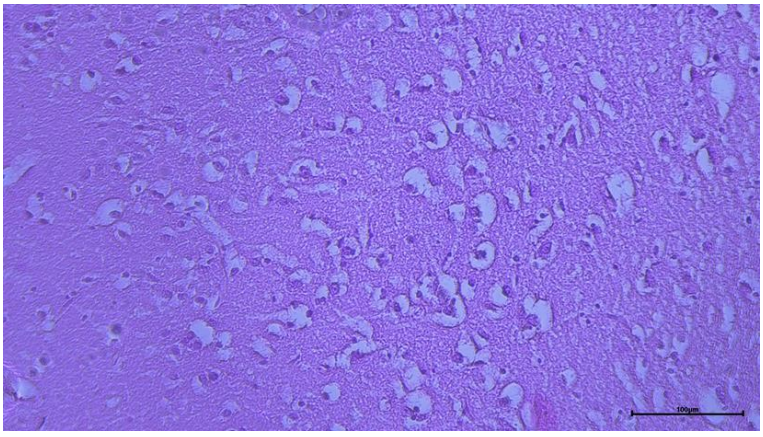

Figure 5: Pyknotic nuclei and brain glial cell plasmolysis, H/E, bar=10 µm

Inflammatory microlesions, hyperaemia and oedema were found out in the medullary area of mandibular lymph nodes.

The microscopic changes in the lung were local foci of low-differentiated and atypical fibroblasts arranged in groups of different shape and size - metastases from the primary tumour. At some

places, the alveoli had very thin walls and were torn - emphysema. The vessels were overfilled with erythrocytes and substantially dilated, round cell proliferations of lymphocytes and macrophages were observed in the interstitium. The microscopic changes in the lung found by us differ from those described by others (Nicole and Ehrhart, 2020). In the latter study, fibrosarcomas metastasize most often in the heart, pericardium, skin, very rarely in the lung.

Conclusion

The described clinical case of canine fibrosarcoma, diagnosed on the basis of macroscopic and microscopic pathological studies performed by us, proves the malignant nature and invasive course of the disease. On this basis, it can be summarised that if the tumour is diagnosed cytologically at an early stage and removed surgically, local recurrences and invasive spread to other organs and systems of the body can be prevented depending on its localisation.

References

1. Andrew L. and Folpe I. (2009). *Diagnostic Surgical Pathology of the Head and Neck (Second Edition)*, 234–243.
2. Augsburger, D., Nelson P., Kalinski T., Udelnow A., Knosel T. (2017). Current diagnostics and treatment of fibrosarcoma -perspectives for future therapeutic targets and strategies, Oncotarget, 8(61), 638–653.
3. Baisan, R. A., Vulpe V., Lazar M., Pasca S. A. (2018). A rare case of intracardiac fibrosarcoma with myxoid features inducing venous occlusion in a dog: A case report, BMC Veterinary Research, 14, 392–398.
4. Dzhurov, A., Alexandrova E., Alexandrov. M. (1989). *Methods for pathohistological examination*. Zemizdat, Sofia, pp. 28–34.
5. Dyakov, L., Lozanov L., Angelov A., Stoykov. D. (1989). *Exercise guide for veterinary pathohistology*, Zemizdat, Sofia, pp. 28–34.
6. Erik, J., Olson A., Cathy S., Carlson S. (2017). *in Pathologic Basis of Veterinary Disease*, (Sixth Edition), 5, 387–389.
7. Kumar, V. A., Kumari K. N., Kumar K. S., Kumar V. G., Lakshman M. (2018). *Haematobiochemical changes in mammary tumour affected dogs*, Journal of Pharmaceutica Innovation, 7(2), 187–189.
8. Nicole P. and Ehrhart K. (2020). Timothy M. Fan, in Withrow and MacEwen's Small Animal Clinical Oncology, pp. 234–342
9. Hamali H. and Ashrafihelan J. (2010). *Vaginal fibrosarcoma in cow-A case report*, International Journal of Veterinary Research. 4(4), 225–228.
10. Soujanya S. and Madhuri D. (2019). *Cutaneous fibrosarcoma in a dog*, Journal of Entomology and Zoology Studies, 7(1), 861–863.
11. Vegad, J. L. (2007). *Neoplasia.* In: A Text book of Veterinary General Pathology. Edn 2, CBS Publications, New Delhi, pp. 351–352.