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Cutaneous fibrosarcoma in a dog

S Soujanya and D Madhuri

Abstract

In the present study, a round, firm, solid, whitish grey coloured nodular growth was surgically removed from the elbow region of a dog and submitted for diagnosis to Department of Pathology, College of Veterinary Science, Korutla. Histopathology was performed and lesions were noted. Microscopically, the nodular mass was composed of spindle shaped fibrous connective tissue cells with spindle shaped nuclei forming compact interlacing and intersecting bundles. Bright pink colored long and wavy collagen fibers running in all directions were noticed. Nuclear, cellular pleomorphism and nuclear hyperchromatism was seen. The tumour cells were running haphazardly and had a scant amount of cytoplasm. The cell boundaries were poorly defined. The nuclear to cytoplasm ratio was increased. Mitotic figures and numerous blood vessels were noticed. The collagen fibers and fibrocytes arranged in a concentric manner around the blood vessels. Thus in present case, the tumour was confirmed as cutaneous fibrosarcoma based on histopathology.

Keywords: collagen, dog, fibrosarcoma, fibrocytes, histopathology, tumours

1. Introduction

Cancer is the most common cause of death in canines. The most commonly observed tumors in dogs are lymphoma, osteosarcoma, lipoma, melanoma, mammary gland carcinoma, papilloma, hemangiosarcoma, histiocytomas and mast cell tumors. Soft tissue sarcomas are mesenchymal neoplasms derived from soft connective tissues, occur commonly in cutaneous and subcutaneous tissues. Examples for soft tissue sarcomas include fibrosarcoma, liposarcoma, lymphoma, hemangiosarcoma and peripheral nerve sheath tumours.

Fibrosarcoma is a malignant tumor of soft tissue that connects, supports or surrounds other structures and organs of the body [1]. Fibrosarcoma originates from connective tissue cells. Since connective tissue is abundant in all parts of the body, fibrosarcomas can occur anywhere in the body. The most common sites for development of fibrosarcoma are subcutaneous tissue of the head, neck, shoulder and legs. Gingival fibromas are extremely common in the dog [2]. The soft tissue sarcomas account for 8 to 15% of all cutaneous and subcutaneous tumors in the dog and are especially prevalent among middle age to old, medium to large breed dogs [3]. Fibrosarcomas are well circumscribed but unencapsulated tumours. They are comprised of mature fibrocytes which produce abundant collagen. Histological features of fibrosarcomas include herringbone pattern or interwoven arrangement of spindle shaped tumour cells, scant cytoplasm, elongated to oval shaped nucleoli, mitotic figures, marked cellular pleomorphism and increase in cellular density. Fibrosarcomas can be diagnosed by various techniques like fine needle aspiration cytology, histopathology, X-rays, ultrasound scan and immunohistochemistry. Histopathological examination is still one of the best and reliable method for routine diagnosis of various canine neoplasms. In dogs, 60 to 80 percent of skin tumors are benign and can be cured with early surgical removal. Fibrosarcoma of the skin, subcutaneous tissue and oral cavity are generally malignant but their metastasis to other body parts is rare. The cutaneous and subcutaneous soft tissue sarcomas having 7 to 30% of post surgical recurrence rate [4] and up to 17% metastatic rate [5].

Soft tissue sarcomas are occasionally seen in dogs and cats. In a survey on tumours of dogs in Zambia out of 67 tumours only one case of fibrosarcoma in the skin was reported [6]. Present communication describes a rare case of cutaneous fibrosarcoma in a three year old male dog which was diagnosed on the basis of clinico-histopathological findings.

2. Materials and Methods

A 3 year old male dog with a nodular growth at elbow region was brought for diagnosis and treatment to Teaching Veterinary Clinical Complex, College of Veterinary Science, Korutla.

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The information pertaining to the history of clinical signs, age, vaccination, deworming and body weight of the affected dog were recorded. Then a detailed clinical examination was done. Location, size, shape, colour and consistency of the tumorous mass was carefully recorded. After clinical examination, the tumorous mass was surgically excised, representative tumour tissue sample was collected, fixed in 10% neutral buffered formalin and submitted to Department of Pathology, College of Veterinary Science, Korutla for histopathological examination. Formalin fixed tissues were then washed under running tap water, dehydrated in ascending grades of alcohol, cleared in xylene, embedded in paraffin wax and blocks were prepared. 5µm thick sections were cut and stained with Haematoxylin and Eosin as per the standard procedure [7]. Then stained slides were mounted with cover slip by DPX mountant. Then slides were examined under Olympus microscope for histopathological examination and interpretation.

3. Results

3.1 Clinical signs: Detailed history of the affected dog was collected. The dog had anorexia, depression, inactivity, weight loss, dehydration, weakness and emaciation. The dog was dewormed and vaccinated against the most common infectious diseases. Then clinical examination of the dog revealed normal body temperature, pulse rate, pale mucous membranes and anaemia. On palpation, a well circumscribed, round subcutaneous firm, solid, whitish grey colored, nodular and ulcerated growth of 3 X 4 X 0.5 cm in size was observed on right side of the elbow region and it was found to be painful to the dog. Cut section of the tumour mass revealed whitish creamy colored areas of necrosis.

3.2 Histopathological Lesions

On histopathological examination, the tumour mass consisted of spindle shaped fibrocytes with spindle shaped nuclei forming compact interlacing and intersecting bundles (Fig. 1). Bright pink colored long and wavy collagen fibers were observed in between the tumour cells (Fig. 2). The neoplastic fibrocytes were running haphazardly, showed nuclear and cellular pleomorphism. The nuclei of neoplastic cells were large and hyperchromatic. Most of nuclei were elongated to form oval shapes and contained one or more prominent nucleoli. The tumour cells had a scant amount of cytoplasm. The cell boundaries were poorly defined. The nuclear to cytoplasm ratio was increased in neoplastic cells (Fig. 3). Few mitotic figures were noticed. There was no inflammatory reaction in the tumour mass. Numerous blood vessels and abundant collagen stroma were noticed. The collagen fibers and fibrocytes arranged in a concentric manner around the blood vessels (Fig. 4).

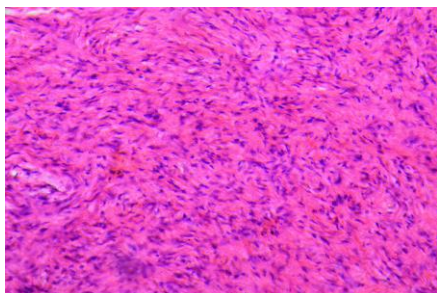


Fig 1: The tumour mass showing spindle shaped fibrocytes with spindle shaped nuclei forming compact interlacing and intersecting bundles. H &E x10

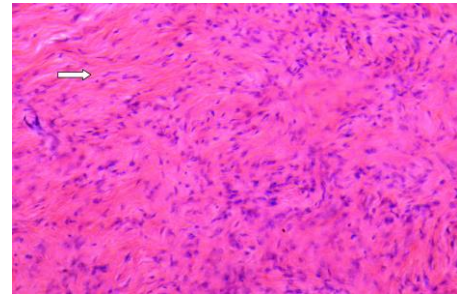


Fig 2: The tumour mass showing bright pink colored long and wavy collagen fibers in between the tumour cells running in all directions (arrow). H &E x10

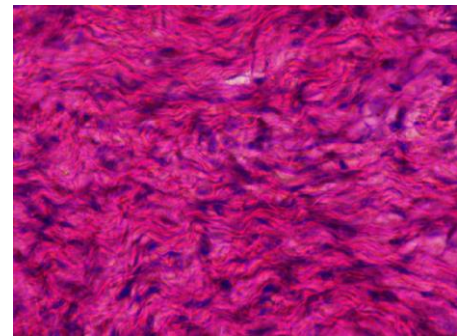


Fig 3: The tumour mass showing neoplastic fibrocytes running haphazardly, showing nuclear and cellular pleomorphism. The nuclei of neoplastic cells were large and hyperchromatic. Most of nuclei were elongated to form oval shapes. H &E x40

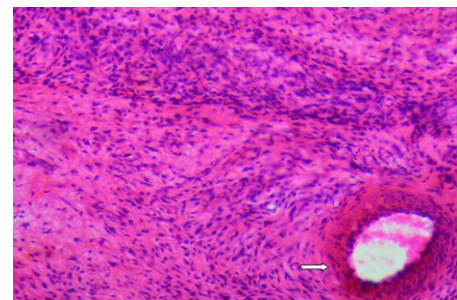


Fig 4: The tumour mass showing numerous blood vessels and abundant collagen stroma. The collagen fibers and fibrocytes arranged in a concentric manner around the blood vessels (arrow). H &E x10

4. Discussion

Fibrosarcoma is the second most prevalent skin tumour in cats, while in dogs it represents a rare tumour [8]. There are various causes for development of fibrosarcoma in animals including genetic susceptibility [9], chemical substances [10], subcutaneous vaccine injections [11], subcutaneous microchip implants [12] and parasitic infections [13]. In present case, the neoplastic transformation of cells in cutaneous fibrosarcoma may be due to release of reactive oxygen and nitrogen species from various cells and growth factors because they are having tumour inducing properties as reported by earlier researchers [14]. In dogs, fibrosarcoma was earlier reported on various parts of the body such as on oesophagus [13], heart [15], urinary bladder [16], omentum [17], trachea [18], vagina [19], intestine [20] and lower eyelid [21]. But in present study, fibrosarcoma was observed on skin of the dog. It may be originated from the dermis because it is rich in the dense fibrous connective tissue.

In present case, histologically the cutaneous fibrosarcoma was composed of spindle shaped tumor cells forming interlacing

and intersecting bundles. The neoplastic fibroblast cells showed nuclear, cellular pleomorphism and nuclear hyperchromatism with presence of mitotic figures. Similar lesions were earlier reported in vaginal fibrosarcoma in a dog^[19]. Neoplastic cells exhibited eosinophilic cytoplasm and indistinct cell borders. Within the tumour mass there were multifocal areas of necrosis and haemorrhage. These lesions are in agreement with intestinal fibrosarcoma in dogs^[20]. Tumour cells having scant cytoplasm and spindle shaped nuclei with inconspicuous nucleoli. Bright pink collagenous stroma which was produced by fibroblasts was observed in between the neoplastic cells. These lesions are in accordance with the earlier reports of fibrosarcoma in lower eyelid of dogs^[21].

The treatment of choice for canine cutaneous and subcutaneous soft tissue sarcomas is surgical excision^[22]. In dogs, mitotic index less than 9 is associated with greater survival rate^[23]. In present case, the tumour mass was surgically removed, there were no evidence of metastasis and the mitotic index of the tumor was low. The dog was reexamined after few days and there was no recurrence at the external surgical site and the animal was completely recovered.

5. Conclusion

The present study describes the diagnosis of a rare case of cutaneous fibrosarcoma in a dog based on clinico-microscopic findings and concludes that if it is surgically excised in early stages, the local recurrence and systemic spread to other organs can be prevented and thus the prognosis may be satisfactory.

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