CASE REPORT

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Osteoblastic Osteosarcoma In A Cat

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Abstract

Osteosarcoma (OS) is the most common malignant bone tumor in humans and animals and constitutes 70-80% of primary malignant cancers in cats. This case report consists of an 11-year-old male tabby cat with dyspnea brought to Kırıkkale University Veterinary Faculty Research and Application Hospital. In the clinical examination, a mass was palpable in the thorax region and it was determined that infiltration was detected into the thorax on radiographic images. All of the whole blood count parameters were normal, however, there was a significantly increased ALP value in serum biochemistry. The mass was removed by excisional biopsy, histopathological examination was performed and osteosarcoma was diagnosed. Adjuvant therapy was not recommended in cat osteosarcomas because of the low metastasis rate and the mean survival of 24-44 months even with amputation or wide local resection. A new mass was detected in the cranial of the thorax at the 9th postoperative month. However re-operation was not required due to the general condition of the animal was good, was an elderly age and no severe dyspnea and similar respiratory problems. In the event that the patient worsens in the future, it was decided to perform euthanasia according to the animal owner's wishes.

Keywords: Cat, osteoblastic osteosarcoma, rib tumor.

INTRODUCTION

Primary bone tumors are rarely seen in cats. The incidence of primary bone tumors in cats among all bone tumors is 4.9 per 100.000 (Dorn et al., 1968). Osteosarcoma (OS) is the most common bone tumor that constitutes 70-80% of primary bone tumors in cats. OS cases are more common in average 10-year-old cats (Heldmann et al., 2000). OS occurs at the same rate in the axial and appendicular skeleton of cats (Argyle et al., 2008; Garden et al., 2005). In a study of 90 cats, 50 cases of osteosarcoma were seen in appendicular and 40 cases in the axial skeleton (Heldmann et al., 2000). Tumors seen in the axial skeleton originate mostly from the pelvis and at least from the rib (Turrel and Pool, 1982).

Osteosarcomas are usually seen in invasive form; however, they may remain in a localized form by compressing the surrounding tissues rather than infiltrating them. Osteosarcomas are mostly locally aggressive, and cat osteosarcoma cases have a lower rate of metastasis than osteosarcoma cases in dogs (Liu et al., 1974). Osteosarcoma lesions consist of irregular exostoses with a capsule of fibrous and cartilage tissue. This formed fibrous capsule is suitable to connect with the surrounding tissue. This makes surgical removal of the lesion difficult (Riddle and Leighton, 1970). Adjuvant therapy is not recommended too much in cat osteosarcomas because of the low metastasis rate and the mean life span of 24-44 months even with amputation or wide local resection (Bitetto et al., 1987; Turrel and Pool, 1982).

MATERIALS AND METHODS

This case report consist of an 11-year-old male tabby cat with dyspnea brought to Kırıkkale University Veterinary Faculty Research and Application Hospital. The radiographic examination was performed for the determination of the location and radiographic appearance of the tumor (Figure 1). Blood samples were taken before anesthesia for hematological and biochemical analyses. Surgical findings included the number of ribs and sternebrae resected, invasions into organs, and chest wall reconstruction. The oncologic outcome was determined from the physical and radiologic examination every month for 4 months and telephone interview with the owner for 9 months postoperatively.

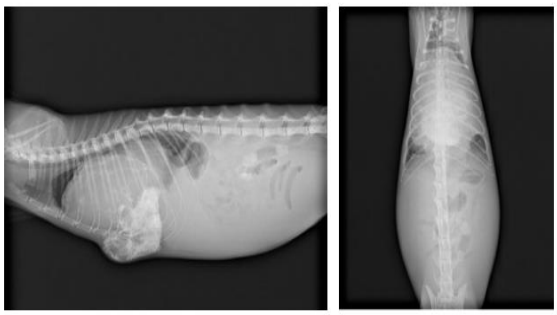

Figure 1. L/L and V/D radiographic images of a local mass invading the thoracic region of the sternum.

Induction of anesthesia was performed with 0.1 mg/kg diazepam (Diazem; Deva drug, Turkey) and 5 mg/kg propofol (Propofol 2% Fresenius; Fresenius Kabi, Austria). Anesthesia was maintained with isoflurane (Adeka, Turkey) and a continuous rate infusion of lactated Ringer's solution (10 ml/kg/h IV)(Ringesol, Vilsan, Turkey) was administered. 0.2 mg/kg butorphanol (Butomidor; Richterpharma, Austria) was administered perioperatively. The mass was localized at the level of 7 and 9 ribs and the last two sternebra. The mass was resected with two sternebrae and four cartilago costalis. After resection, the area where the mass was removed was closed with diaphragmatic advancement techniques (Arosohn 1984). There was no need for lobectomy because of any pulmonary metastasis. The tumor mass was 10.5 × 11.1 × 4.6 cm in size (Figure 2).

Figure 2 Mass removed from the thorax by wide local resection.

A chest tube was placed for a drain of exudation. The drain was removed 72 hours postoperatively since there was minimal exudation (Figure 3a). 25 mg/kg cefazolin sodium (Sefazol, Mustafa Nevzat, Turkey) and 0.2 mg/kg meloxicam (Maxicam; Sanovel, Turkey) were administered for 10 days postoperatively. On the 7th postoperative day, the control x-rays were taken (Figure 3b) and the sutures were taken and delivered to the owner.

Figure 3. (a) Postoperative tube insertion into the thorax. (b) L/L radiographic image of the thorax on postoperative 7th day.

RESULTS

Physical examination revealed dyspnea, lameness, a mass in the thorax region, and bone contrasts was detected in the caudal part of the thorax by radiographic examination without metastasis preoperatively. No specific change was observed in the whole blood count parameters. However, serum ALP level (226 U/L) was significantly higher than normal (25-93 U/L) in the preoperative period. As the operation planning according to the biopsy sample that is taken in the preoperative period would not change, it was decided to perform an excisional biopsy.

A histologic sample was performed by a board-certified pathologist. Tissue samples were fixed in 10% buffered formalin for 48-72 hours and washed under running tap water for 6-8 hours. Subsequently, after routine tissue follow-up in grade alcohol (70º, 80º, 90º, 96º, and 99.5º) and xylol series, they were absorbed in paraffin at 56-58 °C and then paraffin-blocked. 45 µm thick sections were taken from the prepared paraffin blocks and stained with hematoxylin and eosin (HE) and microphotographs were taken with Olympus BX51 trinocular microscope and DP25 digital camera.

Histopathological examination revealed pleomorphic atypical osteoblast-like tumor cells with hyperchromosis and partly mineralized osteoid accumulation between the tumor cells and diagnosed as osteoblastic osteosarcoma (Figure 4).

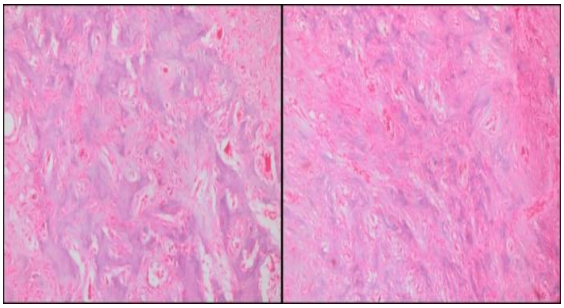

Figure 4. Osteosarcoma. Atypical osteoblastic cells (on the left) and osteoid deposition (purple deposits in the square on the right). Hematoxylin and Eosin (HE) staining. 200x magnification.

There were no complications in the postoperative period. Dyspnea symptoms disappeared after the operation. In the following period, the owner was contacted every month to obtain information about the cat. After the 9th month, it was learned that he had occasional cough complaints with exercise intolerance. In the 12th month postoperative follow-up X-rays, a new mass was detected in the cranial mediastinum region. Due to the good condition of the animal (no signs of severe dyspnea, etc.), it was decided to be re-operated. But the owner didn't accept this. In the event that the patient worsened in the future, it was decided to perform euthanasia at the request of the owner.

DISCUSSION AND CONCLUSION

Osteosarcoma is generally a tumor of the older cat, mean age 10.7 years and no sex and breed predisposition according to earlier reports (Bitetto et al., 1987; Heldman et al., 2000; Kessler et al., 1997) Dyspnea, swelling or mass, and lameness are the common sign of osteosarcoma in rib (Quigley and Leedale, 1983). The rate of metastasis osteosarcomas in cats is low (%5-10) and the average survival is 24-44 months, even with wide local resection or amputation (Garden et al., 2005, Argyle et al., 2008; Heldmann et al., 2000). Adjuvant chemotherapy is not typically recommended for osteosarcomas in cats because of the low metastasis rate (Liu et al., 1974; Bitetto et al., 1987). But some authors state that treatment with adjunctive chemotherapy and radiotherapy promise longer survival times for cats with osteosarcoma (Heldmann et al., 2000; Dhaliwal et al., 2003; Pirkey-Ehrhart et al., 1995; Dhaliwal et al., 2003). İn a previous study, the use

of cisplatin and doxorubicin were improved the survival of the dogs when used as an adjunct to resection for rib osteosarcoma (Pirkey-Ehrhart et al., 1995). In this case, clinical findings (mass on the thorax, dyspnea, lameness) and mean age (11 years old) for feline OS was similar with previous reports. Radiographic findings were consistent with rib osteosarcoma and osteoproliferative lesions and there were no metastasis before and post-surgical time in radiological examination. That's why adjuvant therapy was not started in the postoperative period. Patient survival time (24 months) was correlated with previous studies (Garden et al., 2005; Argyle et al.,2008).

Recurrence frequency was interested in marginal excision and type of osteosarcoma (Heldmann et al., 2000). In control radiography, recurrence of a mass detected in the cranial part of thorax postoperatively 12 months. İt is thought that was interest about marginal excision of mass from thorax or metastasis before surgery. Cat's survival time was 24 months from beginning to postsurgical lifetime. It could provide a long survival time if we had adjunctive chemotherapy and radiotherapy.

The alkaline phosphatases are enzymes primarily derives from bone, hepatic tissue, or kidney in most mammalian species. It is known that serum alkaline phosphatase enzyme levels commonly increased with osteosarcoma in dogs. Serum alkaline phosphatase activity is more readily measured and is known to be a direct reflection of osteoblastic activity (Ehrhart et al., 1998; Kramer and Hoffmann, 1997). Elevated total and bone-specific serum alkaline phosphatase levels were described in dogs with osteosarcoma. A subset of osteosarcoma patients has an increased serum ALP concentration at the time of diagnosis, which is associated with a worse prognosis (Ehrhart et al., 1998; Garzotto et al.,2000). In this case, serum alkaline phosphatase level increased. Preoperative findings of serum alkaline phosphatase were correlated with survival of cats (24-44 months) with osteosarcoma.

The result of this case that rib and sternebrae resection with mass is minimally effective for survival times of the cat with primary rib tumor. Adjuvant therapy may improve survival times of cats when used as an adjunct to resection for rib osteosarcoma.

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Conflict of Interest

The authors declare that there is no conflict of interest.

REFERENCES

Argyle DJ, Brearley MJ, Turek MM. 2008. Decision making in small animal oncology, first ed. Wiley-Blackwell, USA.

Arosohn M. 1984. Diaphragmatic advancement for defects of the caudal thoracic wall in the dog. Vet Surg, 13, 26-28.

Bitetto WV, Patnaik AK, Schrader SC, Mooney SC. 1987. Osteosarcoma in cats: 22 cases (1974-1984). J Am Vet Med Assoc, 190, 91–93.

Dhaliwal RS, Johnson TO, Kitchell BE. 2003. Primary extraskeletal hepatic osteosarcoma in a cat. J Am Vet Med Assoc, 222, 340-342.

Dorn CR, Taylor DO, Schneider R, et al. 1968. Survey of animal neoplasms in Alameda and Contra Costa Counties, California. II. Cancer morbidity in dogs and cats from Alameda County. J Natl Cancer Inst, 40, 307–318.

Ehrhart N, Dernell WS, Hoffmann WE, et al. 1998. Prognostic importance of alkaline phosphatase activity in serum from dogs with appendicular osteosarcoma: 75 cases (1990–1996). JAVMA, 213, 1002–1006.

Garden OA, Reubi JC, Dykes NL, et al. 2005. Somatostatin receptor imaging in vivo by planar scintigraphy facilitates the diagnosis of canine insulinomas. J Vet Intern Med, 19, 168–176.

Garzotto CK, Berg J, Hoffmann WE, et al. 2000. Prognostic significance of serum alkaline phosphatase activity in canine appendicular osteosarcoma. J Vet Intern Med, 14, 587–592.

Heldmann E, Anderson MA, Wagner-Mann C. 2000. Feline osteosarcoma: 145 cases (1990-1995). J Am Anim Hosp Assoc, 36, 518-521.

Kessler M, TassaniPrell M, Vonbomhard D, et al. 1997. Feline osteosarcoma: epidemiologic, clinical, and radiologic findings in 78 cases (1990–1995). Tierarztliche Praxis, 25, 275– 283.

Kramer JW, Hoffmann WE. 1997. Clinical enzymology. In: Clinical Biochemistry of Domestic Animals. Academic Press, San Diego, CA.

Liu SK, Dorfman HD, Patnaik AK. 1974.: Primary and secondary bone tumours in the cat. J Small Anim Pract, 15, 141–156.

Quigley PJ, Leedale AH. 1983. Tumors Involving Bone in the Domestic Cat: A Review of Fiftyeight Cases. Vet Pathol, 20, 670-686.

Pirkey-Ehrhart N, Withrow SJ, Straw RC, et al. 1995. Primary rib tumors in 54 dogs. J Am Anim Hosp Assoc, 31, 65-69.

Riddle WE Jr, Leighton RL. 1970. Osteochondromatosis in a cat. J Am Vet Med Assoc, 156, 1428–1430.

Spugnini EP, Ruslander D, Bartolazzi A. 2001. Extraskeletal osteosarcoma in a cat. J Am Vet Med Assoc, 219, 60–62.

Turrel JM, Pool RR. 1982. Primary bone-tumors in the cat: a retrospective study of 15 cats and a literature-review. Vet Radiol, 23, 152–166.