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Recurrent Squamous Cell Carcinoma of the Submandibular Region after Surgery in a Dog: A Case Report

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CASE REPORT
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ABSTRACT

Squamous cell carcinoma (SCC) is a malignant tumor that has been reported in several organs of different dog breeds. An 8-year-old Shih Tzu, an intact male dog, came to an animal clinic in the Thonburi area, Bangkok Province, Thailand, and a mass of 4.5 × 4.5 cm (width × length) by size was found at the submandibular area. Surgical excision to remove the mass and subsequent histological examination identified the mass as SCC. After conducting the surgery and follow-up, the mass was recurrent at the same location after 33 days and a dog died. Therefore, one of the possible reasons for the death of the dog could be SCC metastasis.

Keywords: Dog, Squamous cell carcinoma, Submandibular

INTRODUCTION

Squamous cell carcinoma (SCC) originates from squamous epithelium, and is a malignant tumor (Willcox et al., 2019). This type of tumor in dogs has been reported in several organs, such as the cranium, cornea, rostral nasal septum, and oral cavity, while it has also occurred cutaneously (Dos Anjos et al., 2019; Simčič et al., 2020; Łojszczyk et al., 2021). Furthermore, SCC has been reported in other species, including cats, horses, and chinchillas (Thomson, 2007; Morrison et al., 2019; Szabo et al., 2019). The predisposing factors that cause SCC include exposure to ultraviolet light, contact with chemical carcinogens, chronic inflammation, and viral infection (Munday et al., 2017; Łojszczyk et al., 2021). In addition, previous studies found that the papillomavirus causes immunosuppression and induces epithelial malignant progression (Munday et al., 2017). Investigating SCC in dogs involves a general physical examination, hematology-serum biochemistry test, cytology, and biopsy to assess metastasis (Thomson, 2007; Silva et al., 2018). The case report presents SCC of the submandibular region in a dog in Thonburi area, Bangkok Province, Thailand, which has been rarely reported so far.

Case report

An 8-year-old Shih Tzu, an intact male dog, came to an animal clinic in Thonburi district, Bangkok Province, Thailand (establishment license 01-957/2562, latitude 13.707529, and longitude 100.478054) with a mass found on the left side of the face. The owner informed the veterinarian that the mass had grown rapidly in the first month after it was first noticed. The dog was eating normally with no vomiting, and had normal feces and urine. The dog had been vaccinated every year and taken for flea and tick prevention regularly. Physical examination revealed the dog had a bodyweight of 5 kg, the mucous membrane was pink, capillary refill time was less than 2 seconds, heart and lungs sounded normal (heart rate 130 bpm and respiratory rate 36 bpm), and eyes-nose-ears were also normal. Palpation on the popliteal lymph nodes was symmetrical, with no swelling. However, palpation on the submandibular lymph node found the left side more prominent than the right side and found a mass of approximately 4.5 × 4.5 cm (width × length) on the left side of the chin (Figure 1). Macroscopic observation found a circle-shaped mass, firm, irregular, hemorrhage, but no necrosis or abscess. Thus, the veterinarian decided to perform surgical excision to remove the mass for histological examination. The dog consumed nothing orally (NPO) for 8 hours before blood was collected from the cephalic vein for the hematology (complete blood count and blood parasites), serum biochemistry (blood urea nitrogen, creatinine, and alanine aminotransferase) test at the Veterinary Clinic Research Unit, Faculty of Veterinary Sciences, Mahasarakham University, Thailand. The biochemical test confirmed that the dog could undergo an operation.

Afterwards, prophylaxis was provided using single injection of amoxicillin-clavulanate 8.75 mg/kg 0.25) ml, SC) and tramadol hydrochloride 4 mg/kg (0.4 ml, SC) (Lorsirigool et al., 2021). In addition, the dog was premedicated with xylazine hydrochloride 0.5 mg/kg (0.125 ml, IM) and atropine 0.02 mg/kg (0.1 ml, IM) (Lorsirigool et al., 2021).

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Induction and maintenance were performed using a combination of tiletamine-zolazepam 5 mg/kg (0.25 ml, IV) (Plumb, 2018). Surgery exclusion of the mass used an aseptic method throughout the entire process. The mass size was 4.5 × 4.5 × 4.5 cm (width × length × height) and was fixed in neutral buffered formalin and sent to a board-certified veterinary pathologist at Mahidol University, Nakhon Pathom, Thailand.

The mass was stained with hematoxylin and eosin. Microscopic findings (Olympus, China) in 100 × magnification revealed the dermis was locally extended by a highly cellular, poorly delineated, infiltrative proliferation of neoplastic squamous epithelial cells that segmentally rimmed a large central cyst and formed cords, lobules, and anastomosing trabeculae separated by a variably dense fibrovascular stroma. Neoplastic cells were polyhedral and had moderate amounts of cytoplasm with variably distinct cell borders and fairly prominent intercellular bridges. Nuclei were round to oval, finely stippled to vesiculate, and contained 1-3 prominent nucleoli. Anisokaryosis was moderate to marked. There were 24 mitoses in 10 high-power fields (400 ×) . Within the central areas of neoplastic lobules and trabeculae, there were variable concentric aggregates of keratin pearls. The large central cyst within the center of the mass had abundant eosinophilic serocellular debris and ingrowth of neoplastic papillary fronds projecting toward the center of the cyst. There were variably dense interstitial and perivascular infiltrates of mixed leukocytes throughout the neoplasm, including lymphocytes, plasma cells, and variable neutrophils. Adjacent to the mass, there were rare well-circumscribed aggregates of epithelioid macrophages surrounding pale brown secretory material. The histological finding suspects squamous cell carcinoma (Figure 2).

Figure 1. A circle-shaped, firm, and irregular mass measured 4.5 × 4.5 cm (w × l) near to the left submandibular region of an eight-year-old Shih Tzu

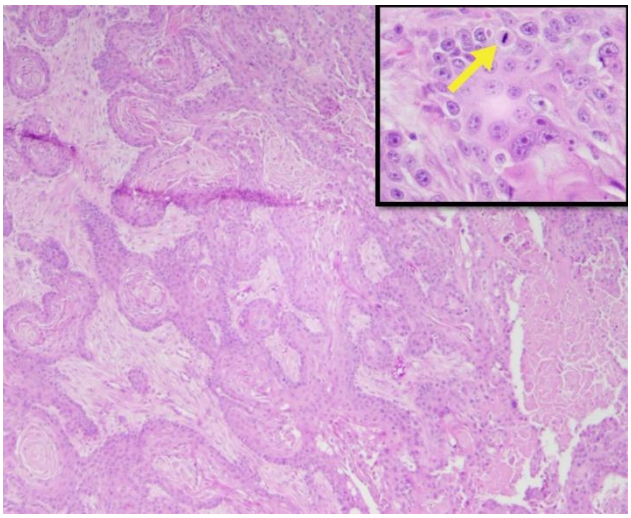

Figure 2. The mass of eight-year-old Shih Tzu stained with hematoxylin and eosin. 100 × magnification reveals infiltrative lobules, trabeculae, and cords of neoplastic squamous epithelial cells. A high magnification micrograph shows cellular detail of the neoplastic cell population (400 ×). Mitosis (arrows) counts ranged around 24 per 10 high power fields.

DISCUSSION

This study reported on SCC in an eight-year-old dog. As previously reported, SCC is commonly found in dogs with an average age of 8.8 years (Willcox et al., 2019). In addition, some previous reports found an average age of 10 years (Lascelles et al., 2000), but the condition can be found from 4 months to 14 years of age (Łojszczyk et al., 2021; Sharma et al., 2021). The effect of gender on cases of SCC is unclear. Some previous reports found no difference between male and female dogs (Willcox et al., 2019), but some reported more cases in males than in females (Lascelles et al., 2000). Breeds predisposed to SCC are commonly reported to be medium to large breeds such as English bulldogs, golden retrievers, German shepherd dogs, and Labrador retrievers (Lascelles et al., 2000; Montiani-Ferreira et al., 2008; Ierace et al., 2018). There may be a large body surface area for contact with the tumor stimulants, such as ultraviolet light and chemical carcinogens. However, cases in small breeds, such as the poodle or Shih Tzu have also been reported (Sharma et al., 2021). The location of SCC has been found to vary. Lascelles et al. (2000) reported SCC of the nasal planum in 17 different dog breeds. In addition, Montiani-Ferreira et al. (2008) found corneal squamous cell carcinoma in English bulldogs (Montiani-Ferreira et al., 2008). In 2019, Willcox et al. (2019)reported that a retrospective study of 193 different dog breeds found dermal SCC on neck (18%), periarticular (25%), and perianal (11%) areas (Willcox et al., 2019). The same year saw reports on cutaneous cases in mixed-breed dogs, American pit bulls, boxers, and English pointers (Dos Anjos et al., 2019). From 2020 to 2021, there were reports of SCC in the cranium and oral cavity (Simčič et al., 2020; Łojszczyk et al., 2021). In the current case study, SCC was near the left submandibular region of a dog,

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which is rarely found. In this case, the cause of the tumor was unclear; the dog was exposed to ultraviolet light every day and had a history of fungal-yeast chronic infection; this condition is related to previous findings that suggest this is a cause of over-expression of the tumor-suppressor gene p53, which if mutated may have caused this SCC (Montiani-Ferreira et al., 2008; Rehfeld et al., 2017). Additionally, viral infection, especially papillomavirus, causes immunosuppression, stimulates the subsequent rapid division of the epithelium, and leads to unstable epithelial hyperplasia resulting in squamous cell epithelial malignant progression (Munday et al., 2017). In this case, the owner declined the test for papillomavirus detection because of the financial constraints. Therefore, the authors cannot rule out the possibility that it was caused by virally-induced SCC.

After surgery, the owner decided not to undergo chemotherapy or radiation. Thirty-three days later, the tumor was found to be recurrent at a similar location, and the dog died, with unknown causes. The owner did not want a necropsy. In the author's opinion, SCC underwent metastasis to the submandibular lymph node and caused an abnormality in vital organs because the microscopic examination has indicated that SCC can be highly locally invasive and neoplasms have metastatic potential. The recurrence of this tumor after surgery is in agreement with Lascelles et al. (2000) who reported an average recurrence of 4-9 weeks (Lascelles et al., 2000). The survival time for SCC dogs after surgery alone with no evidence of metastasis has been reported to be an average of 92 to 4234 days (Sharma et al., 2021). In the current case, the dog died after about 33 days, so it is possible that the dog died from SCC metastasis.

DECLARATIONS

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Competing interests

There is no conflict of interest.

Ethical consideration

The owner of the dog has given consent and signed the permission for data publication. Ethical issues (including plagiarism, consent to publish, misconduct, data fabrication and/or falsification, double publication and/or submission, and redundancy) have been checked and compiled by the authors.

Authors' contribution

AL perform the operation, sample collection, contributed to data, wrote a manuscript, and submission. AL, YS, and NK read and approved the final manuscript.

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