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Squamous Cell Carcinoma in the Base of the Tongue in a Dog

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Abstract : It is difficult to detect and diagnose a mass at the tongue base, particularly if the mass is located under normal appearing mucosa. Computed tomography (CT), particularly post-contrast images, is useful to evaluate a tongue mass and adjacent structures including cervical lymph nodes. Nevertheless, a definitive diagnosis of a mass is obtained by histopathological examination. In this case, we describe a mass arising from the tongue body to the root in a dog. The patient was referred with ptyalism and an eating disorder. An oral examination was performed, and decreased tongue motility was observed. CT scanning was performed, and a lingual mass was detected. A lingual mass sample was collected by biopsy at the postmortem 2 months later. A histopathological examination was performed, and the lingual mass was diagnosed as squamous cell carcinoma.

Key words **:** squamous cell carcinoma, lingual tumor, computed tomography, histopathological examination, dog.

Introduction

Eating disorders occur commonly in dogs. Thus, it is often difficult to clarify the exact cause. Tongue dysfunction is one of the causes of an eating disorder. The tongue is a movable, muscular organ that is involved in taste and plays an important role in obtaining food and water (12). Disorders in tongue movement are caused by many factors, including trauma, congenital ankyloglossia, disorder of the hypoglossal nerve that innervates the muscles of tongue, and neoplasms. Loss of weight, halitosis, and drooling are observed when tongue motility decreases (4,13), but these symptoms are not specific signs of any disease. Tongue trauma is visible through a physical examination of the mouth; thus, it is relatively easy to diagnose. Congenital ankyloglossia is a condition in which a short and thick lingual frenulum attaches to the apex of tongue. A patient with ankyloglossia cannot stick the tongue out of the mouth well. Ankyloglossia is a relatively common finding in humans compared with dogs (5). A disorder of the hypoglossal nerve and lingual tumor are difficult to diagnose by brief visual inspection of the mouth. Computed tomography (CT) and magnetic resonance imaging are useful tools to identify the exact lesion location, margination, and its contents and to assess metastasis (6). However, a histopathological examination of a tissue biopsy sample is needed to identify the histological type of lingual tumor. In this report, we describe a case of a tongue movement problem due to squamous cell carcinoma (SCC) arising from the lingual body to the root under normal appearing mucosa in a dog. The purpose of this report is to demonstrate the diagnostic procedure and diagnostic images of SCC arising from the tongue base under normal appearing mucosa.

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Case

A 9-year-old, neutered female Maltese was presented to the local animal hospital with halitosis and unilateral ptyalism. Dental treatment was performed due to a resorptive lesion near the left fourth premolar. The clinical signs did not improve, and an eating disorder appeared. The patient was referred to Chonnam Veterinary Teaching Hospital. Ptyalism was observed near the left mandibular molar lesion, and inflammation signs were observed in the oral mucosa (Fig 1). Blood biochemistry and complete blood count testing were performed, but no serious problems were detected. In oral exam, tongue motility had decreased. The atropine stimulation test was performed to evaluate tongue function, and the sense of taste was normal. The barium swallow test was performed to evaluate tongue movement. The upper esophagus sphincter opened normally, and the barium flowed into the esophagus when placed on the lingual root. However, the barium was not swallowed when placed on the middle part of the tongue. Skull (Fig 2A), chest, and abdominal radiography were performed. Helical CT (Siemens Emotion 16; Siemens, Erlangen, Germany) scanning of the dog's head, from the lingual apex to the atlas, was performed under general anesthesia for an anatomical evaluation. Pre- and post-contrast CT images were acquired with 130 mAs and 110 kV at a 2 mm slice thickness. On the pre-contrast CT images, the lingual body showed a slight heterogeneous attenuation of 50.6 ± 4.9 Hounsfield units (HU), compared with a relatively homogeneous lingual apex (52.4 ± 3.4 HU). An ill-defined region, about 2 cm long and 1.5 cm thick in the widest region, was focally enhanced (136 ± 16.1 HU) from the lingual body to the root on the post-contrast sagittal CT images

Fig 1. Photographs of the patient with ptyalism and inflammation in the oral mucosa.

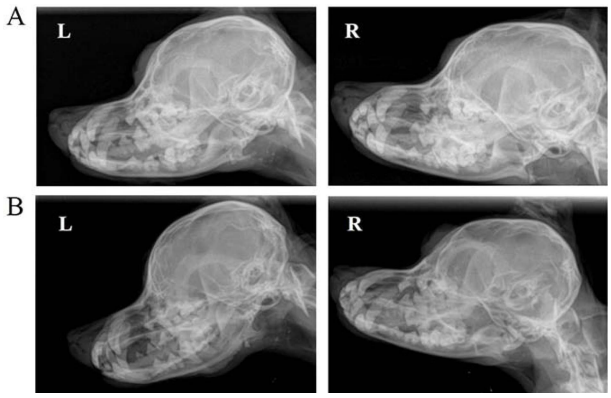

Fig 2. Lateral view radiographs of the skull. (A) Immediately after the referral to veterinary teaching hospital, (B) Two months later after referral.

taken immediately after contrast medium injection. No proliferative or lytic changes in adjacent bones or lymph node enlargement were observed. A biopsy and surgery were planned, but those procedures were delayed by the owner's request.

The patient's weight dropped about 500 g 2 months later. Skull radiography was performed, and a periosteal reaction of the mandible was identified (Fig 2B). CT scanning was performed to re-evaluate the lingual mass and adjacent bone structure. The CT images were acquired with the same scanning protocols as for the previous CT examination. On precontrast CT images, the lingual mass identified from the lingual body to the root was similar to that of the previous CT examination (Fig 3A). However, the cortical bone on the left side of the mandible showed proliferative changes of about 3.5 cm in length (Fig 4). The proliferative bone was composed of hypoattenuating medial and hyperattenuating lateral regions and had an indistinct border with normal bone. No bone lysis was detected. The right mandibular lymph nodes and the medial retropharyngeal lymph node were enlarged and showed homogeneous attenuation. On the postcontrast CT images, the lingual mass showed a similar enhancement pattern with the previous CT images (127.36 ± 10.61 HU) (Fig 3B); however, the size had increased markedly to 5.0 cm long and 1.5 cm thick in the sagittal plane. In addition, the lingual vascular structure was destroyed within the mass. The right mandibular lymph node and the medial retropharyngeal lymph node had intense homogeneous contrast enhancement.

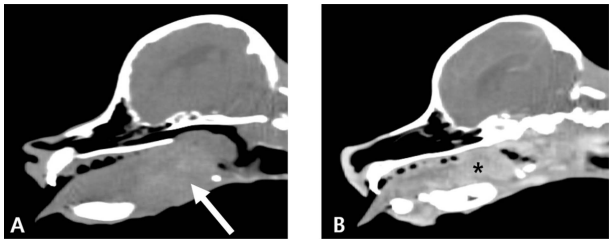

Fig 3. Precontrast (A) and postcontrast (B) parasagittal reformatted images of the head (Window width, 400 HU; Window level, 40 HU). (A) A thickened, heterogeneous attenuation of the tongue from the lingual body to the root (white arrow) is seen. (B) The heterogeneously contrast enhanced the lingual mass (asterisk) is observed with a slight contrast enhancement region of the rostral part of the tongue.

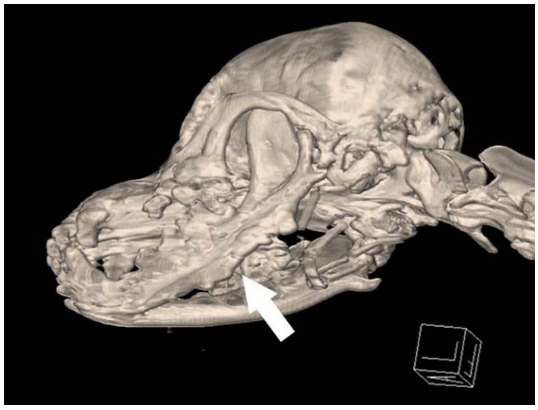

Fig 4. Three-dimensional computed tomography volume-rendered image of the skull view from a left perspective in the patient. The proliferative lesion of the left mandible (arrow), which was located ventral to the mandible had an indistinct border with normal bone.

The patient went into shock under general anesthesia during the CT scan and remained unconscious overnight, although emergency treatment was performed. The dog was euthanized at the request of owner. The lingual mass sample was collected after euthanasia, fixed in 10% neutral buffered formalin, and a histopathological examination was performed. A number of concentrically layered keratinized cells (keratin pearls) were observed in the lesional epithelium. The tumor nests had infiltrated into the muscular layer (Fig 5). Based on these histological features, the lesion was diagnosed as well-

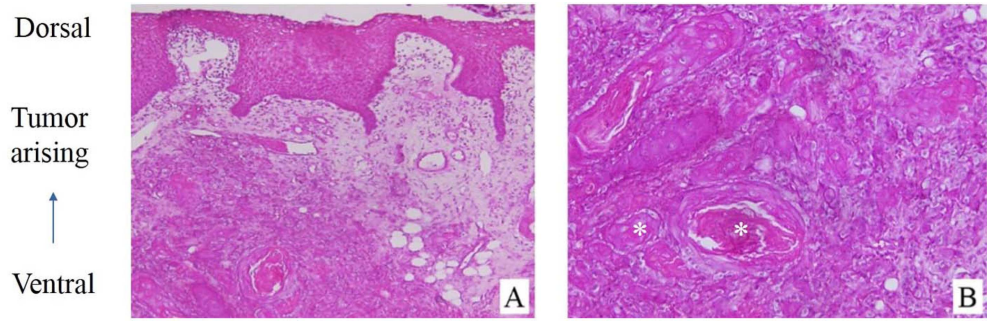

Fig 5. Histologic features of squamous cell carcinoma in this case. (A) The tumor nests were seen beneath the covering epithelium (H&E stain, × 100), (B) which consisted of a number of keratin pearls (asterisk) in connective tissue layer between mucosa and muscle layer (H&E stain, × 200).

differentiated SCC.

Discussion

Tumors of the tongue are rare in dogs, but SCC commonly affects the tongue compared with other tumors. Lingual SCC often spreads to the full thickness of the tongue because it extends and invades surrounding tissue quickly (7). Prognosis is guarded because metastases are very common (8). In this case, the patient was referred with unilateral ptyalism, halitosis, and dysphagia. Dental causes for these signs were ruled out because the patient had received dental care previously. No serious problems except decreased tongue motility were found on the physical examination, radiography, and blood tests. Thus, we thought that the differential diagnosis of lingual mobility limitation was disease of the hypoglossal nerve or a lingual tumor. The hypoglossal nerve regulates tongue movement and disorders of this nerve induce dysphagia, weakness, paralysis, and unilateral atrophy (1,11). A tumor of tongue is often painful, smelly and disturbs lingual function (9). A CT scan was performed to evaluate structural abnormalities of the tongue. The characteristic CT features of a lingual tumor include a thickened, contrast-enhanced soft tissue neoplasia with or without adjacent bone lysis (10). In this case, the CT features of thickened, irregular contrast-enhancement of the mass were consistent with the general CT findings of a lingual tumor. However, this patient had proliferative changes in the left mandible, not lytic changes. No cases of adjacent bone proliferation without bone lysis in a patient with oral SCC have been reported (2). The reason for this proliferative change in the left mandible is unknown. However, the proliferative change progressed rapidly over 2 months and was located from the middle part of the mandible to the caudal part near the lingual mass; hence, it was supposed that the cause of this proliferation was the lingual mass. In addition, being located on the ventral aspect of the mandible and lateral to the cortical bone, it was judged that the proliferative changes were not due to mechanical stimulation of the lingual mass. Therefore, we thought that the lesion was suspected to be a simple periosteal reaction or a metastasis of lingual SCC. It is necessary to histopathological assessment of mandible bone to identify the lesion but we couldn't took a sample of mandible bone because the client didn't want to do it. Although this patient did not have metastasis to the lung on thoracic radiographs or thoracic CT images, the enlarged medial retropharyngeal lymph node and right mandibular lymph node showed intense contrast enhancement, so regional lymph nodes metastasis was suspected. The lingual mass was diagnosed as SCC and confirmed by histopathological examination. SCC of the tongue frequently arises on the lingual ventral surface in the area of the frenulum (7). However, this lingual mass was not observed grossly because it was located at the base of the tongue under normal appearing mucosa. Microscopic nests were formed by circumferential tumor cells and central keratin pearls. These are typical features of well-differentiated SCC (3).

Conclusion

A lingual tumor should be suspected, when tongue mobility is limited without any specific signs. A CT scan is a useful method to diagnose a hidden tumor, but a histopathological evaluation is needed to confirm the tumor type. Application of these appropriate diagnostic methods may be a great help to definitively diagnose and treat lingual tumor.

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개의 혀 뿌리에서 발생한 편평세포암종

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요 약 : 혀 뿌리 부위의 종양, 특히 종양이 정상으로 보이는 점막 아래에 위치해 있는 경우 발견하고 진단하기가 어렵다. 전산화단층촬영법, 특히 조영후 영상은 혀의 종양을 평가하고 경부 림프절을 포함한 인근 조직을 평가하기에 유용하다. 그러나 종양을 확진하기 위해서는 조직병리검사가 필요하다. 본 증례는 개에서 혀의 뿌리부터 몸통에 걸쳐 종양이 발생하였으며 환자는 유연과다 및 섭식장애 증상으로 전원되었다. 구강검사 결과 혀의 운동성 장애가 관찰되었으며 전산화단층촬영으로 혀 종양이 확인되었다. 2달 뒤 사후에 개의 혀에서 조직을 채취하여 조직병리검사를 실시한 결과 혀의 종양은 편평세포암종으로 진단되었다.

주요어 : 편평세포암종, 혀 종양, 전산화단층촬영법, 조직병리검사, 개