Computed tomographic features of oral squamous cell carcinoma in cats: 18 cases (2002–2008)

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Objective—To describe the computed tomographic features of oral squamous cell carcinoma (SCC) in cats and identify imaging characteristics associated with survival time.

Design—Retrospective case series.

Animals—18 cats with a diagnosis of oral SCC.

Procedures—Information on history; clinical, laboratory, and diagnostic imaging findings; treatment; and survival time was obtained from medical records of 18 cats with oral SCC. Computed tomography (CT) studies were examined to identify features associated with oral SCC. The association of CT features with survival time was evaluated.

Results—On CT images, SCC was centered at the following sites: sublingual or lingual region (n = 7), maxilla (5), buccal mucosa (4), mandible (4), pharyngeal mucosa (2), soft palate mucosa (1), and lip (1). These results were in agreement with the results of oral examination for all sites, except the soft palate (CT, 1 cat; oral examination, 4 cats). On CT images, extension of maxillary masses was most often observed to affect the orbit (5 cats). Heterogeneous contrast enhancement was most commonly identified (8/18). Osteolytic mass lesions were identified on CT images in 9 cats. None of the quantitative CT features that were identified, including mass size, attenuation, or lymph node width, were correlated with survival time.

Conclusions and Clinical Relevance—Common CT features of oral SCC in cats included sublingual and maxillary locations, marked heterogeneous contrast enhancement, and osteolysis. Computed tomography may be used to determine mass extension and lymph node enlargement, but results did not correlate with survival time. (*J Am Vet Med Assoc* 2010;236:319–325)

Oral tumors comprise 3% to 10% of all neoplasms reported for cats.[1,2] Squamous cell carcinoma occurs commonly and has been reported to account for 61.2% to 76.2% of oral tumors affecting cats.[2-4,a] Proposed risk factors include the use of flea collars and a diet of canned food or tuna fish.[5] Mean age at admission is 10 to 12.5 years, and there is no apparent sex predilection.[1-3,a] The sublingual or lingual region, gingiva, pharynx, and tonsils, in descending order of frequency, are the most affected sites.[1–4,6] In cats, SCC of the oral cavity is a locally invasive disease that is considered to have a low potential for metastasis.[1,2] However, metastasis to regional lymph nodes has been reported in up to one-third of patients.[1,2,6] On clinical examination, oral SCC is typically characterized by mucosal ulceration and lesions suggestive of suppurative inflammation and tissue necrosis.[2] These nonspecific lesions must be differentiated from those associated with other diseases, including eosinophilic granuloma, gingival hyperplasia, lymphocytic-plasmacytic stomatitis, severe periodontal disease, ranula, and other oral tumors,[1,2,7] which may have a similar appearance.

Abbreviations	
CT	Computed tomography
HU	Hounsfield unit
SCC	Squamous cell carcinoma
WL	Window level
WW	Window width

Squamous cell carcinoma is the most common tumor of the oral cavity in humans, and CT is routinely used in these patients for diagnosis and tumor staging.[8] Although it has been our experience that CT imaging is widely performed as part of the diagnostic workup of cats with SCC of the oral cavity, to our knowledge, the CT characteristics of this disease in cats have not been reported. The objectives of the study reported here were to describe the CT features of oral SCC in cats and to identify imaging characteristics associated with survival time. We hypothesized that survival time would be negatively correlated with mass size and contrast enhancement, as well as tributary lymph node size, presence of osteolysis, and presence of maxillary lesions. We also hypothesized that CT measurements of SCC masses would be significantly larger than measurements

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obtained on oral examination. Additionally, maximum lymph node width from CT images was evaluated as a possible predictor of metastatic lymphadenopathy.

Materials and Methods

Criteria for selection of cases—Medical records from the Dentistry and Oral Surgery Service at the Matthew J. Ryan Veterinary Hospital of the University of Pennsylvania (between 2005 and 2008) and the Veterinary Medical Teaching Hospital of the University of Wisconsin, Madison (between 2002 and 2008), were reviewed to identify cats with a diagnosis of SCC of the oral cavity. Cats were selected for the study if they had a diagnosis of SCC of the oral cavity based on histologic examination of tissue samples and had undergone CT of the head, with images acquired before and after IV administration of contrast medium. Eighteen cats were identified for inclusion in the study. Cats that had received any form of treatment for the SCC, including excision, chemotherapy, or radiation, prior to CT imaging were excluded. All cats from the University of Pennsylvania were also enrolled in a therapeutic trial investigating the use of a novel chemotherapeutic agent for treatment of oral SCC in cats. Computed tomographic imaging of these patients was performed prior to any therapeutic intervention.

Medical records review—Historical information obtained from the owner or referring veterinarian, results of physical examination including oral examination, results of clinicopathologic analyses (CBC, serum biochemical panel, urinalysis, total thyroxine concentration, and FeLV/FIV), results of histologic examination of tissue samples, and CT images were reviewed for each cat. Thoracic radiographs obtained for 16 of 18 cats were reviewed for evidence of pulmonary metastatic disease by a board-certified radiologist (JAR or TS). Mandibular lymph node samples, which were collected by fine-needle aspirate from 14 of 18 cats within 1 to 2 days of CT examination and submitted for cytologic examination, were reviewed for evidence of nodal metastasis. Samples reported as nondiagnostic or as salivary gland tissue were excluded. Information on treatment interventions and on survival time (ie, days from diagnosis) was also obtained from review of medical records. When necessary, referring veterinarians were contacted by telephone to obtain survival time information for cats with incomplete medical records.

CT imaging—Computed tomography for all cats was performed with single–detector row, third-generation scanners.[b–d] Images of the head and cranial aspect of the neck were obtained in axial acquisition mode with the patients positioned in sternal recumbency. After survey images were acquired, an IV bolus of iodinated contrast medium[e,f] was administered at a dose of 800 mg of iodine/kg and postcontrast images were obtained. Computed tomography was performed with the following parameters: bone and detail reconstruction algorithms; slice thickness of 1 to 3 mm for bone series and 3 mm for soft tissue series; small field of view (approx 10 cm) with 512 × 512 image matrix; and 120 kVp and 140 mAs.

Computed tomographic images were reviewed in the Digital Imaging and Communications in Medicine (ie, DICOM) format or as printed films by 2 authors (AG and TS) who were aware of the diagnosis of SCC of the oral cavity for all cats. Images in the DICOM format were evaluated at a computer workstation with diagnostic imaging software.[g] All CT evaluations with printed films (5 cats; CT evaluations performed prior to Picture Archiving and Communication System [PACS] installation) included a bone reconstruction algorithm displayed at a WW of 1,500 to 2,000 HU and WL of 250 HU and a detail reconstruction algorithm displayed at a WW of 300 to 500 HU and WL of 100 HU. Digital CT images were viewed after manual adjustment of WW and WL to HU values similar to those used for the printed films of the bone and detail images. Images were evaluated for the presence and location of a mass lesion in the oral cavity, associated bone lysis, change in appearance of adjacent lymph nodes, and any other abnormalities. The dimensions (ie, maximum width and height) of all masses were measured on transverse CT images by use of the diagnostic imaging software[g] or a handheld measurement device (printed film CT images). Maximum mass length for all CT studies was determined by counting the number of consecutive CT slices the mass occupied and multiplying by the slice thickness. Contrast enhancement patterns were subjectively characterized as homogenous, rim enhanced, or heterogeneous. On CT evaluations with digital images, contrast enhancement of any masses was quantified by calculation of attenuation measurements (HU) of the most contrast-enhancing region on the precontrast and postcontrast soft tissue images. In addition, the degree of contrast enhancement was categorized as mild, moderate, or marked on the basis of the ratio of the postcontrast and precontrast attenuation values. The maximum width of all lymph nodes, measured on postcontrast CT images, was recorded. Computed tomographic features and measurements were recorded after a consensus was reached by the 2 reviewers.

Statistical analysis—Student *t* tests (paired and unpaired) were used to compare data that met criteria for normality (Gaussian distribution). Nonparametric analyses (Wilcoxon rank sum tests) were used to compare data with a skewed distribution (non-Gaussian). Values for tumor size, as determined by calculation of the sum of length, width, and height, were obtained from CT images and compared with values obtained from the oral examination. Estimated tumor size, postcontrast attenuation values (HU), and maximum lymph node width (mm) were all tested for correlation with survival time by use of linear regression analysis. Cats were grouped according to the presence or absence of osteolytic lesions or a lesion located in the maxilla, and mean survival times for these groups were compared. Mean values for maximum width of mandibular lymph nodes for cats with and without a cytologic diagnosis of metastatic lymphadenopathy were compared. All analyses were performed with a statistics software program.[h] Values of $P \le 0.05$ were considered significant.

Results

Animals—The study population consisted of 18 cats with a diagnosis of SCC of the oral cavity. Mean

± SD age was 13.2 ± 3.5 years (range, 7 to 20 years). Mean body weight was 4.3 ± 1.4 kg (9.5 ± 3.1 lb; range, 2.6 to 6.9 kg [5.7 to 15.2 lb]). There were 11 spayed females and 7 castrated males. Of the 18 cats, 14 were domestic shorthairs, 2 were Himalayans, and 2 were Maine Coons. Mean duration of clinical signs at the time of CT was 37.7 ± 46 days (range, 0 to 180 days). The most common clinical signs reported as part of the history or identified during physical examination were anorexia (n = 7), ptyalism (4), lethargy (3), sanguineous oral discharge (3), oral pain (3), and halitosis (3). Less frequently reported clinical signs included licking (n = 2) or weight loss (2). Two of the cats had no clinical signs of disease at the time of diagnosis. On oral examination performed under general anesthesia, masses were most frequently identified in the sublingual or lingual region (7/18) and in the maxilla (5/18). Ulceration of the primary lesion was detected in 14 of 18 cats. Thoracic radiographs (ie, right lateral, left lateral, and ventrodorsal views) were available for review in 16 of 18 cats. No pulmonary metastatic lesions were identified in 15 cats, and 1 cat had diffuse pulmonary nodules. Neither radiographs of the thorax nor radiology reports were available for 2 cats. Fourteen cats had fine-needle aspiration of mandibular lymph nodes ipsilateral to the oral SCC lesion, and 5 of these 14 cats had cytologic evidence of metastasis.

CT findings—On CT images, SCC was identified at the following sites: sublingual or lingual (n = 7), maxilla (5), buccal mucosa (4), mandible (4), pharyngeal mucosa (2), soft palate mucosa (1), and lip (1). Almost half of the cats (8/18) had masses identified at more than 1 anatomic site. Computed tomographic findings correlated well with physical examination findings, except when SCC involved the soft palate. Oral examination revealed evidence of SCC of the soft palate in 4 cats, which was visible on CT in only 1 cat. Local extension of the soft tissue mass into the orbit (5 cats; **Figure 1**) was identified more often than extension into the nasal cavity (1 cat) or the cranial vault (1 cat). Nine cats had evidence of osteolysis associated with the soft tissue mass detected on CT images **(Figure 2)**.

On precontrast CT images, all masses were isoattenuating to surrounding soft tissues (mean ± SD at-

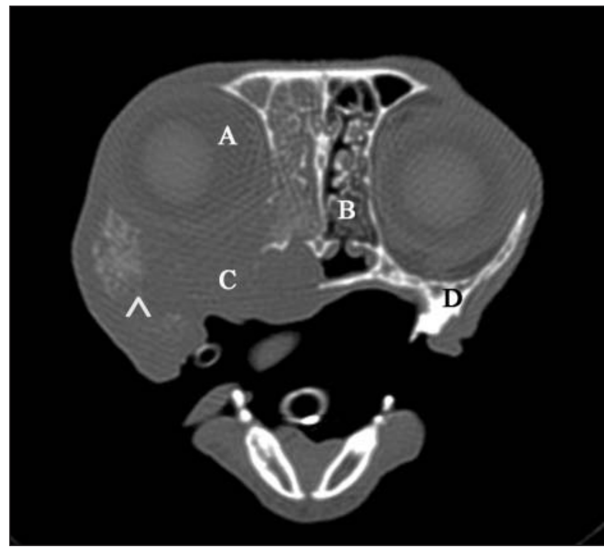

Figure 2—Cross-sectional CT image at the level of the caudal nasal turbinates of a cat with oral SCC (WW, 2,500 HU; WL, 500 HU). Notice the osteolytic lesions are present in the right lacrimal bone, palatine bone, right caudal maxillary turbinates, and caudal maxilla. The right nasal passage, frontal sinus, and nasopharynx contain fluid material. A = Right eye. B = Nasal turbinates. C = Soft tissue mass in the maxilla, with extensive associated osteolysis of the right zygomatic arch and associated osteoproliferation (^). D = Normal left zygomatic arch.

Figure 1— Postcontrast cross-sectional CT image at the level of the rostral frontal sinus of a cat with oral SCC (WW, 400 HU; WL, 100 HU). A = Left eye. B = Left frontal sinus. C = Contrast-enhancing soft tissue mass, with extension into the ventral aspect of the left orbit (arrows). Mass extension has caused exophthalmos (arrowhead) of the left eye.

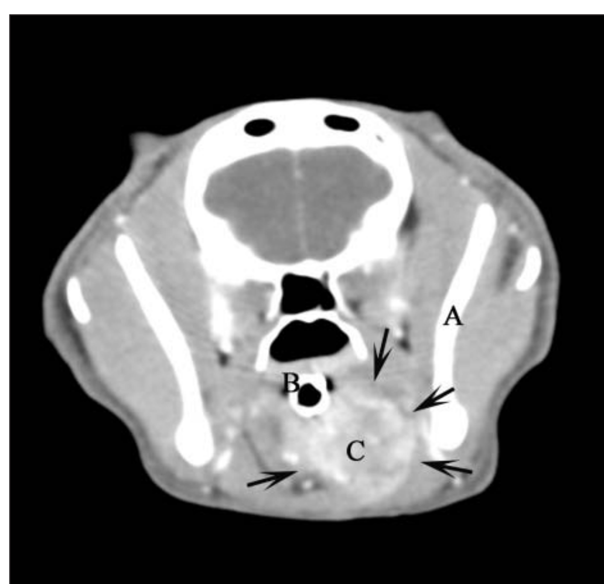

Figure 3—Postcontrast cross-sectional CT image at the level of the vertical mandibular rami of a cat with oral SCC (WW, 400 HU; WL, 100 HU). A = Left mandibular ramus. B = Endotracheal tube. C = Soft tissue mass. The sublingual mass (C) has marked heterogeneous contrast enhancement (arrows).

tenuation values, 51.9 ± 7.4 HU [range, 43.5 to 71 HU]). Masses identified in almost all patients (17/18 cats) had marked contrast enhancement with mean attenuation values of 147.2 ± 30 HU (range, 78 to 178.9 HU). Heterogeneous contrast enhancement was the predominant enhancement pattern (8/18 cats) detected **(Figure 3)**. Rim enhancement (6/18) and homogenous contrast enhancement (4/18) were observed less frequently.

Mandibular and medial retropharyngeal lymph nodes were readily identified and measured on postcontrast CT images **(Figure 4)**. Mean ± SD maximum width of mandibular and medial retropharyngeal lymph nodes was 4.1 ± 1.9 mm (range, 1.5 to 8.6 mm) and 5.3 ± 1.5 mm (range, 2 to 8.4 mm), respectively. Parotid and lateral retropharyngeal lymph nodes were not identified in any cat.

Cats in the study received a variety of treatments. Most cats (n = 13) received a chemotherapeutic agent (difluoromethylornithine[i]) under investigation in an ongoing therapeutic trial. The remaining 5 cats underwent surgery (n = 2) or received palliative care (3) that included administration of pain medication and NSAIDs. One of the 2 cats undergoing surgery also received a postoperative dose of carboplatin.[j] Survival time as determined at the date of last follow-up ranged from 14 to 1,020 days, with a median survival time of 60 days (SE, 57 days). The single cat treated with a combination of surgery and chemotherapy survived 1,020 days.

Measurements of mass dimensions based on findings on CT and oral examination were available for comparison for 13 cats. Medical records of 5 cats did not contain mass measurements from the oral examination. There was no significant (*P* = 0.70) difference in mass size measured on oral examination, compared with mass size measured on CT images. None of the quantitative CT features, including estimated mass size, postcontrast attenuation (HU) values, and maximum lymph node width (mm), correlated with survival time (all correlation coefficients [R^2] were < 0.21 and all *P* values were > 0.07). No significant (*P* = 0.20) differences were found between survival times for patients grouped according to the presence or absence of osteolytic lesions. Cats with oral SCC lesions affecting the

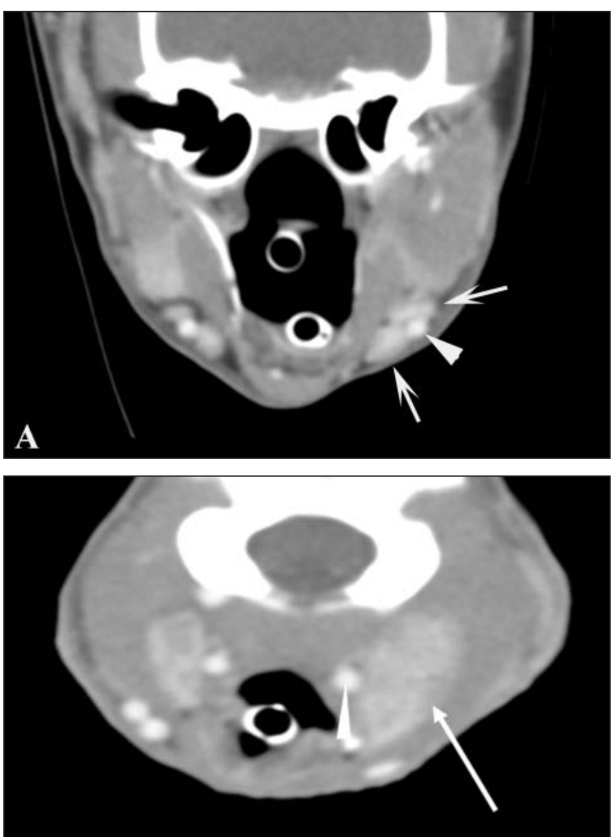

Figure 4—Postcontrast cross-sectional CT images at the level of the tympanic bullae (A) and the occipital condyles (B) of a cat with oral SCC (WW, 400 HU; WL, 40 HU). A—Enlarged left mandibular lymph nodes (arrows) surround the contrast-filled linguofacial vein (arrowhead). B—Enlarged medial retropharyngeal lymph nodes (arrow) located lateral to the contrast-filled common carotid artery (arrowhead) and caudal to the mandibular salivary gland. This patient had cytologic evidence of mandibular lymph node metastasis.

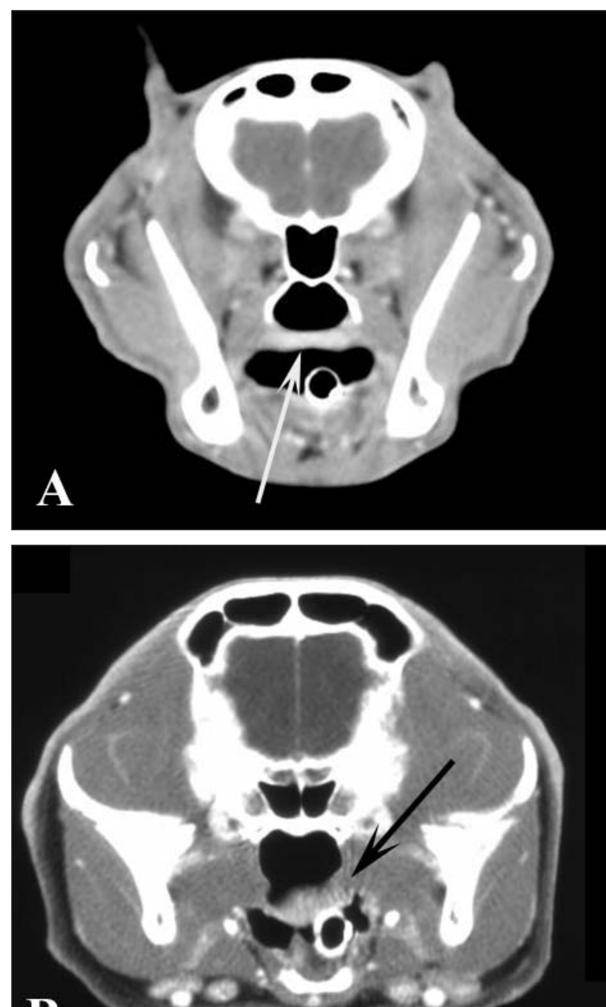

Figure 5—Postcontrast cross-sectional CT images from 2 cats. A—Computed tomographic image at the level of the sphenoid sinus of a clinically normal cat (WW, 400 HU; WL, 40 HU). Notice the homogenous contrast enhancement of the soft palate (white arrow). B—Computed tomographic image at the level of the temporomandibular joint of a cat with SCC of the soft palate (WW, 500 HU; WL, 100 HU). Notice the similar homogeneous contrast enhancement of the soft palate, with asymmetry and dorsoventral thickening (black arrow).

maxilla had significantly ($P = 0.009$) longer survival times than did cats without maxillary lesions.

The mean ± SD maximum width of mandibular lymph nodes measured on CT images in patients with cytologic evidence of metastasis (5.3 ± 2.1 mm) was not significantly ($P = 0.21$) different from the mean maximum width of mandibular lymph nodes in patients without metastatic disease (3.9 ± 1.7 mm). No clinically useful cutoff value for maximal mandibular lymph node width was identified for use in the identification of malignant lymph nodes.

Discussion

Results of the present study enabled identification of several common CT features of oral SCC in cats. These included marked heterogenous contrast enhancement of masses and adjacent osteolysis on images of sublingual and maxillary mucosal lesions. Computed tomography may be used to accurately define mass extension and facilitate lymph node staging in cats with SCC, but these features did not correlate with survival time. Computed tomography images and oral examination provided similar information regarding localization of lesions for all affected sites for the cats in our study, with the exception of the soft palate. Soft palate lesions were identified on oral examination 4 times as often as on CT images. Contrast-enhanced CT imaging of a tumor has been the only method by which it is possible to identify an oral SCC that lacks a mass effect, in our experience. We have observed that most cats examined at our hospital that undergo CT imaging of the head have a moderate degree of homogenous contrast enhancement of the soft palate even in the absence of disease and suggest that this may account for the decreased sensitivity of CT for the identification of SCC of the soft palate in the present study (**Figure 5**). Thorough oral examination is therefore particularly important for evaluation of patients with small lesions or those localized to the soft palate, tonsils, or pharynx.

Mass size measured on CT images was not significantly different from mass size measured during oral examination under anesthesia. This was unexpected and may be because the inclusion criteria for the present study selected cats with oral cavity masses only. Cats with SCC lesions of the head and neck other than oral SCC were not included, and lesions in these patients may not be as accessible to gross examination and mensuration, compared with oral masses. It has been our experience that oral SCC lesion margins on postcontrast CT images are more conspicuous and may be detected with greater confidence than detection of margins by visual inspection alone. Measurements based on oral examination may have been inaccurate because oral SCC lesion margins can be difficult to differentiate on gross inspection as a result of surrounding edema, inflammation, and desmoplasia. In addition, accurate measurement of maxillary masses, which affected 5 of 18 cats in the present study, is inherently more difficult than is measurement of masses located in other regions of the oral cavity.

The characteristic CT features of oral SCC in cats included a mass lesion, marked, heterogeneous contrast enhancement, and a high rate of adjacent osteolysis. These characteristics are almost identical to the CT features of oral SCC in humans,[8] which has been subjectively characterized as markedly contrast enhancing. A moderate to marked degree of contrast enhancement reflects the highly vascular nature of SCC and is consistent with prior reported data for tumors that originate in the oral cavity in cats.[2] The cats in the present study had masses that were isoattenuating to surrounding soft tissues and had an almost 3-fold increase in attenuation values after IV administration of an iodinated contrast agent.

A heterogeneous contrast enhancement pattern on CT images of SCC lesions in humans has been considered representative of regions of tumor necrosis, desmoplasia, or both[8] and is suggested as the reason for the postcontrast CT appearance of the oral SCC lesions in the cats in the present study. Half of the cats in our study had osteolytic lesions adjacent to the primary mass lesion. In 1 report[9] describing the radiologic diagnosis of head and neck SCC in humans, CT is recommended as more sensitive for the detection of bone destruction than is magnetic resonance imaging. Osteolytic lesions that are detected on CT images of cats and humans lack specificity. Osteolysis in head CT images of humans may be indicative of an acute or chronic dental abscess or osteoradionecrosis (ie, previous radiation therapy),[8] for example. Cats commonly have chronic inflammatory periodontal disease that cannot be differentiated from other oral inflammatory diseases on the basis of findings on CT images alone, particularly in the absence of a mass effect[7] or only noncontrast imaging.

In the present study, significant associations were not found between survival time and mass size, postcontrast attenuation, or maximal lymph node width (all R^2 values < 0.21; all P values ≥ 0.07). The small number of cats in this study may partly explain the lack of significant association between mass size and survival time. Tumor volume in cats with SCC of the nasal planum was an important prognostic factor in predicting the response to radiation therapy in 1 prior report.[10] Smaller volume nasal planum SCC tumors were less likely to fail to respond to treatment, compared with the response of larger, more invasive masses.[10] In the present study, cats grouped according to the presence or absence of osteolysis did not significantly differ in survival times ($P \geq 0.20$). Although type II error or small sample size may have affected our results, we suggest that identification of a single factor (eg, osteolysis or lymphadenopathy) that may predict survival is unlikely because survival time in patients with SCC is affected by many variables. The statistical analysis of the survival data was repeated for the 13 cats treated with difluoromethylornithine. The data from this group undergoing a single treatment protocol also did not provide a correlation between survival time and imaging data. No significant differences in survival times were found on the basis of the categorical CT imaging features identified.

Mandibular and retropharyngeal lymph nodes of the cats in the present study were easily identified and measured on postcontrast CT images when the region of interest was included in the scan area. The mandibular lymph nodes were always located adjacent to the linguofacial veins. Landmarks for locating the medial retropharyngeal lymph nodes included the common carotid artery medially, the mandibular salivary glands rostrally, and the wings of the atlas caudodorsally. All lymph nodes had a rim-enhancement pattern, and subjectively decreased hilar attenuation was more prominently identified in the larger lymph nodes. The small size of all lymph nodes prevented accurate region of interest determination of attenuation values (HU). The CT characteristics of normal mandibular and medial retropharyngeal lymph nodes have been described in 102 dogs[11]; however, there have been no similar reports published for cats.

Cytologic examination of mandibular lymph node aspirates identified SCC metastases in 5 cats in the present study. Fine-needle aspiration has been reported as an accurate method for the detection of lymph node metastases in dogs and cats with solid tumors, although excisional biopsy may be preferred.[12] The prevalence of nodal metastases in our study population (5/14 cats evaluated) was nearly identical to that reported in a histologic study[13] of lymph nodes in dogs and cats with oral and maxillofacial cancer. The aforementioned study, describing regional metastasis of oral tumors in dogs and cats, found only 54.5% of metastases were identified when only the mandibular lymph nodes were evaluated. The authors concluded that evaluation of parotid and medial retropharyngeal lymph nodes was warranted.[13] Metastatic SCC in the retropharyngeal lymph nodes was identified in 9% of 774 humans with SCC of the head and neck.[14] Decreased survival rates and an increased likelihood of distant metastases were found to be associated with the presence of retropharyngeal lymphadenopathy.[14] Approximately 30% to 65% of humans with oral SCC have clinical evidence of lymph node involvement at the time of initial evaluation.[8,9] Staging of lymph nodes in humans with head and neck cancer by use of CT imaging has been reported to be 90% to 95% accurate versus clinical staging alone (75% to 80% accurate).[8,9] The World Health Organization staging criteria (ie, tumor, nodes, and metastasis) based on head and neck CT images of humans resulted in changes to more than 50% of the tumor nodes metastasis stage assigned on the basis of physical examination alone.[15] Nodal classification was altered after CT imaging in 36% of 81 humans with SCC of the upper respiratory tract and gastrointestinal tract.[15]

In the present study, 5 cats with cytologic evidence of mandibular lymph node metastases did not have significantly different maximum width values, compared with values for the 9 cats with normal lymph nodes. No meaningful lymph node width cutoff value could be identified to accurately identify malignant lymphadenopathy in our patient population. Therefore, sensitivity and specificity calculations were not performed. It is likely that the small number of patients and the use of cytologic examination of fine-needle aspirates contributed to the inability to identify a significant difference between groups. Histologic examination of excised nodes may have more accurately identified nodal metastases. Some reports[12,13] suggest that fine-needle aspiration may be a sensitive and specific method for evaluating the regional lymph nodes in dogs and cats, but this remains somewhat controversial. Other limitations include the inherent variability of observer measurements and the unpredictable anatomic slice position of head and neck nodes during CT image acquisition. Intuitively, it may be expected that CT-derived volume measurements are more accurate than maximum width measurements obtained at various angles of the lymph node long axis. However, a recent study[16] evaluating humans found no association between nodal volume measured on CT images and head and neck metastasis, whereas axial node diameter and central lymph node necrosis had odds ratios predictive of metastasis. Further prospective studies are indicated to determine sensitive and specific CT lymph node staging criteria in cats. Currently, CT imaging of cats with oral SCC may be of particular value in the evaluation of lymph nodes that are relatively inaccessible (eg, medial retropharyngeal lymph nodes) prior to more invasive diagnostic procedures.

The CT imaging criteria for identification of a metastatic lymph node in humans include the following: maximum diameter > 10 to 15 mm, central necrosis or decreased attenuation of the node, and nodal extension beyond its capsular margin.[9,15,17] Lymph nodes with diameters larger than the size criteria are metastatic approximately 80% of the time.[15] The most specific criterion is the presence of central nodal necrosis, regardless of lymph node size.[9] In humans, the presence of metastatic cervical lymphadenopathy is the most critical prognostic indicator in patients with SCC.[9,15] The detection of a single ipsilateral malignant lymph node reduces the projected survival time in humans with SCC by approximately 50%; patients with bilateral metastatic lymphadenopathy have 25% of the survival time of patients without nodal metastases.[9]

Median survival time of the 18 cats in this study was 60 days (mean, 135 days). When the single cat that survived 1,020 days was removed from the statistical calculation, median survival time remained 60 days but the mean survival time decreased to 80 days and the SE decreased to 15 days. These survival data are consistent with prior reports for cats receiving supportive care only,[18] palliative radiation therapy,[19] an accelerated radiation protocol,[20] or surgery and radiotherapy combined,[21] indicating that cats with oral SCC have a poor prognosis regardless of treatment modality. Discussion of survival related to different treatment modalities is beyond the scope of this study. Eighty-four percent of humans and < 10% of cats with SCC of the head and neck survive 1 year from diagnosis.[22] The marked difference in survival rates has been attributed to comparably late diagnosis and the frequently invasive and advanced stage of disease on initial examination for cats versus humans.[22]

The retrospective nature of the study reported here presents several limitations. All patients were examined at veterinary teaching hospitals where they underwent CT imaging and treatment. This may not reflect the general population of cats with oral SCC. We were unable to determine the diagnostic accuracy of CT for differentiation of oral SCC from other aggressive oral cavity lesions because our study did not include all cats admitted for evaluation of oral cavity disease. In addition, most patients (13/18) in the present study were part of a chemotherapy trial, which may have affected survival times.

Computed tomographic imaging of patients with head and neck neoplasia is of value for defining the extent of a mass, the involvement of adjacent structures, and the identification of regional metastases. In the present study, postcontrast CT images of SCC in the maxilla in cats most frequently had evidence of orbital extension of the primary SCC lesion. The nasal cavity and cranial vault were also sites of local mass extension. Computed tomography provides superior soft tissue contrast resolution, compared with that of radiography, and depicts anatomy without the limitation of superimposition. Head and neck CT may provide the greatest advantage for the evaluation of masses or nodal metastases that cannot be completely assessed by clinical examination; however, further prospective studies of veterinary patients are indicated.

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f. Hypaque 76%, Amersham Health/GE Healthcare Inc, Princeton, NJ.
g. iSite Radiology, version 3.5.69.1, Koninklijke Phillips Electronics NV, Amsterdam, the Netherlands.
h. Graphpad Instat3, Graphpad Software Inc, La Jolla, Calif.
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