THYROGLOSSAL DUCT CARCINOMA IN A DOG – A CASE REPORT AND LITERATURE REVIEW

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ABSTRACT

A 12-year old neutered mixed breed bitch was presented with a large cervical mass pressing on the trachea and resulting in dyspnea, exercise intolerance, fatigue, mild cyanosis, depression and loss of weight. Post mortem examination revealed a large mass, in the cranial-midline cervical region located adjacent to the esophagus and the trachea. Histologically the mass was densely cellular, well-demarcated, multilobular, expansive and partially encapsulated. Two main populations of neoplastic cells were evident: The first consisted of an aggregation of thyroidogenic epithelium arranged in follicles and packets of more compact and less differentiated neoplastic cells. The second population of cells consisted of large polygonal epithelial cells with indistinct cell borders, abundant eosinophilic and homogenous cytoplasm. The clinical, histolgical and immunohistochemical results were consistent with a squamous cell carcinoma of the thyroglossal duct remnants, a rare tumor in the dog.

Keywords: dog, thyroglossal duct carcinoma

INTRODUCTION

Thyroid carcinoma arising in thyroglossal duct remnants are rare, and since the first report by Brentano in 1911 and until 2006, only approximately 200 cases have been reported in medical literature, most as single case reports. Tumors arising from cystic remnants of the thyroglossal duct have been reported in dogs, a cat, rabbit, horse and in a calf. In a 9-year survey of the occurrence of congenital anomalies in Shami breed goats, 29 cases out of 211 were diagnosed as thyroglossal duct cysts. The clinical signs and pathology of thyroglossal duct carcinomas are similar to those reported in humans. Clinical signs such as dysphagia, choking, coughing, dysphonia and diminished vocal ability have reported in dogs. (1, 2)

CASE REPORT

A 12-year old neutered mixed breed bitch was presented with a large cervical mass pressing on the trachea and resulting in dyspnea, exercise intolerance, fatigue, mild cyanosis, depression and loss of weight. Ultrasound revealed a uniform echoic mass with hypoechoic foci. The growth was suspected to be neoplastic. A biopsy was performed revealing a high number of large squamous epithelial cells, with anisokaryosis, anisocytosis, atypia and prominent nucleoli.

At the request of the owners the dog was euthanized. At post mortem the bitch was in very good body condition. A large mass, 15 cm in diameter was present in the cranial-midline cervical region located adjacent to the esophagus and the trachea. The mass displayed multifocal areas of necrosis. In the esophageal mucosa a *Spirocira lupi* granuloma (1.5 cm) was present. Other findings included diffusely edematous lungs, endocardiosis of the mitral valve and a diffusely enlarged spleen with hemosiderotic plaques. Other organs examined were without any detectable pathological findings.

Histologically the mass was densely cellular, well-demarcated, multilobular, expansive and partially encapsulated. Two main populations of neoplastic cells were evident: The first consisted of an aggregation of thyroidogenic epithelium arranged in follicles and packets of more compact and less differentiated neoplastic cells (Figures 1 & 2). These follicles were lined by low cuboidal epithelial cells. The thyroidogenic epithelial cells were small with distinct cell borders and scant cytoplasm. Nuclei were round to oval, centrally located and hyperchromatic. The second population of cells consisted of large polygonal epithelial cells with indistinct cell borders, abundant eosinophilic and homogenous cytoplasm (Figure 3). The nuclei were round to oval nuclei, centrally located, vesicular, with 1-3 prominent nucleoli. Marked anisokariosis and karyomegaly were noted. Mitoses were frequent. Foci of

squamous metaplasia and keratin formation were present. Cords of tumor cells infiltrated the capsule (Figure 4). A microscopic metastatic focus was detected in the lungs (Figure 5).

Imunohistochemical analysis revealed the cells positive to cytokeratin and negative for vimentin indicting the epithelial origin of the cells.

A diagnosis of squamous cell carcinoma of the thyroglossal duct remnants was made based on the ventral location in the neck, the histological appearance and immunohistochemical findings.

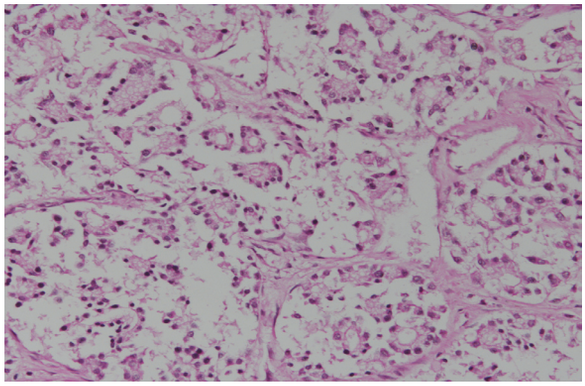

Figure 1. Thyrogenic squamous cell carcinoma cells arranged in follicles and packets (H&E x200).

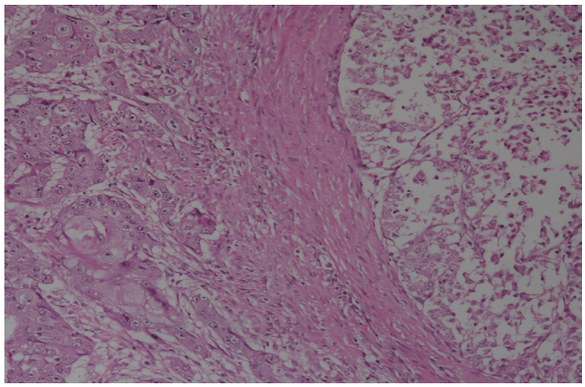

Figure 2. Thyroglossal squamous cell carcinoma: Thyrogenic large polygonal epithelial cells and a focus of squamous metaplasia (H&E x100).

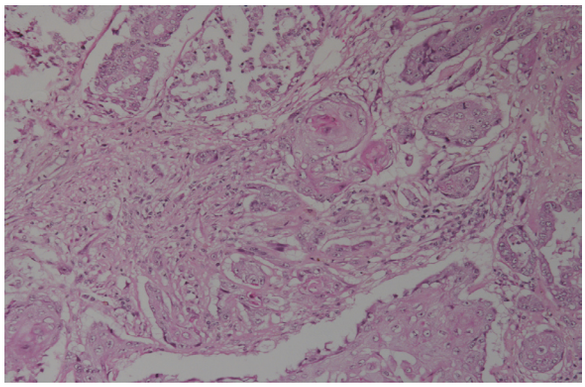

Figure 3. Thyroglossal squamous cell carcinoma: Thyrogenic epithelium, foci of squamous metaplasia and keratin formation (H&E x100).

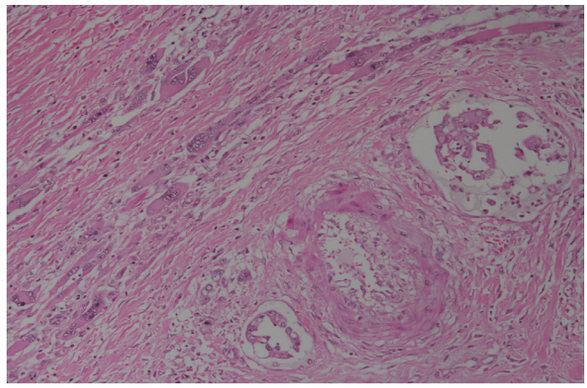

Figure 4. Cords of thyroglossal squamous cell carcinoma infiltrating the capsule and blood / lymph vessels (H&E x100).

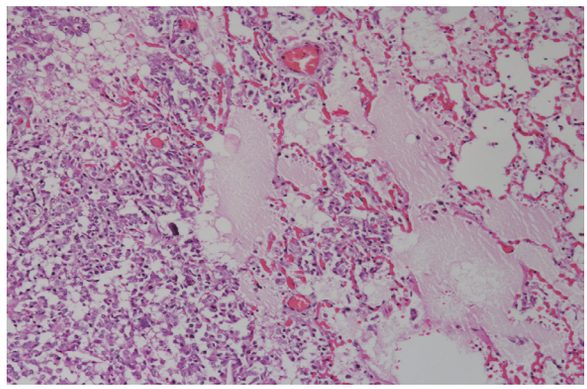

Figure 5. Metastatic focus of thyroglossal squamous cell carcinoma in the lungs (H&E x100).

DISCUSSION

This case report presents a rare finding of a squamous cell carcinoma of the thyroglossal duct remnants in a 12-year old bitch. In humans thyroglossal duct cysts are usually observed in children. This a second case in which a carcinoma of a thyroglossal duct remnant has been reported in a geriatric dog (1). Due to the rarity of the tumor there are no signalment criteria available as yet and therefore the diagnosis of thyroglossal duct remnant tumors remain a diagnostic challenge. The differential diagnosis of a ventral mass includes dermoid cysts, sebaceous cysts, lymphadenopathy, abscesses, carotid body tumors, lipomas, salivary mucoceles, adenomas and carcinomas of the thyroid or parathyroid and cystic remnants of the thyroglossal duct (3).

Embryologically the thyroid diverticulum develops from the floor of the first pharyngeal pouch during the fourth fetal week and descends to its final position in the lower portion of the neck ventrally to the trachea. It is intimately related to the aortic sac in its development, and this association leads to the frequent occurrence of accessory thyroid parenchyma, which may undergo neoplastic transformation, in the mediastinum of the adult dog. During its migration, the gland primordium remains attached to the pharynx by a narrow neck, the thyroglossal duct.

The duct becomes a solid stalk and normally degenerates by the sixth fetal week, permanently marking its point of origin as the foramen cecum of the tongue. The hyoid bones develop after the thyroglossal duct is in place and may be found in front of, behind, or surrounding the diverticulum. A portion of the thyroglossal duct may fail to involute postnatally and can persist as a cyst, a duct or ectopic thyroid tissue. Neoplasms of thyroglossal duct remnants appear to develop *de novo* from the thyroidogenic epithelium and are not cystic metastases from primary thyroid carcinomas attached to the cystic tissue (2, 4-6).

In humans the most common histopathologic diagnosis of thyroglossal cyst tumors is that of a papillary adenocarcinoma, accounting for 85% of all tumors. Other histologic types include mixed papillary and follicular types, squamous cell type (7% of cases being more aggressive with a poorer prognosis), follicular and basal cell carcinoma. A case of anaplastic carcinoma arising from the thyroglossal duct remnant has been diagnosed in an 84-year-old woman (7).

Carcinomas of thyroglossal duct remnants appear to be well-differentiated and slow growing with limited evidence of focal tissue invasion (6). The prognosis associated with squamous cell carcinoma in the thyroglossal duct is poorer than that associated with papillary carcinoma (8)**.** A special surgical method, Sistrunk's procedure, is indicated when thyroglossal cysts and tumors are diagnosed in humans in order to remove and prevent recurrence of the lesion (2, 3, 7, 9).

Thyroid carcinoma arising in thyroglossal duct remnants is rare, and since the first report by Brentano in 1911 and until 2006, only approximately 200 human cases have been reported in medical literature- most as single case reports (10). Thyroid carcinoma is diagnosed in approximately 1% to 2% of thyroglossal duct remnants. The clinical signs and pathology of this lesion are similar in animals to those reported in human cases. In 70% of human patients, an asymptomatic neck mass was the sole presenting complaint. Rare symptoms include hoarseness, dysphagia, sinus tact drainage, and weight loss or pain associated with the mass (7, 9). Clinical signs such as dysphagia, choking, coughing, dysphonia and diminished vocal ability have been reported in dogs (1, 2).

Tumors*,* arising in cystic remnants of the thyroglossal duct, appear as well circumscribed, fluctuant, movable enlargements (~2-4 cm diameter) on the ventral midline in the cranial cervical region. The clinical history usually indicates a slowly progressive expansion of the cervical mass. On cross-section, multilocular cystic areas containing translucent proteinaceous fluid alternate with white solid areas. The thyroid and parathyroid glands appear to be normal in the few cases studied in dogs (1, 5, 6).

In man an increase in the number of reported human cases of thyroglossal duct neoplasms have appeared since 1960. This is probably due to an increased awareness on the part of clinicians and pathologists, rather than an increase in the incidence of these tumors. Thyroglossal duct cyst is the most common non-odontogenic tumor of the human neck, usually becoming apparent before adulthood and lying on the ventral midline.

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