Adenocarcinoma of the nictitans gland in a dog

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Abstract: The case of a five-year-old spayed female French Bulldog with a mass in the right third eyelid is described. Ultrasonography and computed tomography were used to identify this pathological lesion and to visualise its morphology and extent. The mass was removed and submitted for histopathological examination. A final diagnosis of adenocarcinoma of the nictitans gland was made. In the discussion we compare the presented case with the available literature. Only limited information is published about this pathology.

Keywords: canine neoplasia; computed tomography; gland of the third eyelid; orbital neoplasia; retrobulbar space

Exophthalmos is the most common clinical sign associated with orbital mass lesions. Differential diagnoses for exophthalmos include orbital foreign body, abscess, cellulitis, orbital neoplasia, zygomatic sialadenitis, zygomatic salivary mucocele and masticatory myositis (Betbeze 2015). Generally, canine ocular neoplasia is uncommon when compared to neoplasms arising from other organs (Dubielzig 1990). Orbital neoplasia can have various origins and evaluating the exact anatomic location of the mass within the orbit is crucial for proper characterisation, further surgical planning and prognosis (Labelle and Labelle 2013; Betbeze 2015). Different types of orbital tumours have been described (Kern 1985; Burk 1992; Hendrix and Gelatt 2000; Betbeze 2015), but the extent of the here-described tumour is unusual and unique in the veterinary literature.

Case description

A five-year-old spayed female French Bulldog was presented with a mass associated with the right eye and a history of sudden loss of vision. Hyphaema and exophthalmos were detected (Figure 1). The right eye globe appeared smaller in size compared to the left globe, which did not show any morphological abnormalities. Intraocular pressure of the affected eye was elevated (35 mm Hg) compared to the healthy globe (22 mm Hg). All other organ systems were clinically unaffected.

Ultrasonography (US) of the right eye was performed using a 14 MHz linear transducer (Vivid 7, GE Vingmed Ultrasound, Norway). A heterogeneous mass was found ventromedial to the right eye globe and extension into the retrobulbar space was noticed. The mass lesion was well
defined with a hyperechoic peripheral rim. The size of the mass was $28 \times 23$ mm. The right globe was smaller in size than the left and deformed. No ultrasonographic abnormalities of the intraocular structures were noted. The differential diagnosis after ultrasonography was neoplastic mass or granuloma. Computed tomography (CT) was recommended for better assessment of anatomical structures of the entire orbit. The dog was anaesthetised using medetomidine ($0.15 \text{ ml } i.v.$; Domitor 1 mg/ml, Orion Pharma, Czech Republic), butorphanol ($0.3 \text{ ml } i.v.$; Butomidor 10 mg/ml, Richter Pharma, Austria) and propofol ($2 \text{ ml } i.v.$; Propofol-Lipuro 1%, B Braun, Germany). A CT examination (LightSpeed 16, GE Medical Systems, USA) was performed with the animal in sternal recumbency and the scanned area covered the entire head to the level of the sixth cervical vertebra. The CT scans were performed in the helical mode with 100 kV, automatic mA, rotation time 1 s, slice thickness 2.5 mm, spiral pitch 0.9 and medium frequency kernel. After the pre-contrast examination, $2.3 \text{ ml/kg}$ of a 300 mg/ml non-ionic iodine contrast medium (Iomeron 300, Bracco Imaging, Germany) were injected intravenously at 3 ml/s using a power injector system (MCT Plus, Medrad, USA). Scanning parameters were identical for the pre-contrast and post-contrast examinations. The examination showed the presence of a large mass of soft tissue density with a small elliptical hypodense central area. The mass was located ventromedially to the right eye globe with extension into the retrobulbar space. Focal thickening of the upper eyelid was also observed (Figure 2). Both these lesions exhibited a strong degree of homogenous contrast-enhancement. The hypoattenuating central area in the retrobulbar mass was not contrast-enhancing. No signs of bone destruction were detected. The deformity of the eye globe was evident from both the pre-contrast and post-contrast scans. The mass focally invaded the posterior wall of the globe (Figure 3). The ipsilateral medial retropharyngeal lymph node was enlarged with ho-
A macroscopically visible mass was extirpated, and the third eyelid was amputated. Haemostasis was performed by electrocoagulation. No conjunctival sutures were required. A partial temporal tarsorrhaphy at the medial commissure was undertaken to prevent a globe prolapse. The patient recovered from the surgery uneventfully and was discharged the following day.

The resected mass was submitted to histopathological examination. Histopathology showed the presence of a neoplastic glandular epithelial cell population proliferating in the sparse fibrous mucosal stroma. The neoplastic cells proliferated focally in a tubulopapillary form. In the major part of the tumour parenchyma cells showed a solid type of growth. Cellular atypia was of moderate intensity and was present multifocally within the tumour tissue, characterised by anisocytosis, anisokaryosis with cells demonstrating prominent nucleoli and mitotic figures (Figure 4). Infiltrative growth of the neoplastic cells into fibrous stroma in some areas was detected. A secretion was noted in the apical parts of the cells and in the glandular lumen. The presence of a mild lymphocytic and neutrophilic inflammatory reaction was detected focally within the neoplastic tissue. The surrounding stroma was sparse and formed by well differentiated fibrous tissue. Based on the histopathological examination, the tumour was diagnosed as a nictitans gland adenocarcinoma, grade II.

The dog was euthanised six months after the surgery due to recurrence of the mass. The owners did not wish to continue with any diagnostic or other therapeutic procedures.
DISCUSSION AND CONCLUSIONS

The most common neoplasias of the third eyelid are adenocarcinoma, papilloma and malignant melanoma (Ward 1999). The blue third eyelid gland neoplasia is relatively uncommon in dogs. Between the years 2003 and 2013 only 15 cases of epithelial neoplasms of the third eyelid gland were detected among 39 213 canine cases. Eight of these 15 cases were adenocarcinomas (Miyazaki et al. 2015).

Third eyelid gland neoplasia is clinically characterised by protrusion of the third eyelid, exophthalmos, strabismus, resistance to retropulsion or enophthalmos (Headrick et al. 2004; Labelle and Labelle 2013).

In the available literature, adenocarcinomas are overrepresented, but a few reports of adenoma and pleomorphic adenoma can also be found (Wilcock and Peiffer 1988; Wang et al. 2001; Headrick et al. 2004). There is one case report of a third eyelid adenocarcinoma in a cat (Komaromy et al. 1997). As well as the third eyelid gland, the lacrimal gland and the zygomatic salivary gland can also be sources of intraorbital neoplasias. These neoplastic processes may have similar histological and behavioural features and their differentiation is, therefore, problematic (Wilcock 1993; Wang et al. 2001). These structures can be differentiated based on the anatomical location; however, the clinical appearance and symptoms are in most cases identical. In this situation, diagnostic imaging, especially transversal imaging modalities, are very helpful. A thorough description of periorbital glands and their differentiation can be found elsewhere (Wang et al. 2001).

The mass in this case shares some of the macroscopic features such as lobulation and firmness, with already described cases (Ward 1999; Headrick et al. 2004).

Diagnostic imaging modalities should be used as a helpful clinical and diagnostic tool to distinguish the origin of a mass lesion. Ultrasonography is an easily performed examination; however, the interpretation is operator-dependent. It can be used to diagnose intraocular as well the retrobulbar disorders. CT offers a detailed view of all body areas without the superimposition of nearby structures. It is a valuable imaging modality for orbital diseases. Due to presence of vitreous body and very good tissue contrast intraocular structures can be readily identified. The use of contrast media makes this differentiation even better. In this case, it was impossible to identify the structure that gave rise to the mass based on ultrasonographic examination and only a heteroechoic mass in the retrobulbar space was detected. The CT, however, revealed a connection of the mass with the upper eyelid through the medial commissure. Based on the CT appearance neoplastic rather than merely granulomatous processes were suspected. The focal invasion of the posterior wall of the eye globe was observed. To the authors’ knowledge, this behaviour has not previously been described in this type of neoplasia and is considered unique. It has already been mentioned that adenocarcinomas have an expansive and variably infiltrative character (Wang et al. 2001; Labelle and Labelle 2013), but only infiltration to the loose connective tissue was noticed (Wang et al. 2001). Focal invasion to the globe wall, as in this case, can be used as a sign of aggressive nature and a potential complication of the neoplastic process. This feature must be considered for planning the surgery and to provide a better outcome for the patient. In the case described herein removal of the visible mass together with third eyelid amputation was performed. To remove the mass, which was located predominantly in the retrobulbar space, a complete orbital exenteration must be performed. It is stated that complete surgical excision should provide a good prognosis (Labelle and Labelle 2013).

The patient was managed after the surgery in a private veterinary practice and we were only informed about the recurrence of the mass in the same eye six months after the surgery. Based on the owners’ decision euthanasia was performed. Because no additional examinations were performed, we can only speculate as to whether or not this was a recurrence of the previous neoplastic process; however, this would be a highly probable course of disease due to the fact that a complete resection of the mass was not possible.

The CT examination covered the cranial part of the neck and ipsilateral regional lymphadenopathy was detected. Because no tissue samples were collected for histopathology from this lymph node, we can only speculate as to whether the enlargement of the lymph node was a result of metastatic spreading from the primary neoplastic process. The causes of enlarged lymph nodes are in general inflammation, neoplastic infiltration and metastatic spread (Taeymans 2011; Zwingenberger and Taeymans 2015). There is only one report where possible metastasis, represented by enlargement of the man-
dibular lymph node, after an incompletely excised adenocarcinoma occurred (Wilcock and Peiffer 1988). No necropsy was provided in that case.

In conclusion, here we provide a case description of a nictitans gland adenocarcinoma that is relatively uncommon in dogs. The invasion of the neoplastic mass into the eye globe wall seen in this case is unique and has been not described yet in the available veterinary literature. We suggest that these features should be investigated in patients with retrobulbar masses. CT is recommended in similar cases because of its superior visualisation of anatomical details and the possibility to appropriately plan the surgical procedure.

REFERENCES


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