A 7-year-old sexually intact male Persian cat was evaluated at the National Taiwan University Veterinary Teaching Hospital for recurrence of multiple cystic periocular masses affecting the left eyelids. A number of similar cystic lesions had been resected from the left eyelids 18 months earlier, with lesions recurring within 6 months after surgery. The cat had blepharospasm and signs of discomfort following rupture of the largest cyst the day prior to examination. Previous histologic examination of the cysts had revealed apocrine hidrocystomas.

Clinical Findings—Multiple pigmented nodules were seen around the skin of the upper and lower left eyelids. The nodules were brownish to black, round, soft, and fluid-filled. Signs of pain were not evident during palpation of the nodules.

Treatment and Outcome—The largest cyst on the upper eyelid was removed by means of a V-shaped full-thickness excision. Histologic and immunohistochemical examination of the excised tissue confirmed the diagnosis of apocrine hidrocystoma. The remaining periocular cysts were Surgically debrided and then treated topically with 20% trichloroacetic acid. All lesions healed rapidly without any signs of discomfort. During a recheck examination 12 months later, the upper and lower left eyelids appeared morphologically normal, and there was no evidence of recurrence.

Clinical Relevance—Findings suggested that chemical ablation with trichloroacetic acid may be a useful treatment for apocrine hidrocystomas in cats. (J Am Vet Med Assoc 2007;230:1170–1173)

Use of chemical ablation with trichloroacetic acid to treat eyelid apocrine hidrocystomas in a cat

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Case Description—A 7-year-old Persian cat was evaluated for recurrence of multiple cystic periocular masses. A number of cyst-like lesions had been resected from the left eyelids 18 months earlier, with lesions recurring within 6 months after surgery. The cat had blepharospasm and signs of discomfort following rupture of the largest cyst the day prior to examination. Previous histologic examination of the cysts had revealed apocrine hidrocystomas.

Clinical Findings—Multiple pigmented nodules were seen around the skin of the upper and lower left eyelids. The nodules were brownish to black, round, soft, and fluid-filled. Signs of pain were not evident during palpation of the nodules.

Treatment and Outcome—The largest cyst on the upper eyelid was removed by means of a V-shaped full-thickness excision. Histologic and immunohistochemical examination of the excised tissue confirmed the diagnosis of apocrine hidrocystoma. The remaining periocular cysts were surgically debrided and then treated topically with 20% trichloroacetic acid. All lesions healed rapidly without any signs of discomfort. During a recheck examination 12 months later, the upper and lower left eyelids appeared morphologically normal, and there was no evidence of recurrence.

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Abbreviation

TCA Trichloroacetic acid

were suspected to be recurrent apocrine hidrocystomas. Surgery was scheduled for the next day.

Prior to surgery, the cat was treated with cefazolin (40 mg/kg [18 mg/lb], IV) and meloxicam (0.2 mg/kg [0.09 mg/lb], SC) and sedated with ketamine (5 mg/kg [2.3 mg/lb], IM). Anesthesia was induced with propofol (3 mg/kg [1.4 mg/lb], IV) and maintained with isoflurane. The upper and lower left eyelids were routinely

Figure 1—Photograph of a cat with multiple apocrine hidrocystomas involving the left upper and lower eyelids. The largest cyst (arrow), which involved the upper eyelid, had ruptured 1 day previously.

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prepared, and artificial tear ointment\(^{4}\) was applied to the corneal surface. Lidocaine (2%) with epinephrine (1:100,000) was used for local anesthesia and hemostasis.

A V-shaped, full-thickness excision of the area of the upper eyelid containing the largest cyst was performed. The wound was closed with 2 layers of sutures. The tarsocconjunctival layer was apposed with 6-0 absorbable polyglactin 910, and the skin and orbicularis oculi layer was apposed with 5-0 nylon. A figure 8 suture pattern was used for the lid margin. Resected tissue was submitted for histologic and immunohistochemical examination to confirm the diagnosis.

Fluid was aspirated from the remaining 3 largest cysts with some difficulty. The fluid contained brownish debris and reddish clots. Cytologic examination of the fluid revealed only normal-appearing epithelial cells, debris, and RBCs.

For these 3 cysts, an incision was made in the cyst wall, and remaining fluid was drained. The cyst wall was then excised, and tissue underlying the cysts was debrided with a scalpel blade. A sterile cotton-tipped swab moistened with 20% TCA\(^{b}\) was then applied to each lesion for approximately 5 to 10 seconds, depending on the size of the lesion, with a longer period used for larger lesions. The lesions turned pale almost immediately subsequent to this treatment. Care was taken to prevent the TCA from contacting unaffected skin surrounding each lesion. Following treatment with TCA, each lesion was closed by suturing surrounding skin with 5-0 nylon in a simple interrupted pattern. Because of unrelated procedures performed prior to the eyelid surgery, the anesthetic period had become quite prolonged. Therefore, the cat was allowed to recover from anesthesia at this time. After surgery, the cat was treated with carprofen (2 mg/kg [0.9 mg/lb], PO, q 12 h) and cephalaxin (20 mg/kg [9 mg/lb], PO, q 12 h).

Following surgery, the cat had no signs of ocular discomfort and was discharged to its owner. The clinical course was unremarkable until the sixth day after surgery, when the owner noticed squinting of the left eye. Ophthalmic examination of the left eye revealed blepharospasm, purulent discharge, a large but superficial area of corneal ulceration, and upper eyelid entropion. The upper eyelid entropion was suspected to have been caused by shortening of the eyelid during cyst excision and to have been exacerbated by the blepharospasm resulting from corneal ulceration. The owner was instructed to apply ciprofloxacin ophthalmic solution and an artificial tear replacement ointment\(^{4}\) to the eye 4 times a day until corrective surgery could be performed 3 days later. The entropion of the upper eyelid was corrected by means of lateral canthoplasty and a modified Hotz-Celsius technique. In addition, remaining small cysts were treated with TCA at this time.

The cat recovered well after this second surgery. Areas of the eyelids treated with TCA did not have any evidence of bruising. The corneal ulcer resolved in a week, leaving a translucent corneal scar. All lesions that had been treated with TCA healed rapidly.

During follow-up ophthalmic examinations 2, 4, and 8 weeks and 3, 6, 8, and 12 months after surgery, the eyelids appeared to have healed without complications, and there was no evidence of lesion recurrence. Eyelid appearance and function were normal.

Excised tissue specimens were fixed in neutral buffered 10% formalin, routinely processed, and sectioned. Sections were stained with H&E or periodic acid–Schiff stain and examined. Additional sections were immunostained against proliferating-cell nuclear antigen (clone PC10; 1:400) and Ki67 antigen (MIB-1; 1:200) by use of a conventional avidin-biotin-peroxidase complex technique.

Histologic examination of tissue sections revealed multiple, dilated cysts in the dermis of the eyelid. Cyst lumens appeared to contain large amounts of eosinophilic hyaline and granular secretions. Numerous macrophages laden with eosinophilic secretions and neutrophils were present adjacent to a ruptured cyst. The cyst wall was lined by cuboidal to flattened epithelial cells in a single layer. Some of the epithelial cells revealed decapitation secretion, characterized by apical bleb-like protrusions, suggestive of acinar gland–type secretion (Figure 2). Material that stained positively with periodic acid–Schiff stain was present in the cytoplasm of the epithelial cells lining the cyst wall. Approximately 3% of the cuboidal to flattened epithelial cells expressed Ki67, whereas approximately 30% of these cells expressed proliferating-cell nuclear antigen (Figure 3).

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**Figure 2**—Photomicrograph of a section of eyelid from the cat in Figure 1. The dermis is expanded by multiple cysts containing eosinophilic hyaline to granular material (arrow). H&E stain; bar = 500 μm.

**Figure 3**—Photomicrographs of sections of eyelid from the cat in Figure 1 following immunohistochemical staining for proliferating-cell nuclear antigen (A) and Ki67 (B) in epithelial cells of the cyst wall (arrows). Hematoxylin counterstain; bars = 10 μm.
histologic features supported the notion that the cysts may have originated from 1 or more apocrine sweat glands. Granulomatous inflammation caused by rupture of the cysts and local, sebaceous gland hyperplasia were also present. On the basis of gross and microscopic features of the lesions, a diagnosis of apocrine hidrocystoma was made.

**Discussion**

Primary eyelid neoplasms are common in dogs and relatively rare in cats, as ophthalmic tumors account for only 2% of all feline neoplasms. Most eyelid tumors in cats are malignant, with squamous cell carcinoma being the most common, followed by basal cell carcinoma, mast cell tumor, adenocarcinoma, and fibrosarcoma. The prevalence of eyelid tumors in cats increases with age. In the cat described in the present report, potential differential diagnoses for the multiple dark eyelid masses included apocrine hidrocystoma, basal cell tumor, mast cell tumor, adenocarcinoma, and melanoma.

Apocrine hidrocystoma is a benign tumor that, in cats, most commonly involves the eyelids, ear pinnae, and neck. Lesions most likely originate from ectopic residues from apocrine glands or as a result of proliferation of normal Moll's glands. The disease was first reported in humans in 1964 and was first reported in cats in 1999. To our knowledge, only 3 case reports involving a total of 7 cats with this condition have been published.

Apocrine hidrocystomas can be distinguished from retention cysts on the basis of clinical signs, histologic features, and results of immunohistochemical staining. Cystic structures that occur in the eyelids of dogs and cats include cysts associated with the nasolacrimal system and cystic dilatations of the Meibomian and other eyelid glands. Cysts associated with the nasolacrimal system are usually solitary and located near the medial canthus. Cystic dilatations of the Meibomian glands (chalazion) are filled with lipid-containing material. In contrast, the multiple eyelid cysts observed in the cat described in the present report resembled apocrine cystomas in humans both clinically and histologically.

The exact etiology of apocrine hidrocystomas is still unknown, but a breed predisposition among Persian cats has been suggested previously. Reported ages of cats with this condition have ranged from 7 to 11 years. The cysts are usually slow growing and darkly pigmented because of lipofuscin-rich fluid within the cysts. The diagnosis is typically made on the basis of results of histologic and immunohistochemical examinations of biopsy specimens. Cytologic examination of surgically removed tissue can often be used to assist with the initial diagnostic differentiation of this tumor from other tumors. In the present case, histologic and immunohistochemical characteristics of the lesions were compatible with apocrine hidrocystomas reported in the literature.

A previous report indicated that results of immunostaining for Ki67 antigen in masses from 2 Persian cats with apocrine hidrocystomas were positive, suggesting that these were adenomatous proliferative tumors. In the present report, results of immunostaining for Ki67 antigen and for proliferating-cell nuclear antigen were positive, demonstrating that these cysts contained actively proliferating apocrine epithelial cells. The percentage of cells in the cystic wall that were expressing Ki67 was 5 times the percentage of cells in the epithelium of normal apocrine sweat glands that express this antigen, and the percentage of cells expressing proliferating-cell nuclear antigen was 10 times the percentage of cells that normally express this antigen. These findings provided further evidence that the apocrine hidrocystomas in this cat were adenomatous proliferative tumors, not retention cysts of the eyelids.

In humans, potential treatments for multiple eyelid apocrine hidrocystomas include drainage, surgical excision, topical application of atropine or scopolamine, electrosurgery, laser excision, observation, and most recently, tissue debridement and chemical ablation. Surgical excision has been the treatment of choice for humans with a single lesion, as resection of multiple large cysts may require skin grafting, possibly resulting in scar formation. Unfortunately, secondary entropion or entropion may occur following full-thickness excision of eyelid masses located close to the lid margin. Patient observation without treatment could be a viable option in patients without any evidence of discomfort.

Treatment in previous reports of cats with multiple apocrine hidrocystomas involved local excision of the cystic structures with or without eyelid reconstruction, but the recurrence rate was high. In 2 cats treated by means of simple excision alone, for instance, masses recurred 8 and 10 months later. In another report of 2 cats treated by means of cyst drainage and surgical excision, masses recurred 7 months and 3 years later. On the other hand, in a report of a cat that underwent excision followed by eyelid reconstruction, there was no evidence of recurrence 6 months after surgery. In our experience, apocrine hidrocystomas typically recur in cats within 10 months after local excision. Therefore, development of alternative treatments is warranted.

Trichloroacetic acid was chosen for chemical ablation of the lesions in the cat described in the present report after extensive literature study and consultation with human plastic surgeons and ophthalmologists. Trichloroacetic acid is a strong acid that denatures protein. It is also a powerful keratolytic agent that can coagulate proteins of the skin, killing all living structures to the level of the reticular dermis, and erode the midlayer of skin and the associated mucous membrane. Therefore, TCA has been widely used in human patients for the treatment of benign epidermal or cutaneous lesions, such as freckles, senile lentigo, seborrheic keratosis, and pigmented naevi. It has also been shown to have a therapeutic effect on genital warts, lesions of human papillomavirus, and other intraepithelial neoplasms as a result of damage to viral or tumor cell DNA. These properties of TCA may account for why it appeared to successfully prevent recurrence of the apocrine hidrocystomas in the cat described in the present report.

Trichloroacetic acid was reportedly used to treat 2 human patients with apocrine hidrocystomas and a third patient with a conjunctival cyst with satisfactory results and no evidence of recurrence. In the cat described in the present report, topical treatment with 20% TCA following local debridement resulted in a satisfactory outcome. However, additional studies are
needed to identify an optimal protocol for chemical ablation with TCA in cats with apocrine hidrocystomas.

Adverse effects associated with use of TCA are minimal if the chemical is applied to the lesions carefully to avoid contact with normal surrounding skin. The major adverse effect is that TCA contact with normal skin may cause pain, blisters, burns, or discoloration of the contacted area. Trichloroacetic acid is not absorbed following topical application; therefore, no systemic adverse effects are expected after topical treatment with TCA.\textsuperscript{13,14} Findings for the cat described in the present report suggest that chemical ablation with TCA may be a viable method of treating eyelid apocrine hidrocystomas. Given the potential advantages of TCA treatment, it might also be worthwhile to use this agent for the treatment of other benign epidermal or cutaneous lesions in animals.

References


Selected abstract for JAVMA readers from the American Journal of Veterinary Research

Prevalence of obese dogs in a population of dogs with cancer

Lisa P. Weeth et al

Objective—To determine the body condition score (BCS) distribution for dogs examined at a teaching hospital and examine whether the BCS distribution for dogs with cancer differed significantly from the distribution for dogs without cancer.

Animals—1,777 dogs with cancer and 12,893 dogs without cancer.

Procedures—A retrospective prevalence case-control study was conducted that used medical records from 1999 to 2004. Information was collected on BCS (9-point system), age, breed, sex, neuter status, diagnosis, and corticosteroid administration. Body condition score at the time of examination for cancer (dogs with cancer) or first chronologic visit (dogs without cancer) was recorded. Logistic regression was used to compare BCS prevalence distributions between groups.

Results—The overall prevalence of obese dogs (BCS ≥ 6/9) was 14.8% (2,169/14,670), and the overall prevalence of overweight dogs (BCS ≥ 6/9 to < 7/9) was 21.6% (3,174/14,670). There was a significant difference in the BCS distribution between dogs with and without cancer, with a slightly lower prevalence of being overweight and obese in dogs with cancer. The prevalence of obese and overweight dogs varied with specific cancer types when compared with the prevalence for dogs without cancer.

Conclusions and Clinical Relevance—Differences in obesity prevalence among cancer types was suggestive of an incongruous effect of this variable on cancer expression or a differential effect of specific cancer types on weight status. Systematic use of BCSs will help elucidate the association between obesity and cancer development. (Am J Vet Res 2007;68:389–398)