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ARTICLE *in* VETERINARY DERMATOLOGY · DECEMBER 2015

Impact Factor: 1.73 · DOI: 10.1111/vde.12283

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Vet Dermatol 2016; **27**: 3–e2 DOI: 10.1111/vde.12283

Aspergillus otitis in small animals – a retrospective study of 17 cases

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Background – *Aspergillus* spp. are saprophytic opportunistic fungal organisms and are a common cause of otomycosis in humans. Although there have been case reports of *Aspergillus* otitis externa in dogs, to the best of the authors' knowledge, this is the first retrospective case series describing *Aspergillus* otitis in dogs and cats.

Objective – To characterize signalment, putative risk factors, treatments and outcomes of a case series of dogs and cats with *Aspergillus* otitis.

Animals – Eight dogs and nine cats diagnosed with *Aspergillus* otitis.

Methods – A retrospective review of medical records from 1989 to 2014 identified animals diagnosed with *Aspergillus* otitis based on culture.

Results – All dogs weighed greater than 23 kg. The most common putative risk factors identified in this study were concurrent diseases, therapy causing immunosuppression or a history of an otic foreign body. *Aspergillus* otitis was unilateral in all study dogs and most cats. Concurrent otitis media was confirmed in three dogs and one cat, and suspected in two additional cats. *Aspergillus fumigatus* was the most common isolate overall and was the dominant isolate in cats. *Aspergillus niger* and *A. terreus* were more commonly isolated from dogs. Animals received various topical and systemic antifungal medications; however, otic lavage under anaesthesia and/or surgical intervention increased the likelihood of resolution of the fungal infection.

Conclusion – *Aspergillus* otitis is uncommon, typically seen as unilateral otitis externa in cats and larger breed dogs with possible risk factors that include immunosuppression and otic foreign bodies; previous antibiotic usage was common.

Introduction

Otitis externa – inflammation of the external ear canal and sometimes the pinna – is a common ailment in small animals, occurring in 4.6% of the canine case population in one hospital based study.[1] Otomycosis, a fungal infection of the ear, was diagnosed in 26.7% of those cases.[1] The most common organism to cause otomycosis in dogs is *Malassezia pachydermatis*.[1–4]

In humans otomycosis is diagnosed most commonly in warm, humid climates.[5,6] Predisposing factors include immune compromise, cleansing the ear with sticks/swabs, prior otology procedures, swimming, use of non-sterile oil in the ear, wearing head coverings, pruritus elsewhere on the body and the use of topical antibiotics or steroids.[6–11] *Aspergillus* spp. and *Candida* spp. are the most common fungi implicated in otomycosis in people.[5–7,10–15]

Aspergillus spp. are saprophytic environmental fungi that occasionally cause opportunistic infections in small animals. In dog and cats sino-nasal and sino-orbital aspergillosis are the most common manifestations.[16–20] Less commonly, and particularly in immunocompromised individuals or German shepherd dogs, the fungal organism may cause disseminated disease.[21] Dissemination is most commonly associated with *A. terreus*,whereas the sino-nasal form is more commonly associated with *A. fumigatus*.[18,21,22]

Two case reports of dogs with *Aspergillus* otomycosis have been published describing treatment and outcome.[23,24] To the best of the authors' knowledge there are no studies that have evaluated *Aspergillus* otitis in a series of small animals. This retrospective study evaluated the clinical presentation, possible risk factors and outcomes of *Aspergillus* otitis in dogs and cats seen at a university teaching hospital over a 25 year period.

Materials and methods

The University of California, Davis, veterinary medical teaching hospital records system was searched for cases presented between 1 June 1989 and 1 June 2014 using the words "*Aspergillus* otitis". The inclusion criterion was a clinical diagnosis of *Aspergillus* otitis (otitis externa and/or media), confirmed by identification of the organism on culture from samples obtained from the ear canal and/or identifica-

Accepted 30 October 2015
Sources of Funding: This study was self-funded.
Conflict of Interest: No conflicts of interest have been declared.
The study was presented at the North American Veterinary Dermatology Forum 2015 in Nashville, TN, USA; Vet Dermatol 2015; 26: 148 (abstract).

tion of the organism on histopathology. The study population included both cats and dogs, although separate descriptive statistics were done for each species.

The signalment, age of onset, weight of the animal, extent of disease (otitis externa versus otitis media; unilateral versus bilateral), description of the ears on physical and otoscopic examination, and concurrent/predisposing diseases were recorded for each case. Clinical data including results of cytological examination of ear canal exudate, bacterial and fungal cultures, histopathology, treatment protocols, response to therapy and time to resolution (if available) were also recorded. Resolution was defined as absence of inflammation and exudate within the ear on physical examination, and negative cytological exam and/or fungal culture of swabs obtained from the external canal.

Results

The initial search identified 33 cases, of which 17 met the criteria for inclusion in the study. There were eight dogs and nine cats included in the study.

Canine cases

There were four spayed female and four castrated male dogs. All dogs in this sample represented large breeds. There were two golden retrievers, two Border collies, and one each of the following: Labrador retriever, Vizsla, Doberman and Rhodesian ridgeback. The mean body weight of these dogs was 34.7 kg (range 23.8–48.6 kg). The average age at the time of diagnosis was 6.75 years (range 3–10 yr) and the mean duration of clinical signs prior to diagnosis was 2.5 months (range 0.3–6 month).

History and clinical findings in canine cases

All dogs had a unilateral otitis externa and three were diagnosed with otitis media of the affected ear via either computed tomography (two cases) or otoscopic observation of a ruptured tympanum (one case). Five of eight dogs had undergone computed tomographic examination. Potential risk factors included grass awn foreign body (three cases), concurrent immunosuppression (two cases; one due to chemotherapy for neoplasia and one that had received glucocorticoids for immune-mediated thrombocytopenia), a mass in the external canal (one case) and ear lavage with aural haematoma repair (one case). One dog had no identifiable risk factors. Five of eight dogs had been treated with systemic antibacterials prior to diagnosis and four dogs had received topical otic preparations containing antibacterial agents. Three dogs had received a combination of topical and systemic antibacterial therapy.

Four dogs had results of cytological evaluation of otic exudate available for review. Only two of the four dogs had observable fungal hyphae on cytology (Table 1). All dogs had *Aspergillus* species isolated on samples of otic exudate submitted for either bacterial cultures and/or fungal cultures, and some reported mixed populations of micro-organisms (Table 1). Several different species of *Aspergillus* were cultured from either the bacterial or the fungal culture submissions: three each were *A. niger* and *A. terreus*, and one each was *A. fumigatus* and *A. awamori*. No dog had more than one species of *Aspergillus* cultured. One dog underwent ventral bulla osteotomy and biopsy of the otic canal; histopathology revealed fungal hyphae and these were confirmed by fungal culture to represent *A. fumigatus*. A second dog was negative for fungal organisms on histopathology of a biopsied mass from the tympanic bulla.

Treatment and outcomes of dogs

All dogs were treated with topical medications following the diagnosis of otitis and seven received systemic drugs (Table 2). Six of the eight resolved with treatment with a mean time to resolution of 73 days (range 21–199 d); at the time of writing one dog was still undergoing treat-

Table 1. Laboratory data and physical examination at time of diagnosis of *Aspergillus* ear infection – canine cases

Case number	Physical examination	Otoscopic examination	Cytological results	Bacterial culture	Fungal culture	Histopathology
Dog 1	Purulent exudate	n.a.	n.a.	*Aspergillus niger*	n.a.	
Dog 2	Brown ceruminous debris	Yellow fluid	Hyphae, yeast*, inflammatory cells	No growth	*Aspergillus niger*	
Dog 3	Brown ceruminous debris and purulent exudate	Yellow fluid, ruptured tympanic membrane, stenosis, ulceration	n.a.	No growth	*Aspergillus fumigatus*	Fungal hyphae
Dog 4	Brown ceruminous debris	White plaques, ruptured tympanic membrane, stenosis	Inflammatory cells, cocci bacteria	*Staphylococcus pseudintermedius*	*Aspergillus terreus*	
Dog 5	Brown ceruminous debris and purulent exudate	Yellow fluid, mass	n.a.	*Aspergillus awamori*	n.a.	
Dog 6	Brown ceruminous debris	n.a.	Mixed bacteria, yeast* and hyphae	*Staphylococcus pseudintermedius*	*Aspergillus niger*	
Dog 7	Brown ceruminous debris	Stenosis	n.a.	*Aspergillus terreus*, *Corynebacterium* sp. and *Bacillus* sp.	n.a.	
Dog 8	Brown ceruminous debris and purulent exudate, ulceration, mass	n.a.	RBC, neutrophils, mixed bacteria	*Aspergillus terreus*, *Corynebacterium* sp. and *Enterococcus* sp.	*Aspergillus terreus*	

RBC, red blood cells.
*Most likely *Malassezia* spp.

Table 2. Treatment and outcome for dogs with *Aspergillus* ear infection

Case number	Topical treatment(s)	Systemic antifungal medication	Systemic antibiotic	Systemic corticosteroid	Surgery	Flushing under anaesthesia	Days to resolution
Dog 1	Gentamicin						24
Dog 2	Dexamethasone	Fluconazole				Weekly	199
Dog 3	Clotrimazole	Itraconazole, lufenuron			VBO		21
Dog 4	Voriconazole	Fluconazole, terbinafine		Prednisone	TECABO	Once	49
Dog 5	Orbifloxacin, posaconazole & mometasone*, amikacin	Itraconazole	Amoxicillin-clavulanate§		VBO		106
Dog 6	Miconazole, polymixin B & prednisolone†	Fluconazole		Prednisolone		Once	39
Dog 7	Enrofloxacin, dexamethasone, ketoconazole	Ketoconazole					No follow-up
Dog 8	Hydrocortisone aceponate, miconazole & gentamicin‡			Prednisolone			No resolution after 343 days

VBO, ventral bulla osteotomy; TECABO, total ear canal ablation and bulla osteotomy.
*Posatex (Intervet/Merck Animal Health; Summit, NJ, USA).
†Surolan (Vetoquinol/Janssen Pharmaceutica; Beerse, Belgium).
‡Easotic (Virbac; Fort Worth, TX, USA).
§Clavamox (Zoetis Inc.; Kalamazoo, MI, USA).

ment (343 d in duration) and one was lost to follow-up. Three of these six dogs underwent otic lavage under general anaesthesia and two had ventral bulla osteotomies.

Feline cases

There were seven spayed female and two castrated male cats. Six domestic shorthair, one domestic longhair, one domestic medium hair and one Persian cross-bred cat were represented. The mean body weight was 6.5 kg (range 3.6–7.8 kg). The mean age at the time of diagnosis was 9.1 years (range 2–13 yr), and the mean duration of clinical signs before diagnosis was 9.9 months (range 1–36 month). Four cats lived indoors only and five cats were also allowed outside.

History and clinical findings of feline cases

Two cats had bilateral otitis externa and seven cats had unilateral otitis externa. One cat was confirmed to have otitis media on computed tomography and two additional cats were suspected to have otitis media. Potential risk factors included diabetes mellitus (two cats), immunosuppressive therapy (one cat) and allergic dermatitis (two cats). Three of nine cats had been tested for feline leukaemia virus and feline immunodeficiency virus, and all were negative. Eight of nine cats had been treated with systemic antibacterial agents prior to diagnosis and five had received topical otic preparations containing antibacterials. Five cats had received a combination of topical and systemic antibacterial therapy.

Seven of nine cats had cytological evaluation of otic exudate samples recorded. Only two had visible fungal hyphae on cytology evaluation (Table 3). Results of bacterial and fungal culture are given in Table 1. Several different species of *Aspergillus* were isolated from either the bacterial or fungal cultures. Five isolates were identified as *A. fumigatus*, three as only *Aspergillus* sp., and one each as *A. niger* and *A. flavus*. One cat had both *A. flavus* and *A. niger* isolated. One cat underwent biopsy of nodules noted in the external otic canal; histopathology revealed intralesional mycelia which were confirmed by fungal culture to represent *A. fumigatus*.

Treatments and outcomes of cats

Eight cats were treated with topical medications following diagnosis of otitis and eight were treated with systemic drugs (Table 4). No cat underwent surgical treatment (beyond a tissue biopsy) or lavage under anaesthesia. The otitis in five of nine cats resolved with a mean time of 94 days (range 38–196 d). One of these five cats relapsed 2 months after treatment was discontinued and the otitis could not be resolved after 293 days at which time the cat was lost to follow up. The cat which received immunosuppressive therapy for control of an immune-mediated disease had not resolved after 493 days and developed metastatic neoplasia. Two cats were lost to follow-up, one immediately following initiation of treatment and the other after 149 days. One cat was still undergoing treatment at the time of writing (370 d).

Discussion

We have identified only 17 cases of *Aspergillus* otitis from a hospital population over a 25 year period. The majority of cases were unilateral, consistent with previously reported cases of *Aspergillus* otitis in dogs[23,24] and humans.[8,13–15] In humans bilateral otomycosis is more commonly seen in immunocompromised patients.[12] In the present study two cats presented with bilateral

Table 3. Laboratory data and physical examination at time of diagnosis – feline cases

Case number	Physical examination	Otoscopic examination	Cytological results	Bacterial culture	Fungal culture	Histopathology
Cat 1	Brown ceruminous debris	Erythema, stenosis	Gram − and + bacteria, neutrophils	*Aspergillus* sp. and *Enterococcus* sp.	n.a.	
Cat 2	Brown ceruminous debris	n.a.	n.a.	*Aspergillus* sp. and *Staphylococcus pseudintermedius*	n.a.	
Cat 3	Brown ceruminous debris	n.a.	Neutrophils, yeast*	*Aspergillus fumigatus* and coagulase negative *Staphylococcus* sp.	n.a.	
Cat 4	Brown ceruminous debris	Dark brown debris	Yeast*, hyphae	*Aspergillus* sp. and *Staphylococcus hemolyticus*	n.a.	
Cat 5	Brown ceruminous debris	n.a.	Hyphae, inflammatory cells	*Aspergillus fumigatus*	n.a.	
Cat 6	Haemorrhagic crusts	n.a.	n.a.	*Aspergillus flavus and niger*, *Staphylococcus pseudintermedius* and *Corynebacterium* sp.	*Aspergillus flavus*	
Cat 7	Brown ceruminous debris	Proliferative nodules	Inflammatory cells	n.a.	*Aspergillus fumigatus*	Intralesional mycelia
Cat 8	Brown ceruminous debris	n.a.	Mixed bacteria, inflammatory cells	*Aspergillus fumigatus*, *Serratia liquefaciens* and *Staphylococcus aureus*	n.a.	
Cat 9	Purulent exudate	Purulent exudate	RBC, neutrophils, cocci bacteria	Coagulase negative *Staphylococcus* sp.	*Aspergillus fumigatus*	

RBC, red blood cell.
*Most likely *Malassezia* spp.

Table 4. Treatment and outcome for cats with *Aspergillus* ear infection

Case number	Topical treatment(s)	Systemic antifungal medication	Systemic antibiotic	Systemic corticosteroid	Days to resolution
Cat 1	Miconazole, aluminum acetate, hydrocortisone				No resolution after 149 d
Cat 2	Orbifloxacin, posaconazole & mometasone*	Fluconazole	Cefpodoxime§		45
Cat 3	Orbifloxacin, posaconazole & mometasone*	Fluconazole	Marbofloxicin¶	Methylprednisolone	No resolution after 370 d
Cat 4	Miconazole, dexamethasone	Fluconazole			146
Cat 5	Gentamicin, betamethasone & clotrimazole†		Amoxicillin-clavulanate**		No follow-up
Cat 6		Fluconazole	Lincomycin	Prednisolone, methylprednisolone acetate††	No resolution after 493 d
Cat 7	Miconazole	Itraconazole	Amoxicillin-clavulanate**		196
Cat 8	Gentamicin, mometasone & clotrimazole‡	Itraconazole		Prednisolone	45
Cat 9	Orbifloxacin, posaconazole & mometasone*	Fluconazole	Marbofloxicin¶		38

*Posatex (Intervet/Merck Animal Health; Summit, NJ, USA).
†Otomax (Intervet/Merck Animal Health).
‡Mometamax (Intervet/Merck Animal Health).
§Simplicef (Zoetis Inc.; Kalamazoo, MI, USA).
¶Zeniquin (Zoetis Inc.).
**Clavamox (Zoetis Inc.).
††Depo-Medrol (Zoetis Inc).

disease. One was being profoundly immunosuppressed for immune-mediated skin disease and thrombocytopenia, but the other had no identifiable cause for immune suppression. None of the dogs presented with bilateral otitis.

Fungal otitis media has been reported in humans, although less commonly than fungal otitis externa.[25] In our study population otitis media was identified on computed tomographic findings or observation of a ruptured tympanic membrane in three dogs and one cat, and two cats were suspected of having otitis media. The confirmed cases had *Aspergillus* cultured from samples collected from the middle ear (obtained via ventral bulla osteotomy in two dogs, aspiration of fluid from middle

ear in one dog with a ruptured tympanic membrane and myringotomy in one cat). One cat and one dog with *Aspergillus* otitis media were immunocompromised which could explain the more invasive nature of the infection. Another dog with otitis media had a prior grass awn foreign body found in the ear, which may have penetrated the tympanic membrane causing the otitis media. No potential risk factors were identified in one cat and one dog with otitis media.

All dogs in the current study represented large breeds, but there were no obvious breed predilections. However, the sample size was very small and not compared to the general hospital population. Interestingly, no German shepherd dogs were involved. This breed is predisposed to the development of systemic aspergillosis.[21]

When all cases are considered, the most common putative risk factors were immunosuppression (endogenous or iatrogenic; 3 of 8 dogs and 3 of 9 cats) and grass awn foreign bodies (3 of 9 dogs). Otic foreign bodies have not been specifically identified as a predisposing cause of otomycosis in humans, but the use of ear sticks for otic cleansing has been identified as a predisposing cause in people.[7] This is presumably because the *Aspergillus* sp. is introduced into the ear by the foreign body, which may also cause concurrent physical trauma to the ear at the time of its entry. Three different species of *Aspergillus* were isolated from the three dogs with grass awn foreign bodies. Unfortunately, due to the small sample size it is not possible to determine if there was a statistically significant association between these potential risk factors and development of *Aspergillus* otitis.

In humans there has been some suggestion that fluoroquinolones contribute to the development of otomycosis.[9,10] Antimicrobial use prior to the diagnosis of otomycosis was very common among the cases in our study, and three dogs and seven cats had previously been treated with a topical and/or systemic fluoroquinolone prior to diagnosis with *Aspergillus* otitis. However, many other antibacterial classes were also represented, so it is therefore not possible to determine if fluoroquinolone exposure specifically increased the risk of *Aspergillus* otitis.

The species most commonly isolated in this case population was *A. fumigatus* (five cats and one dog). *Aspergillus fumigatus* is also the most common species involved in feline and canine rhinosinusitis.[18,22] In dogs *A. niger* and *A. terreus* were each isolated from three cases. *Aspergillus niger* has previously been documented as a cause of otitis externa in dogs,[26] and *Aspergillus* otomycosis in humans is most commonly caused by *A. fumigatus* and *A. niger*.[11,13] In humans with invasive aspergillosis, *A. terreus* is associated with a poorer prognosis when compared to other species of *Aspergillus*.[27] *Aspergillus terreus* is also frequently associated with resistance to amphotericin B, but not azole antifungal medications.[28,29] In two of three dogs from which *A. terreus* was isolated, the otomycosis did not resolve in one case and a total ear canal ablation and bullae osteotomy was required in the other. The third dog was lost to follow-up.

Based on this case series, dogs may have a better prognosis; 75% of dogs were treated successfully compared to only 56% of cats. This may be due to the fact that more dogs were treated with otic lavages under anaesthesia or surgical removal of infected material via a total ear canal ablation and/or ventral bulla osteotomy. None of the cats received these treatments. In dogs with sino-nasal aspergillosis, meticulous rhinoscopic or surgical debridement is recommended before infusing topical antifungal medication into the nasal cavity and sinuses.[30–32] Concurrent systemic antifungal medication administration is also recommended. In humans with otomycosis, thorough mechanical debridement of fungal elements is recommended prior to instituting topical therapy.[7,8,25]

Clotrimazole is often recommended to manage otomycosis in humans because of its broad spectrum of activity and lack of ototoxicity.[5,11,33] Resistance of *Aspergillus* spp. to antifungal agents has been reported.[34–38] In this study all animals that received systemic itraconazole had the infection resolved, whereas only 75% of those treated with systemic fluconazole resolved. This may reflect the fact that *Aspergillus* spp. are commonly resistant to fluconazole,[39] or could be related to other case specific factors. Posaconazole and voriconazole may prove to be useful for cases of *Aspergillus* otomycosis nonresponsive to other antifungal medications.[36,37] Voriconazole has been used in cats with systemic fungal disease but has been associated with renal and neurological toxicity.[18,40,41] These adverse effects were not seen in a dog treated with voriconazole.[42] Posaconazole has also been used with fewer adverse effects in cats.[18,43]

Major limitations of this study include its retrospective nature and the small sample size. Case investigations and management were not consistent due to the retrospective design and the rarity of this infection makes it difficult to accumulate a sample size large enough to determine the statistical significance of putative risk factors. It is also important to note that *Aspergillus* spp. are environmental saprophytes and growth on culture does not prove causation. *Aspergillus* spp. is the most common cause of "false positive" fungal cultures.[44] Identification of intralesional hyphae by histopathology provides the best evidence of pathological effect and visualization of hyphae on cytological exam is supportive.[1,25,45]

In summary, this case series suggests that *Aspergillus* spp. are uncommon causes of otitis externa with or without concurrent otitis media in small animals, with a predisposition for unilateral disease. There may be a predisposition for large dogs, and immunosuppression and otic grass awn foreign bodies may be risk factors. Prior antibacterial therapy was very common amongst these cases, as might be expected in a referral population. Analysis of a larger group of cases will be necessary to assess whether thorough otic lavage or surgery is indicated in cases of *Aspergillus* otitis and whether use of systemic itraconazole provides a therapeutic advantage.

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Résumé

Contexte – *Aspergillus spp.* est un organisme fongique opportuniste saprophytique, cause fréquente d'otomycose chez l'homme. Bien que des cas d'otite externe liée à *Aspergillus* chez le chien soient décrits, à la connaissance des auteurs, ceci est la première étude rétrospective de cas décrivant des otites à *Aspergillus* chez le chien et le chat.

Objectifs – Déterminer le signalement, les facteurs de risque, les traitements et l'évolution d'une série de cas de chiens et de chats atteints d'otite à *Aspergillus*.
Sujets – Huit chiens et neufs chats atteints d'otite aspergillaire.
Méthodes – Une revue rétrospective des données médicales de 1989 à 2014 ont identifiés les animaux atteints d'otite aspergillaire à la culture.
Résultats – Tous les chiens pesaient plus de 23 kg. Les facteurs de risque principaux identifiés dans cette étude étaient les maladies concurrentes, les traitements immunosuppresseurs ou des commémoratifs d'otite à corps étranger. Une otite aspergillaire était unilatérale pour tous les chiens de l'étude et la plupart des chats. Une otite moyenne a été confirmée pour trois chiens et un chat et suspectée pour deux autres chats. *Aspergillus fumigatus* était fréquent et le plus fréquemment isolé chez le chat. *Aspergillus niger* et *terreus* étaient plus fréquents chez le chien. Les animaux recevaient de traitements topiques et systémiques antifongiques; cependant, un lavage auriculaire sous anesthésie et/ou intervention chirurgicale augmentaient la probabilité de résolution de l'infection fongique.
Conclusion – L'otite aspergillaire est rare, typiquement observée en tant qu'otite unilatérale externe chez les chats et les chiens de grande race avec des facteurs de risque qui regroupent une immunosuppression et des corps étranger auriculaires; un traitement antibiotique précédent était fréquent.

Resumen
Introducción – *Aspergillus spp.* son hongos saprofíticos oportunistas que son una causa común de otomicosis en humanos. Aunque se han descrito algunos casos de otitis causadas por *Aspergillus* en perros, a nuestro entender este es el primer estudio retrospectivo de casos descritos de otitis externa causadas por *Aspergillus* en perros y gatos.
Objetivo – caracterizar la anamnesis, factores de riesgo, tratamientos y resultados de una serie de casos de perros y gatos con otitis causada *por Aspergillus*.
Animales – ocho perros y nueve gatos diagnosticados con otitis causada por *Aspergillus*
Métodos – una revisión retrospectiva de los historiales clínicos desde 1989 al 2014 identificados con animales diagnosticados por otitis causada por *Aspergillus* basado en resultados del cultivo.
Resultados – todos los perros pesaron más de 23 kilos. Los posibles factores de riesgo más comunes identificados en este estudio fueron enfermedades concomitantes, terapia causando inmunosupresión, o historia de un cuerpo extraño en el oído. La otitis causada por *Aspergillus* fue unilateral en todos los perros de este estudio y en la mayoría de los gatos. Se confirmó además otitis media en tres perros y un gato, y se sospechó en otros 2 gatos. *Aspergillus fumigatus* fue el aislado más frecuente en general, y fue él dominante en gatos. *Aspergillus niger* y *Aspergillus terreus* fueron aislados más comúnmente en perros. Los animales recibieron varias medicaciones tópicas sistémicas antifúngicas, sin embargo el lavado ótico bajo anestesia y/o la intervención quirúrgica incrementaron la posibilidad de resolución de la infección fúngica.
Conclusión – la otitis causada por *Aspergillus* es poco frecuente, típicamente observada como una otitis unilateral externa en gatos y en perros de raza grande con posibles factores de riesgo incluyendo inmunosupresión y cuerpos extraños en el oído; terapia previa con antibióticos fue también común.

Zusammenfassung
Hintergrund – *Aspergillus spp.* sind saprophytische opportunistische Organismen, die eine häufige Ursache für eine Otomykose beim Menschen darstellen. Obwohl es Fallberichte über *Aspergillus* Oitis externa bei Hunden gibt, handelt es sich hierbei nach bestem Wissen der Autoren um eine erste retrospektive Fallserie, die *Aspergillus* Otitiden bei Hunden und Katzen beschreibt.
Ziele – Eine Charakterisierung des Signalements, der möglichen Risikofaktoren, Behandlungen und Erfolge einer Fallserie von Hunden und Katzen mit *Aspergillus* Otitis.
Tiere – Acht Hunde und neun Katzen mit der Diagnose einer *Aspergillus* Otitis.
Methoden – Eine retrospektive Review der Krankenakten zwischen 1989 und 2014 von Tieren mit der Diagnose *Aspergillus* Otitis, welche auf einer Kultur basierte.
Ergebnisse – Alle Hunde wogen über 23kg. Die häufigsten möglichen Risikofaktoren, die in dieser Studie identifiziert werden konnten, waren gleichzeitige Erkrankungen, immunsupprimierende Therapie oder der Vorbericht eines Fremdkörpers im Ohr. Die *Aspergillus* Otitis trat bei allen untersuchten Hunden und bei den meisten Katzen unilateral auf. Eine gleichzeitige Otitis media wurde bei drei Hunden und einer Katze bestätigt, und bei zwei weiteren Katzen vermutet. *Aspergillus fumigatus* war insgesamt das häufigste Isolat und war das dominierende Isolat bei Katzen. *Aspergillus niger* und A. *terreus* wurden häufiger bei den Hunden isoliert. Die Tiere erhielten verschiedene topische und systemische antimykotische Medikamente; trotzdem erhöhte eine Ohrspülung unter Narkose und/oder eine chirurgische Intervention die Wahrscheinlichkeit einer Heilung der Pilzinfektion.
Schlussfolgerung – Eine *Aspergillus* Otitis kommt selten vor, tritt typischerweise als unilaterale Otitis externa bei Katzen und Hunden größerer Rassen mit möglichen Risikofaktoren, wie Immunsuppression und einem Fremdkörper im Ohr, auf; vorherige Verwendung von Antibiotika war häufig.

要約

背景 ー Aspergillus sppは日和見腐生性真菌で、ヒトにおいて耳真菌症の一般的な原因の一つである。イヌにおいてAspergillus外耳炎の症例報告はあるものの、筆者の知るところによれば、これはイヌとネコのアスペルギルス耳炎を解説する初めての回顧的な症例である。

目的 ー 連のAspergillus耳炎のイヌとネコの症例の症状、推定されるリスクファクター、治療法および治療結果を特徴づけることである。

供与動物 ー Aspergillus 耳炎の8頭のイヌおよび9頭のネコ

方法 ー 1989から2014年に培養検査でAspergillus耳炎と診断された動物の医療記録の回顧的な再検討

結果 ー すべてのイヌの体重は23kg以上であった。この研究で特定された、最も一般的な推定されるリスクファクターは併発疾患、免疫抑制を生じる治療、あるいは耳道内異物の履歴であった。Aspergillus耳炎は調査したすべてのイヌとほとんどのネコにおいて片側性であった。中耳炎の併発が3頭のイヌと1頭のネコで確認され、さらに2頭のネコで疑われた。Aspergillus fumigatusが全体で最も多く分離され、ネコでは大部分を占めていた。Aspergillus niger と A. terreusがイヌでより多く分離された。動物は様々な外用療法や全身性抗真菌療法を受けたが、麻酔下での耳洗浄や/あるいは外科的な介在により真菌感染症の治癒の可能性が増加した。

結論 ー Aspergillus耳炎は一般的ではなく、免疫抑制や耳道内異物を含むリスクファクターを持つネコおよび大型犬種のイヌにおいて、典型的には片側性の外耳炎が認められ、過去の抗菌剤使用が共通していた。

摘要

背景 ー 曲霉菌是腐生条件致病性真菌性微生物,常可引起人耳霉菌病。尽管有过一例犬感染曲霉菌性外耳炎的病例报告,但就作者所知,这是第一篇回顾性描述犬猫曲霉菌性外耳炎的报告。

目的 ー 描述犬猫曲霉菌性外耳炎病征、推测的风险因素、治疗及其效果。

动物 ー 诊断为曲霉菌性耳炎的八只犬和九只猫。

方法 ー 回顾分析1989至2014年通过真菌培养诊断为曲霉菌性耳炎的病例。

结果 ー 所有犬体重均大于23公斤。该研究中最常见的致病因素为并发疾病,治疗产生的免疫抑制或耳部异物病史。该研究中所有犬和大部分猫曲霉菌性耳炎是单侧的。三只犬、一只猫并发了中耳炎,另两只猫疑为中耳炎。黑曲霉和土霉菌最常感染犬。动物接受了多种外部和全身性抗真菌药物;然而,麻醉下耳道灌洗和/或外科的介入,增加了真菌感染治愈的几率。

结果 ー 曲霉菌性耳炎不常见,特点为大型犬和猫的单侧外耳炎,可能增加感染的因素有免疫抑制和耳道异物;之前通常有抗生素治疗史。

