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Nasal aspergillosis is a severe disease of the dog, causing destructive rhinitis and sinusitis. Although clinical signs are quite typical, definitive diagnosis can be difficult to achieve.

Canine aspergillosis is a challenging disease for veterinary practitioners as well as for pet owners. To date it is still unclear, what causes the infection. This lack of understanding entails a symptomatic treatment, consisting of either local therapy aiming to eliminate the fungus in the patient’s nasal and paranasal sinuses or systemic antifungal treatment. Many dogs need multiple treatments, and a small group of patients (12.9%) is euthanized because of treatment failure (1). What we know is, that young to middle-aged dogs of middle to large breeds with mesocephalic and dolichocephalic skulls are affected more frequently and that male dogs are overrepresented. We also know, that there are no breed predilections or environmental factors identified so far. The onset of the clinical signs is insidious and clinical signs alone are not enough to rule out the differentials such as intranasal foreign body, nasal neoplasia, oronasal fistula, tooth root abcess, and idiopathic lymphoplasmacytic rhinitis. Most patients are presented with a history of unilateral or bilateral nasal discharge with serosanguineous to mucinous character. The intranasal irritation is expressed by sneezing and reverse sneezing, and by hyperaesthesia of the nose. The eruption of sneezing can lead to episodes of unilateral or bilateral epistaxis. In more progressed stages of the disease, the bones forming the nasal cavity can be affected and deformities of the skull or neurological signs can occur. At clinical examination the nasal planum can be depigmented along the draining tracts of the nasal discharge. The air passage through the nose is normal or even enhanced depending on the amount of intranasal structure-loss. The further diagnostic workup includes a thorough intra-oral inspection under sedation to rule out teeth-related differentials. Radiographs of the skull are useful to appreciate conchal destruction, but the extent of the disease can be evaluated more accurately with CT scan. Furthermore CT scan offers multiplanar reconstructions that give detailed information about the integrity of the cribriform palate, a detail, which is invaluable for planning local treatment (2). With anterograde rhinoscopy it is almost always possible to see the fungus, which appears as grayish-white, fuzzy plaques adhering to the nasal mucosa. The plaques are often located deep in the nasal cavity near the opening to the frontal sinus. The therapy of canine nasal aspergillosis we suggest as first treatment consists of thorough debridement of the fungal plaques under rhinoscopic guidance and irrigation of the nasal cavity with Clotrimazole 1%. A cuffed endotracheal tube is needed and wet gauze swabs are packed over the entrance of the larynx, to prevent aspiration of Clotrimazole solution, fungal debris and blood. After debridement of any visible plaques, Folley catheters are used to occlude the nasopharyngeal opening and the nares. Through the Folley catheters the Clotrimazole is infused into the nasal and frontal sinuses. During one hour the patient will be rotated four times to ensure that the liquid makes contact with all surfaces. The success rate of the first treatment is 46-67% (3). The treatment causes some irritation but in the second week after the Clotrimazole-flush the dog should gradually improve. If clinical signs persist or re-occur, rhinoscopy is recommended. Not every recurrence of clinical signs is caused by fungal infection. Due to the conchal destruction, intranasal defense mechanisms are weakened. Without rhinoscopy it is not possible to differentiate between fungal re-infection and secondary rhinitis. Some authors recommend control rhinoscopy after the first treatment, independent of the clinical signs, but most owners do not comply with this suggestion, either because of financial reasons, or because of concerns of repeated anesthesia (4). Another local treatment option is daily flushing via surgically implanted catheters during 10 consecutive days. The reported success rate is high and in contrary to the one-hour intranasal flush the administration through catheters is considered safe in patients with partial destruction of the cribriform plate. Yet, there are contradictory reports about the efficacy of distribution of the antifungal agent when applied through trephine holes and dogs do not tolerate the treatment well (3). Systemic antifungal drugs like Itraconazole have a low success rate (50%). Furthermore, they are expensive and risky, since they have to be administered for three months and side effects like diarrhea and liver intoxication are frequently reported (5). Whether a dog belongs to the small yet worrisome group of untreatable patients is hard to predict. In a multicenter assessment of treatment

Reference:
success, the factors associated with treatment failure were adjunctive therapy with systemic antifungals and bilateral changes identified on rhinoscopy (1).

References:
3. Richardson EF, Mathews KG. Distribution of topical agents in the contents and the morphology of the bulla and of the external ear canal, but with CT- scan the bulla and the external ear canal, and even the inner ear can be appreciated in detail (2). Basically TECA and LBO are performed in the same manner in dogs and cats, but there are a few important differences. The patient is positioned with the affected ear uppermost. A V-shaped incision is made, starting cranial to the tragus and extending to the point where the vertical part of the external ear canal meets the horizontal part. A second incision starts caudal to the tragus and joins the ventral point of the first incision. The ventral point of the skin flap is then grasped with an Alice tissue forceps and sharply dissected away from the subcutis in dorsal direction to the tragus. With sharp and blunt dissection through the subcutis the vertical ear canal is exposed. The dissection is continued around the distal part of the vertical ear canal in dorsal direction. With sturdy Mayo-Noble dissecting scissors the entrance of the external ear canal is severed from the pinna. Bleeding can be significant at that point but will easily be stopped with electrocautery. The ear canal is then grasped with more Alice tissue forceps for stabilization and freed from the muscles of the pinna by sharp dissection. Dissection continues in proximal direction right on the cartilage of the external ear canal to prevent inadvertent vascular and neurological damage. In patients with end-stage otitis externa, calcification of the external ear canal and chronic inflammation of the surrounding tissues can hinder the identification of the facial nerve, and knowledge of the anatomy in this area is invaluable. The facial nerve exits the skull through the stylomastoid foramen, which is situated dorsocaudally from the external meatus. After giving rise to branches to the muscles of the pinna it courses ventrally around the horizontal part of the external ear canal and heads further rostrally where it splits in a dorsal and a ventral part to innervate the muscles the face. In dogs the facial nerve runs close to the external meatus but in most cats the nerve will already be encountered while dissecting around the horizontal ear canal. When dissection continues further proximally, care is taken to avoid inadvertent laceration of the retroarticular vein, which runs between the external meatus and the temporomandibular joint. When the external ear canal is severed at the junction to the external meatus, the facial nerve is protected with a periosteal elevator. Dissection is carried on inside the external meatus until all epithel is removed. When further exposure is needed to accomplish cleaning, a lateral bulla osteotomy (LBO) is done. For LBO, the lateral part of the bulla is meticulously dissected free of soft tissues. The maxillary vein and the external carotid artery run ventral to the bulla. The latter gives rise to the caudal auricular artery, which supplies the pinna. In cats, as the facial nerve, the caudal auricular artery can often already be encountered further distally, level with the external meatus. To start LBO the ventral part of the

TOTAL EAR CANAL ABALATION IN CATS AND DOGS. “SAME SAME BUT DIFFERENT.”
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To know about the differences between dogs and cats when performing total ear canal ablation, will help to avoid intra-operative and post-operative complications in this advanced surgical procedure.

Total ear canal ablation (TECA) with or without lateral bulla osteotomy (LBO) in dogs and cats is a salvage procedure. The primary indications for TECA are end-stage ear canal disease and neoplasia. The patient’s history, evaluation of the cranial nerves and thorough examination of the ears is the minimal work-up prior to surgery. If middle ear disease or inner ear involvement is suspected, or extension of a neoplasia is unclear, diagnostic imaging is performed. Radiographs of the skull will give some information about the bulla and the external ear canal, but with CT- scan the contents and the morphology of the bulla and of the external ear canal, and even the inner ear can be appreciated in detail (2). Basically TECA and LBO are performed in the same manner in dogs and cats, but there are a few important differences. The patient is positioned with the affected ear uppermost. A V-shaped incision is made, starting cranial to the tragus and extending to the point where the vertical part of the external ear canal meets the horizontal part. A second incision starts caudal to the tragus and joins the ventral point of the first incision. The ventral point of the skin flap is then grasped with an Alice tissue forceps and sharply dissected away from the subcutis in dorsal direction to the tragus. With sharp and blunt dissection through the subcutis the vertical ear canal is exposed. The dissection is continued around the distal part of the vertical ear canal in dorsal direction. With sturdy Mayo-Noble dissecting scissors the entrance of the external ear canal is severed from the pinna. Bleeding can be significant at that point but will easily be stopped with electrocautery. The ear canal is then grasped with more Alice tissue forceps for stabilization and freed from the muscles of the pinna by sharp dissection. Dissection continues in proximal direction right on the cartilage of the external ear canal to prevent inadvertent vascular and neurological damage. In patients with end-stage otitis externa, calcification of the external ear canal and chronic inflammation of the surrounding tissues can hinder the identification of the facial nerve, and knowledge of the anatomy in this area is invaluable. The facial nerve exits the skull through the stylomastoid foramen, which is situated dorsocaudally from the external meatus. After giving rise to branches to the muscles of the pinna it courses ventrally around the horizontal part of the external ear canal and heads further rostrally where it splits in a dorsal and a ventral part to innervate the muscles the face. In dogs the facial nerve runs close to the external meatus but in most cats the nerve will already be encountered while dissecting around the horizontal ear canal. When dissection continues further proximally, care is taken to avoid inadvertent laceration of the retroarticular vein, which runs between the external meatus and the temporomandibular joint. When the external ear canal is severed at the junction to the external meatus, the facial nerve is protected with a periosteal elevator. Dissection is carried on inside the external meatus until all epithel is removed. When further exposure is needed to accomplish cleaning, a lateral bulla osteotomy (LBO) is done. For LBO, the lateral part of the bulla is meticulously dissected free of soft tissues. The maxillary vein and the external carotid artery run ventral to the bulla. The latter gives rise to the caudal auricular artery, which supplies the pinna. In cats, as the facial nerve, the caudal auricular artery can often already be encountered further distally, level with the external meatus. To start LBO the ventral part of the

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External meatus is removed with Ruskin double-action rongeurs or down-biting Love-Kerrison rongeurs. This part of the bulla is the thickest in both dogs and cats. But while in dogs, the ventral part of the external meatus can be prominent, in cats often only a small rim can be found. As much of the lateral bulla is removed as needed for cleaning. In cats the middle ear is more distinctly separated in two compartments than in dogs. The separating shelf can be mistaken for the ventral floor of the bulla. To access the hypotympanum, this shelf needs to be removed. After cleaning, a Penrose drain is placed in case of expected fluid production or severe contamination during the procedure and the wound is closed in three layers. Postoperative complications include facial paralysis, Horner’s syndrome, haemorrhage, vestibular disease, wound dehiscence, fistulation, and abscessation. In cats the incidence of postoperative facial paralysis (56%) and Horner’s syndrome (42%) is much higher than in dogs (28% and 3%, respectively). This is attributed to the greater fragility of the feline tympanic plexus and facial nerve.

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In practice, veterinarians are regularly confronted with companion animals suffering from urological problems. In most cases the description of these problems can be resumed as ‘losing’ urine too frequently (urine incontinence, pollakiuria) or too infrequently (urine retention, urine outflow obstruction). In many dogs and cats presented with urological problems, other clinical signs are also noticed by owners, such as haematuria and stranguria. However, the latter clinical signs can also be seen in animals that do not show an abnormal frequency of urination.

Assessment of a clinical case starts with a complete signalment, history and physical examination. These findings may lead to a tentative diagnosis or a list of diagnostic possibilities. Additional diagnostic tests are often required to establish a diagnosis or limit diagnostic possibilities. However, in some cases immediate instituting of proper therapy is more important than making a definite diagnosis, e.g. in animals with a urinary tract obstruction, a distended bladder and uraemia. Available options for further diagnostic examination include urinalysis (routine analysis, urine culture), diagnostic imaging studies (ultrasonography, urethrography, cystography, IV pyelography, CT scanning), endoscopic examination of the lower urinary tract, haematological and blood biochemical tests, stone analysis and histopathology of tissue samples. Of course, a well-considered use of diagnostic aids is important to come to the right conclusion and to avoid extra animal inconvenience and wasted costs.

Dysuria is defined as an abnormal micturation, which includes signs like pollakiuria and stranguria. Interpretation of these signs is sometimes difficult and can lead to pitfalls in decision making with regard to further diagnostic testing and therapy. For instance, dogs and cats that are straining may be regarded as ‘dysuric’ but also as ‘consti-
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On the other hand, retention of urine is seen when relaxation of the urethral muscles is insufficient (functional obstruction, upper motor neuron disorders), when detrusor contraction is inadequate (bladder atony from overdistension, lower motor neuron disorders, dysautonomia) or when both muscle systems are not functioning adequate. Unfortunately, the reliability and clinical use of urodynamic tests to determine the functionality of the various components contributing to the micturation process are (still) very limited in companion animals.

Normal micturation consists of a urine storage phase and a voiding phase and depends on a well-coordinated interaction between the nervous system and the lower urinary tract. Sympathetic stimulation of the internal urethral sphincter (smooth muscle) and relaxation of the detrusor muscle of the bladder wall (also smooth muscle) are primarily responsible for effective urine storage. In addition, the external urethral sphincter (striated muscle) encircling portion of the urethra distal to the internal sphincter, contributes to the closure of the urethra. At voiding, the urethral sphincter muscles relax. Simultaneously, parasympathetic stimulation of the detrusor muscle results in the emptying of the bladder. This process may seem simple, but requires a complex interaction of the sympathetic, parasympathetic and somatic nervous systems, the bladder and the urethra.

Insufficient tonus of the urethral sphincter muscles during the urine storage phase will result in an involuntary outflow of urine (incontinence), as will an increased tension of the detrusor muscle (bladder instability or ‘urge incontinence’). However, involuntary loss of urine will also be seen in animals with anatomic abnormalities where urine flow bypasses the sphincters (ectopic ureters) or in animals with urine overflow when the bladder volume and pressure exceed outlet resistance because of detrusor atony.

In all urological patients, urinalysis is considered a very valuable, yet quite inexpensive diagnostic test, also in animals without clear macroscopic abnormalities in the urine. Routine analysis provides information about haemorrhage, inflammatory processes and infection, crystal formation, renal function (concentrating ability, glomerular permeability, tubular damage) and other processes involving the whole animal (e.g. glucose metabolism, haemolysis, acid-base disturbances). It
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makes sense for most veterinary practices to perform urinalysis in-house, because it can be performed easily, economically and rapidly. The most important variables that influence interpretation of the results are the method of sample collection, the storage time and storage conditions.

Other diagnostic aids that are often essential in additional examination of urological patients are abdominal imaging techniques, which usually consist of ultrasonography and (contrast) radiography. Ultrasonographic examination is often preferred because it safely provides valuable information about three-dimensional morphology, usually without the need of sedation and the advantage of direct guidance during percutaneous cystocentesis or aspiration biopsies. Advantages of radiography compared to ultrasonography are a less difficult localization of radiopaque uroliths in nondilated ureters or urethra and, using positive contrast studies, visualization of the entire urethra in male dogs and localization of urine leakage after trauma.1,2

The purpose of these lectures is to clarify the diagnostic and therapeutic approach to disorders of the lower urinary tract in dogs and cats. Although functions of the kidney and the lower urinary tract are closely related, there are also important differences in their specific function and in clinical signs when affected by diseases. New treatment options and current clinical research projects in the Netherlands will be addressed. Although a well-considered and consistent approach may solve many clinical ‘question marks’, enigmas will remain in veterinary urology. That’s what keeps it interesting!

References: