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The Veterinary Record 167:177-178 (2010)

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Short Communications

Chronic rhinitis due to *Streptococcus equi* subspecies *zooepidemicus* in a dog

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PRIMARY bacterial rhinitis is rare in dogs; it is usually secondary to nasal trauma, inhalation of an irritant, neoplasia, or viral, fungal or parasitic infections. *Streptococcus equi* subspecies *zooepidemicus* (*S zooepidemicus*), a common cause of respiratory infections in horses, has been associated with acute necrotising haemorrhagic pneumonia ([Garnett and others 1982](#), [Kim and others 2007](#), [Pesavento and others 2008](#), [Byun and others 2009](#)), septicaemia ([Quinn and others 1999](#)) and canine infectious respiratory disease complex ([Chalker and others 2003](#)) in dogs. This short communication describes a case of chronic rhinitis due to *S zooepidemicus* in a dog.

A 10-month-old neutered female crossbred dolichocephalic dog, of medium size, was referred to the Veterinary Teaching Hospital of the University of Bologna because it had a bilateral nasal discharge. According to the history, the dog had begun to show clinical signs at the age of three months, and had been treated with 20 mg/kg amoxicillin orally twice daily for five days; there had been a slight initial improvement without complete resolution, followed by gradual worsening of the clinical signs.

The dog had received the normal course of vaccinations. The initial physical examination was unremarkable except that the dog was sneezing and had a bilateral purulent nasal discharge and dark red nasal mucous membranes.

A full haematological and biochemical evaluation was performed. The biochemical profile was normal. Haematology revealed eosinophilia (1248 x 10⁹ cells/l, reference range 0 to 750 x 10⁹ cells/l); this was not attributed to a parasitic origin, as coprological examination and an ELISA test for heartworm antigen were both negative.

Thoracic and nasal radiographs were unremarkable. Rhinoscopy was performed with backward and forward approaches, using flexible (6 mm x 1050 mm; Pentax EG 1840) and rigid (30°, 2.7 mm x 190 mm; Karl Storz) endoscopes. The flexible endoscope was inserted inside the nasopharynx up to the choanae while an assistant pulled back the soft palate. With the exception of the presence of thick, whitish mucus, no alterations of the choanae and nasopharynx were detected. A rigid endoscope was inserted into each nostril to examine the rostral part of the nasal cavities up to the ethmoidal volutes. An increase in the free space of the superior, middle, inferior and common meatus due to lysis of the nasal turbinates in both cavities was evident. Inspection of the right and left nasal cavities revealed thickening of the mucosa, which appeared hyperaemic, with the presence of diffuse polyps and numerous patchy tenacious mucopurulent plugs ([Fig 1](#)).

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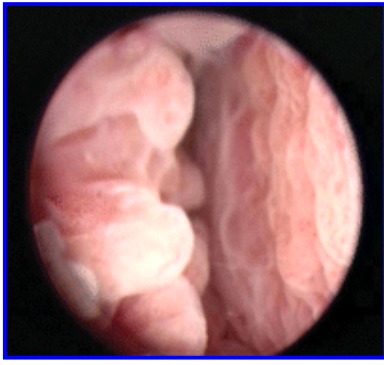
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FIG 1 : Endoscopic view of the ethmoid turbinates of a dog, achieved by rigid endoscopy, revealing hyperaemia of the nasal mucosa and small inflammatory nodules

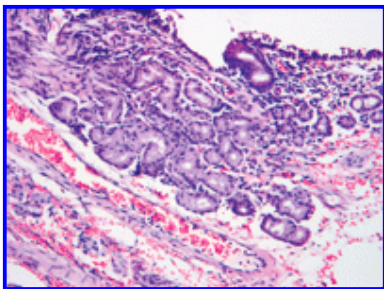
Nasal swabs were collected from both nasal cavities and placed in Amies charcoal transport medium for bacteriological analysis. Several mucosal biopsies, approximately 4 x 2 mm in size, were taken from the nasal turbinate using Hartmann forceps under endoscopic guidance, for histology.

The nasal swabs were used for routine aerobic and anaerobic bacterial cultures. After 24 hours of incubation, colonies consistent in appearance with β -haemolytic streptococci were isolated in pure culture on Columbia blood agar base plates with 5 per cent sterile sheep blood. The isolates were identified to the species level by biochemical characteristics and enzymatic action, using the API 20 Strep manual identification kit (bioMérieux), as *S zooepidemicus* (profile number 0463607).

The identification of *S zooepidemicus* was also confirmed by amplification of a portion of the 16S rRNA gene by PCR using generic primers (1492-r; p27-f) ([Brosius and others 1978](#)). The sequence of the 833 bp PCR product showed 100 per cent identity with *S zooepidemicus* (GenBank accession numbers FM204884 [[GenBank](#)], CP001129) ([Beres and others 2008](#), [Holden and others 2009](#)) and with *S equi* subspecies *ruminatorum*, using BLAST ([Altschul and others 1997](#)). However, the strain isolated from the dog did not have the colony appearance or biochemical characteristics of the type strain of *S equi* subspecies *ruminatorum* ([Baverud and others 2007](#)).

An antimicrobial susceptibility test, performed by the disc diffusion method, revealed that the isolate was sensitive to penicillin, cefalexin, erythromycin, marbofloxacin and chloramphenicol.

The sections from the biopsy were examined histologically; the morphological diagnosis suggested chronic diffuse moderate lymphoplasmacytic rhinitis, with numerous intravascular eosinophils. In particular, multifocally, the nasal epithelium of the turbinates was atrophic, cuboidal with the loss of cilia, and ulcerated. There was severe exocytosis of neutrophils through the epithelium. Multifocally, there were many submucosal haemorrhages and the vessels were hyperaemic. A moderate infiltrate of lymphocytes and plasma cells with scattered haemosiderin-laden macrophages surrounded the nasal glands and expanded the lamina propria-submucosa ([Fig 2](#)). The blood vessels were filled with a moderate to high number of eosinophils, some of which were multisegmented, and the vascular endothelium showed plump nuclei, indicating a reaction in the endothelium.



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FIG 2 : Histological examination of a tissue biopsy from the nasal turbinate of a dog. Atrophy and ulceration are evident in the epithelium, and there is a moderate lymphoplasmacellular infiltrate in the lamina propria-submucosa. The vessels are hyperaemic and there is mild haemorrhage. Haematoxylin and eosin. x 200

On the basis of the results, of the dog was diagnosed with chronic rhinitis due to infection with *S zooepidemicus*.

Based on the results of the antimicrobial susceptibility test, the dog was treated with 12.5 mg/kg amoxicillin and clavulanic acid administered orally twice daily, and 2 mg/kg marbofloxacin administered orally once daily, for 20 days. In addition, the dog received aerosolised 0.9 per cent sodium chloride via a nebuliser twice a day for 30 days, to remove the mucopurulent material that had accumulated in the nasal cavity.

A few days after the start of treatment, the dog showed a slight clinical improvement, with a progressive reduction of sneezing and nasal discharge; complete recovery was evident one month later. Two months after the antibiotic treatment was completed, a bacteriological examination was performed and was negative.

It is likely that the first antibiotic treatment (amoxicillin for five days) was ineffective because of its short duration and the poor penetration of the drug into the nasal mucosa. It is advisable to use longer-term antibiotic treatment (for at least 20 days) in association with aerosolised saline in order to remove the exudates and to facilitate penetration and distribution of the antibiotic in the nasal mucosa.

The dog's history was examined further, with the aim of identifying a possible source of infection; this revealed the fact that the dog lived on a stud farm with a considerable turnover of horses.

In this case it was not possible to test the horses on the stud farm for *S zooepidemicus*. Further studies should be performed in order to evaluate possible transmission of *S zooepidemicus* infection between different species, especially considering a recent report of the transmission of *S zooepidemicus* from a dog with respiratory disease to a human being ([Abbott and others 2009](#)).

Provenance: not commissioned; externally peer reviewed

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