

Diagnosis and management of a rare case of allergic rhinitis in a dog

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Abstract

Allergic rhinitis has been rarely reported in dogs. It is generally expressed as a hypersensitivity response of the nasal mucosa to airborne allergens. A 10 year old German Shepherd intact female dog was presented with history of intermittent epistaxis and sneezing from 3 months. On physical examination, the dog was alert and active with normal appetite. Detailed history revealed the purchase of new furniture at home, which could be a source of allergy in the present case. Hematological analysis revealed absolute eosinophilia. Biochemical tests revealed increased concentration of total proteins, globulin and fibrinogen. Blood gas analysis showed insignificant change in partial pressure of oxygen. Nasal swab cytology demonstrated few neutrophils along with increased number of eosinophils confirming the presence of allergic inflammation. No abnormality was detected in dorso-ventral radiograph of nasal cavity. The affected animal was treated with the chlorpheniramine orally @ 4mg/dog twice a day for 7 days followed by same dose once a day for 1 month along with Celin (vitamin C) 500 mg once daily for 7 days, till the signs subsided. Allergic rhinitis was confirmed in the dog on the basis of blood smear and nasal smear eosinophilia and response to therapy.

Keywords: Allergic rhinitis, Dog, Eosinophilia, Nasal swab cytology, Radiography

Allergic rhinitis has not been well recognized in dogs and cats. Inflammation induced by airborne allergens in the nasal mucosa is usually expressed in the form of allergic rhinitis. Seasonal cause of allergic rhinitis is mainly the pollen production whereas on other times, it may occur due to house dust and molds. Sudden rhinitis can be caused by the lodging of foreign objects in the nasal cavity or due to the inhalation of smoke or irritant gases (Kuehn, 2016). Signs of allergic rhinitis may worsen in some specific seasons or on introduction of new furniture or the fabric in the house and making use of new perfumes and cleaning agents or after cigarette smoking (Nelson and Couto 2014). Allergic rhinitis mainly affects the mucosal lining of the upper respiratory tract only whereas asthma involves bronchial tubes of the lower respiratory tract. Adequate scientific literature endorse the involvement of eosinophils in the pathophysiology of the allergic respiratory diseases (Sonawane *et al.*, 2016). Sneezing and serous or mucopurulent nasal discharge along with eosinophilic inflammation in nasal biopsy of allergic rhinitic dogs was recorded by Nelson and Couto (2014). A good correlation has been observed between nasal smear eosinophilia and clinical score severity in human allergic rhinitis patients (Patel and Nagpal, 2014) suggesting it a valuable test for diagnosis of allergic rhinitis. This present case report may be the first report

of allergic rhinitis in India.

Clinical History, Diagnosis and Management

A 10 year old intact female German shepherd, weighing 35 Kg, was presented to the Small Animal Clinics of Guru Angad Dev Veterinary and Animal Sciences University, with chief complaint of intermittent epistaxis and sneezing from 3 months. On presentation, dog was alert and active with normal appetite. Detailed history revealed the purchase of new furniture at the house, which could be a source of allergy due to being recently varnished. Clinical examination revealed rectal temperature 102.2°F, heart rate 88 beats per minute, respiratory rate 52 breaths per minute and slightly congested mucous membrane. Auscultation of chest revealed normal heart and lung sounds.

Blood sample was collected for hemato-biochemical examination. Complete blood examination of the dog revealed absolute eosinophilia (2440/ μ l), normal haemoglobin (12.9g/dl), high total leukocyte count (15250/ μ l), normal Total Erythrocyte Count (6.87 \times 10⁶/ μ l), normal PCV (41.3%) and platelet count (285 \times 10³/ μ l). Differential leukocytic count demonstrated 58 percent neutrophils, 26 percent lymphocytes and 16 percent eosinophils. Biochemical analysis showed high total proteins (8.2 g/dl), low albumin (2.2 g/dl), high globulin (6 g/dl) levels and albumin to globulin ratio

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as 0.37. The fibrinogen concentration was recorded as 0.6 g/dl. Elevated levels of total protein, globulin and fibrinogen along with decrease in albumin concentration were in accordance with the study conducted by Solter *et al.*, (1991) in a dog suffering with inflammatory conditions where significant changes in the acute phase proteins even in the absence of changes in total or differential WBC count was noted.

On blood gas analysis, insignificant change in the partial pressure of oxygen (PaO_2) (71 mm Hg) was observed whereas the saturation of oxygen was within the normal levels (93%) suggesting zero hindrance to the supply of oxygen to lungs. Deep nasal swab cytological examination revealed few neutrophils along with increased number of eosinophils confirming the presence of eosinophilic inflammation. Fungal culture of the nasal swab was found negative. Dorsoventral radiograph of the nasal cavity was normal.

The dog was treated with the chlorpheniramine orally @ 4mg/dog every 12 hour for 7 days followed by same dose once a day till the signs subsided (i.e. for 1 month) as per described by Nelson and Couto (2014) along with Celin 500 (vitamin C) for 7 days. In our study, chlorpheniramine resulted in excellent recovery after one week though it was continued for one month until clinical signs resolve and dog recuperates completely. Complete blood count was repeated after the clinical recovery of

the dog which showed significant decline in absolute eosinophilia from 2440 to 348 cells/ μl . Hemoglobin concentration (12.7g/dl), total leucocyte count (8700cells/ μl) and total erythrocytic count ($5.52 \times 10^6/\mu\text{l}$) were recorded with no significant difference. Response to therapy confirmed the presumptive diagnosis of the case to be of allergic rhinitis.

Discussion

Allergic rhinitis is a rare inflammatory disorder of nasal cavity in dogs. However, around 20–30 percent of Indian population of human beings, suffers from allergic rhinitis and out of which 15 percent develop asthma. Four main symptoms clinically observed in allergic rhinitic patients are sneezing, nasal itching, rhinorrhea and nasal congestion (Varshney and Varshney, 2015). Allergic rhinitis was found to be a cause of intermittent epistaxis in dogs in a previous study (McDougal, 1977). The affected dog in the study also showed similar clinical signs of sneezing and intermittent epistaxis.

A significant relationship between the nasal and blood smear eosinophilia in human patients with allergic rhinitis was suggested (Sonawane *et al.*, 2016) which indicates that both nasal and peripheral smear eosinophil count are equally important for diagnosis of allergic respiratory diseases. So, nasal eosinophil count being simple, inexpensive, reliable and non invasive



Fig. 1: A dorsoventral radiograph of nasal cavity showing normal nasal passage in a dog with allergic rhinitis.

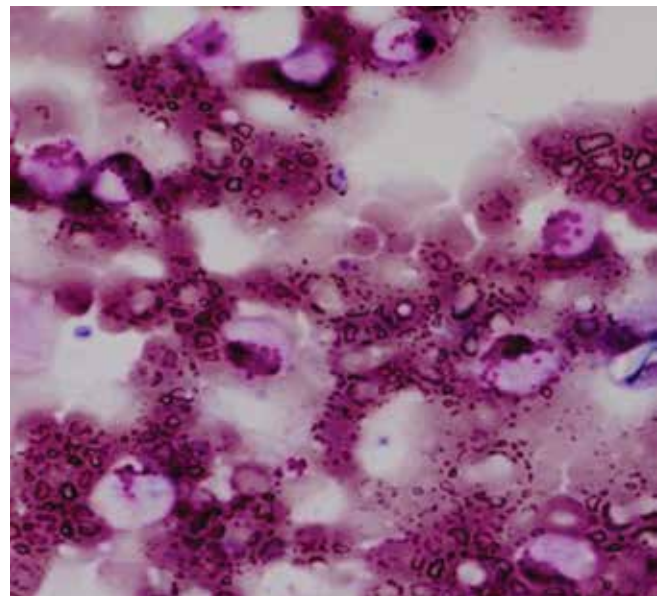


Fig. 2: Large number of eosinophils in the nasal swab smear cytology of dog with allergic rhinitis-100x (Leishman staining)

procedure can be used as a substitute for the invasive peripheral smear eosinophil count (Sonawane *et al.*, 2016). Increased number of eosinophils was observed in the nasal smears of 70 percent of the human patients suffering from allergic rhinitis (Binder *et al.*, 1984). Elevated levels of positive acute phase proteins (APPs) (e.g. fibrinogen) along with decrease in the level of the negative APPs (e.g. albumin) in the affected dog was indicative of inflammatory response of the body (Viitanen *et al.*, 2014).

Lobetti (2014) observed no opacification of the nasal cavity on radiographs in 55% of the dogs affected with Idiopathic lymphoplasmacytic rhinitis. A normal nasal radiograph has been found in many disease conditions affecting nasal cavity or even in the presence of chronic foreign bodies because many diseases only causes non-destructive and/or non-neoplastic or local inflammatory changes (McConnell, 2008). Other diseases of nasal cavity such as nasal mite infestation, foreign body, trauma, dental disease, nasal tumors, viral, bacterial and mycotic infections and congenital abnormalities were excluded on the basis of clinical history and findings of different tests such as complete blood count, serum biochemistry, cytology and fungal culture of the deep nasal swab and nasal radiography.

Prognosis was good in the rhinitic dog as it showed complete clinical recovery after treatment with the antihistaminic along with the avoidance of contact with the source of allergy (newly brought furniture). In human beings, treatments in allergic rhinitic patients are undertaken as per ARIA (Allergic Rhinitis and its Impact on Asthma) guidelines and usually include combination of pharmacotherapy, allergen avoidance and allergen immunotherapy (Varshney and Varshney, 2015).

Allergic rhinitis was confirmed in the present dog on the basis of clinical symptoms, absolute eosinophilia on hematology and increased number of eosinophils on nasal swab cytology along with response to treatment and exclusion of the other diseases based on historical evidences and results of the various lab tests.

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