



Original Research Article

Epidemiological, clinical and haematological studies on canine respiratory diseases in and around Hyderabad city, Andhra Pradesh, India

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ABSTRACT

To undertake detailed investigation on respiratory diseases in dogs in and around Hyderabad city of Andhra Pradesh. The present investigation was carried out the clinical cases of dogs that were presented with the history of respiratory diseases at the University administered Veterinary Hospital, Bhoiguda, Secunderabad and Campus Veterinary Hospital, College of Veterinary Science, Rajendranagar, Hyderabad over a period of 26 months i.e., from October 2008 to November 2010. 90 dogs were selected for this study and grouped into 3 groups i.e., Group I (mild), Group II (moderate), Group III (severe) consisting 30 animals in each group and carried out detailed investigation. Respiratory diseases are more common in dogs with various kinds of epidemiological, physical, clinical and haematological Changes. The highest prevalence of respiratory diseases was recorded in younger age group of animals. The highest prevalence of respiratory diseases was recorded in Pug followed by other dogs. Sex did not influence the incidence of respiratory diseases. The highest prevalence of respiratory diseases was recorded in female group of animals. The common clinical manifestations were dyspnoea, nasal discharge, cough and fever The haematological studies of affected dogs showed no significant change in haemoglobin concentration, lymphocyte count and monocytes and significantly ($p < 0.05$) increase in total leucocyte, neutrophils and Eosinophils count of the blood. This study revealed that the highest prevalence was recorded in younger age group of dogs, female dogs, pugs more prone to effected and cold season is more favorable season for respiratory diseases in dogs. Haematology of respiratory diseases shows increased total leucocyte, neutrophils and Eosinophils count

Keywords

age;
sex;
breed and
season;
Hematology;
dogs;
respiratory
diseases.

Introduction

Dog is considered as faithful companion and its association with man is increasing day by day in urban and semi urban

areas. Respiratory diseases pose a major health problem in dogs and other pet animals worldwide (Devine, 2006; Ford,

1990; Haller and Guscelli, 1994; Knotek, *et al.*, 2001; McCandlish *et al.*, 1978). Medical suggestion is that pet animal can give instantaneous relief from blood pressure and other related diseased condition [9, 11]. Inflammation of the respiratory system can be due to infectious or noninfectious causes. Physical examination findings may include nasal discharge, cough, exercise intolerance, increased respiratory effort or overt respiratory distress, and systemic signs of illness such as lethargy, anorexia and fever (Cadore, J.L. 2011; Centil *et al.*, 2012; Clercx *et al.*, 2003; John *et al.*, 2000). Respiratory disease is a challenging condition to diagnose and can exhibit a wide range of clinical presentations (John *et al.*, 2000; Norris, *et al.*, 2001; Priestnall *et al.*, 2010). The present work deals with detailed investigation of the prevalence, clinical signs and haematological parameters of respiratory diseases in dogs.

Materials and Methods

The present investigation was carried out the clinical cases of dogs that were presented with the history of respiratory diseases at the University administered Veterinary Hospital, Bhoiguda, Secunderabad and Campus Veterinary Hospital, College of Veterinary Science, investigation. Blood samples from these 90 dogs were collected into sterile glass vials containing anticoagulant, Ethylene Diamino- Tetra Acetic acid disodium salt (Na₂EDTA) @ 1 mg/ml for complete blood picture. All the haematological estimations were carried out on the same day as described by Schalm *et al.*

Result and Discussion

A total of 26,642 dogs with the history of systemic diseases were presented to the

medical ward of University administered Veterinary Hospital, Bhoiguda, Secunderabad and Campus Veterinary Hospital, College of Veterinary Science, Rajendranagar, Hyderabad over a period of 26 months i.e., from October 2008 to November 2010. Of these 370 dogs were showing the signs of respiratory disease such as dyspnoea, cough, fever and nasal discharge etc.

In the present investigation the breed wise incidence of respiratory diseases in canines was studied (Table 1). The prevalence of respiratory diseases due to bacterial causes was found to be highest in Pug (20.74%) followed by Labrador Retriever (13.24%), Doberman Pinscher (11.08%), Dachshund (10.00%), Boxer (9.73%), Crossbreds (8.92%), German Shepherd (8.64%), Non-descript (6.76%), Golden Retriever (6.76%), Pomeranian (4.33%).

In the present study, the highest prevalence was recorded in dogs between 0 to 6 months of age (43.78 %) followed by 6 months to 4 year old dogs (30.54 %) and followed by above 4 years aged dogs (25.68 %) (Table 2).

In the present study, the sex wise prevalence of respiratory diseases, which revealed that majority of the cases were female dogs accounting for 52.7% followed by male dogs 47.3 % (Table 3).

In the present investigation prevalence of respiratory diseases were reported in cold season (July to February) 70.81% and only 108 (29.19%) were observed in hot season (April to June) (Table 4).

In the present study the common clinical manifestations are divided into 3 groups i.e. mild, moderate and severe (Table 5).

In mild case (group I) were having dyspnoea at inspiration in 10 (33.33 %), costal respiration in 28 (93.33 %), dry cough in 29 (96.67 %), Serous nasal discharge in 28 (93.33%), Unilateral nasal discharge in 25 (83.33%), Scanty nasal discharge in 23 (76.67%). Whereas, in case of moderate (group II) respiratory diseases clinical manifestations were dyspnoea at rest in 16 (53.33 %), dyspnoea at inspiration in 23 (76.67%), costal respiration in 25 (83.33%), abdominal respiration in 7 (23.33%), dry cough in 15 (50.00 %), moist cough in 15 (50.00 %), Serous nasal discharge in 2 (6.27 %), Mucous nasal discharge in 28 (93.33%), Unilateral nasal discharge in 16 (53.33 %), Bilateral nasal discharge in 14 (46.67%), Copious nasal discharge in 14 (46.67 %), Scanty nasal discharge in 16 (53.33 %). In case of severe (group III) respiratory diseases the common clinical manifestations were dyspnoea at rest in 26 (86.67 %), dyspnoea at inspiration in 8 (26.67%), dyspnoea at expiration in 22 (73.33 %), abdominal respiration in 30 (100%), dry cough in 4 (13.33 %), moist cough in 29 (96.67 %), Mucous nasal discharge in 7 (23.33%), Mucopurulent nasal discharge in 28(93.33 %), Bilateral nasal discharge in 29 (96.67 %), Copious nasal discharge in 27(90 %) (Table 5).

The mean lymphocytes and monocytes values of dogs of group I, II and III were reveals no significant difference when compared to normal dogs. Whereas, the neutrophils, eosinophils were significantly ($p>0.05$) increased in these group dogs when compared to normal dogs. The mean haemoglobin concentration in group I dogs were 12.08 ± 0.145 . The above mentioned value for group II dogs were 12.28 ± 0.102 . The corresponding value of above parameter in group III was 12.02 ± 0.149 .

The mean total leucocyte count in dogs belonging to groups I were 10.16 ± 0.165 ($\times 10^3 \mu\text{l}$). The fore mentioned parameter for group II dogs were 10.6 ± 0.194 . The corresponding value of above parameter in group III were 12.00 ± 0.158 ($\times 10^3 \mu\text{l}$). There was significant increase ($p>0.05$) in total leucocyte count of all groups of dogs when compared to normal ($7.20 \pm 0.042 \times 10^3 \mu\text{l}$).

The mean differential leucocyte count in group I dogs revealed 69.73 ± 0.290 per cent Neutrophils, 22.78 ± 0.098 per cent Lymphocytes. Eosinophils were 8.45 ± 0.178 per cent and Monocytes 2.77 ± 0.079 per cent. The findings of above mentioned parameter in group II dogs were 70.67 ± 0.468 per cent Neutrophils, 23.0 ± 0.155 per cent Lymphocytes, 8.61 ± 0.133 per cent Eosinophils and 3.23 ± 0.102 per cent Monocytes. In group III dogs Neutrophils were 74.93 ± 1.322 per cent, Lymphocytes were 23.16 ± 0.254 per cent, Eosinophils were 9.79 ± 0.132 per cent and Monocytes were 3.35 ± 0.100 per cent. Neutrophils were significantly ($p>0.05$) increased in dogs of group I, II and III. Eosinophils were significantly ($p>0.05$) increased in dogs of groups I, II and III when compared to normal dogs (Table 6).

In the present investigation the breed wise incidence of respiratory diseases in canines was found to be highest in Pug (20.74%) followed by Labrador Retriever (13.24%), Doberman Pinscher (11.08%), Dachshund (10.00%), Boxer (9.73%), Crossbreds (8.92%), German Shepherd (8.64%), Non-descript (6.76%), Golden Retriever (6.76%), Pomeranian (4.33%). Corcoran *et al.*, (1991) reported that similar prevalence of respiratory diseases in 14 dogs of different breeds. Hulas and Hulas (2009), Skae (1988), Ford (1990) ,

Radhakrishnan *et al.*, (2007) and Sehata *et al.*, (2010) and Tekdek and Ezeokoli (1982) were reported that there was no breed predilection among respiratory diseases of dogs and breed wise incidence of respiratory diseases in canines is a predisposing factor. The reason for higher incidence could be attributed to the relatively more sensitivity and large population of these breeds in and around twin cities.

In the present study, the highest prevalence was recorded in dogs between 0 to 6 months of age (43.78 %) followed by 6 months to 4 year old dogs (30.54 %) and followed by above 4 years aged dogs (25.68 %). The decreased incidence along with increased age as seen in the present study might be due to the increased resistance of the dogs along with advancement in age. The present findings are in accordance with the following authors. Botha *et al.*, (1979), Adamama-Moraitou (2012), Amrute (2009), Anusz (2005), Jameson *et al.* (1995) and Varshney *et al.*, (2009) reported that young dogs were more infected than adult dogs among respiratory diseases of dogs. Hulas and Hulas (2009) reported that respiratory diseases of dogs in young and adult dogs alike, no matter their breed or gender.

In the present study, the sex wise prevalence of respiratory diseases, which revealed that majority of the cases were female dogs accounting for 52.7% followed by male dogs 47.3 %. The higher incidence of bacterial respiratory diseases in female dogs might be due to low immunity and some hormonal imbalance at maturity than male dogs. These results corresponded with Botha *et*

al. (2006) reported that symptoms in the female were rapid, shallow respiration with bronchitis, rhinitis and moderate enteritis and in the male the only significant abnormality and explained the reasons as some hormonal imbalance at maturity in either sexes. Whereas Skae (1988) and Hulas and Hulas (2009) reported that; there was no sex predisposition among respiratory diseases in dogs.

In the present investigation prevalence of respiratory diseases were reported in cold season (July to February) 70.81% and only 108 (29.19%) were observed in hot season (April to June). The higher incidence of bacterial respiratory diseases during cold season as seen in present study might be due to the fact that the bacteria multiply rapidly when climatic temperature is low with relative high humidity. These findings are on the lines of Tekdek and Ezeokoli (1982) reported that during the respiratory disease outbreak which occurred between October and December 1980, 21 per cent of dogs compared with 0.2 per cent in preceding year. Skae (1988) was reported highest incidence of 20 clinical cases of chronic respiratory diseases in dogs seen between October 1985 and May 1986. Whereas Uzunova and Koleva (2005) and Sagarra (2008) reported that microclimate, humidity and extreme temperature plays important role in respiratory diseases of dogs. Hulas and Hulas (2009) reported the 'kennel cough' was a seasonal infectious, contagious disease.

In the present study the common clinical manifestations are divided into 3 groups i.e. mild, moderate and severe. In mild

Table.1 Breed – wise Prevalence of Respiratory Diseases in dogs (N=370)

Sl. No	Breed of the Dog	No. of dogs	Percentage
1.	Pug	76	20.54
2.	Labrador Retriever	49	13.24
3.	Doberman Pincher	41	11.08
4.	Dachshund	37	10
5.	Boxer	36	9.73
6.	Cross breed	33	8.92
7.	German Shepherd	32	8.64
8.	Non-descript	25	6.76
9.	Golden Retriever	25	6.76
10.	Pomeranian	16	4.33
Total		370	100

Table.2 Age – wise Prevalence of Respiratory Diseases in dogs (N=370)

S.No	Age group	No. of dogs	Percent
1	0 – 6 months	162	43.78
2	6 months – 4 years	113	30.54
3	> 4 years	95	25.68
Total		370	100

Table.3 Sex – wise Prevalence of Respiratory Diseases in dogs (N=370)

S.No	Sex	No. of dogs	Percent
1	Male	175	47.30
2	Female	195	52.70
Total		370	100

Table.4 Season– wise Prevalence of Respiratory Diseases in dogs (N=370)

S.No	Season	No. of dogs	Percent
1.	Cold Season (July to February)	262	70.81
2.	Hot Season (April to June)	108	29.19
Total		370	100

Table.5 Clinical signs observed in Respiratory Diseases of dogs

S.No.	Parameter		Mild (n=30)		Moderate(n=30)		Severe(n=30)	
			No. of Animals	Percent (%)	No. of Animals	Percent (%)	No. of Animals	Percent (%)
1	Dyspnoea	At rest	0	0	16	53.33	26	86.67
		At inspiration	10	33.33	23	76.67	8	26.67
		At expiration	0	0	0	0	22	73.33
2	Respiration type	Costal	28	93.33	25	83.33	0	0
		Abdominal	0	0	7	23.33	30	100
3	Cough	Dry	29	96.67	15	50	4	13.33
		Moist	0	0	15	50	29	96.67
4	Nasal discharge	Serous	28	93.33	2	6.67	0	0
		Mucous	0	0	28	93.33	7	23.33
		Mucopurulent	0	0	0	0	28	93.33
		Unilateral	25	83.33	16	53.33	0	0
		Bilateral	0	0	14	46.67	29	96.67
		Copious	0	0	14	46.67	27	90
		Scanty	23	76.67	16	53.33	0	0

Table.6 Mean Hematological findings observed in Respiratory Diseases of dogs

S.No	Parameter	Group – I	Group – II	Group – III	Normal Values [#]	
1	Hb (g %)	12.23±0.150	12.32±0.096	12.21±0.119	13±0.28	
2	TLC (× 10 ³ /µl)	11.31±0.160	11.11±0.229	12.25±0.169	7.5±0.62	
3	DLC (%)	Neutrophils (%)	69.6±0.245	70.66±0.407	72.27±0.892	64±0.23
		Lymphocytes (%)	23.13±0.140**	22.66±0.447*	22.99±0.294*	23±0.25
		Eosinophils (%)	7.86±0.079	8.51±0.100	10.11±0.149	2.7±0.79
		Monocytes (%)	2.61±0.033	3.14±0.105*	3.17±0.110	2.6±0.15

[#] Values given by Benjamin, (2007)

* Significant at 5 percent (P < 0.05) level

** Significant at 1 percent (P < 0.01) level

case (group I) were having dyspnoea at inspiration in 10 (33.33 %), costal respiration in 28 (93.33 %), dry cough in 29 (96.67 %), Serous nasal discharge in 28 (93.33%), Unilateral nasal discharge in 25 (83.33%), Scanty nasal discharge in 23 (76.67%). Whereas, in case of moderate (group II) respiratory diseases clinical manifestations were dyspnoea at rest in 16 (53.33 %), dyspnoea at inspiration in 23 (76.67%), costal respiration in 25 (83.33%), abdominal respiration in 7 (23.33%), dry cough in 15 (50.00 %), moist cough in 15 (50.00 %), Serous nasal discharge in 2 (6.27 %), Mucous nasal discharge in 28 (93.33%), Unilateral nasal discharge in 16 (53.33 %), Bilateral nasal discharge in 14 (46.67%), Copious nasal discharge in 14 (46.67 %), Scanty nasal discharge in 16 (53.33 %). In case of severe (group III) respiratory diseases the common clinical manifestations were dyspnoea at rest in 26 (86.67 %), dyspnoea at inspiration in 8 (26.67%), dyspnoea at expiration in 22 (73.33 %), abdominal respiration in 30 (100%), dry cough in 4 (13.33 %), moist cough in 29 (96.67 %), Mucous nasal discharge in 7 (23.33%), Mucopurulent nasal discharge in 28 (93.33 %), Bilateral nasal discharge in 29 (96.67 %), Copious nasal discharge in 27(90 %). Clercx *et al* (2003) reported that respiratory disease dogs shows clinical signs like transient to persistent mucoid or mucopurulent rhinorrhea, cough, and respiratory dyspnoea. Respiratory tract diseases include nasal discharge, sneezing, coughing, epistaxis were common clinical signs, Windsor and Johnson (2006). Vollmar (2009) and Sikorska-Kopylowicz and Nicpon (2009) reported that coughing was a symptom of upper and lower respiratory infections dogs and stated that cough was one of the first signs of most respiratory system diseases. It facilitates the physical excretion of desquamated

parts of epitheliums, discharges and injurious microbial. These findings are in agreement with observation made by the above authors.

The mean haemoglobin concentration in group I dogs were 12.08 ± 0.145 g%. The above mentioned value for group II dogs were 12.28 ± 0.102 g%. The corresponding value of above parameter in group III was 12.02 ± 0.149 g%. There was a no significance difference in haemoglobin concentration of respiratory disease in dogs when compared to normal values. Piva *et al* (2010) reported that haematology in dogs infected with respiratory diseases reveals no change in haemoglobin concentration.

In the present investigation, the mean TLC was significantly ($P < 0.05$) increased in I, II, III groups when compared to normal dogs. Maden *et al* (2000) observed that leukocyte counts were significantly increased while macrophage and lymphocyte counts were decreased. Billen *et al* (2006), Bolln *et al* (2003) and Brendan *et al* (2006) stated that number of inflammatory cells encountered in healthy dogs was less than those in sick dogs. The increase in leucocytes might be due to bacterial infection which usually accompanies the respiratory tract diseases.

The mean lymphocytes and monocytes values of dogs of group I, II and III were reveals no significant difference when compared to normal dogs. Whereas, the neutrophils, eosinophils were significantly ($p > 0.05$) increased in these group dogs when compared to normal dogs. The mean total leucocyte count in dogs belonging to group I were 10.16 ± 0.165 ($\times 10^3 \mu\text{l}$). The fore mentioned parameter for group II dogs were 10.6 ± 0.194 ($\times 10^3 \mu\text{l}$). The corresponding value of above parameter in

group III were 12.00 ± 0.158 ($\times 10^3 \mu\text{l}$). There was significant increase ($p > 0.05$) in total leucocyte count of all groups of dogs when compared to normal ($7.20 \pm 0.042 \times 10^3 \mu\text{l}$). Piva *et al* (2010) and Anusz (2005) earlier reported eosinophilia and leucocytosis was main haematological finding in respiratory diseases. Amrute *et al* (2009) observed that neutrophilia in haematological finding of dogs infected with respiratory diseases at Bombay veterinary college, Mumbai. Similarly Billen *et al* (2006) observed that number of inflammatory cells encountered in healthy dogs was less than those in sick dogs. Leukocyte counts were significantly increased while macrophage and lymphocyte counts were decrease, Maden *et al* (2000). Corcoran *et al* (1991), Brownlie (1990), Charkrabartha (2006), Creighton *et al* (1974), Ivana (2006), Ji SeoYeoun (1995), John *et al* (2012), Spuzak (2006) and Wray (2006) observed absolute circulating eosinophilia was seen in dogs of respiratory tract diseases. The eosinophilia might be due to raised plasma histamine concentration that resulted in release of eosinophils in circulation.

Respiratory diseases are more common in dogs with various kinds of epidemiological, physical, clinical and haematological Changes. The highest prevalence of respiratory diseases was recorded in younger age group of animals. The highest prevalence of respiratory diseases was recorded in Pug followed by other dogs. Sex did not influence the incidence of respiratory diseases. The highest prevalence of respiratory diseases was recorded in female group of animals. The common clinical manifestations were dyspnoea, nasal discharge, cough and fever. The haematological studies of affected dogs showed no significant change in haemoglobin concentration,

lymphocyte count and monocytes and significantly ($p < 0.05$) increase in total leucocyte, neutrophils and Eosinophils count of the blood.

Authors' contribution

SA carried out the case study and sample analysis. DST participated in scientific discussion, wise counsel and *concrete* suggestions. YN participated in scientific discussion, coordination, sample collection and analysis. NS participated in scientific discussion, drafted and revised the manuscript. VG participated in scientific discussion, drafted and revised manuscript. All authors read and approved the final manuscript.

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