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Retrospective study of diseases and associated pneumonia type diagnosed in dogs at post-mortem at Veterinary Teaching Hospital, Ibadan, Nigeria

PO Okusanya, AJJ Jagun*, GA Adeniran, BO Emikpe & T Jarikre

Faculty of Veterinary Medicine, University of Ibadan Oyo State- Nigeria

*Correspondence: Tel.: +2348034701005, E-mail: afusatjagun@yahoo.com

Abstract

The causes and types of pneumonia in dogs have not been accorded due attention in Nigeria. It is imperative to investigate the incidence and type of pneumonia commonly observed during post-mortem at the Department of Veterinary Pathology arm of the Veterinary Teaching Hospital, Ibadan, Nigeria. This investigation was carried out on 397 archival canine samples for dogs presented for necropsy at the Department of Veterinary Pathology, University of Ibadan, during the periods of 2000 - 2012. The gross diagnosis was obtained from the postmortem records while the specific type of pneumonia was by histopathology of selected lungs tissues, using standard techniques. Descriptive statistics was employed to evaluate the effect of age, sex, breed and the type of pneumonia. Alsatian(29%) and Rottweiler(14.4%) breeds of dogs were the common breeds of dogs encountered at post-mortem, and the dogs above 3 year old (51.9%) were the most affected, with leptospirosis (38.5%) being the most prevalent disease diagnosed, followed by neoplasia (13.49%) while infectious canine hepatitis was the least prevalent (0.5%). The histopathological diagnosis revealed that the pneumonic patterns were that of suppurative bronchopneumonia (75%), fibrinous bronchopneumonia (10%) and interstitial pneumonia, (15%). The diseases associated with the different pneumonia seen during the histopathological examination were leptospirosis, canine distemper, and left sided heart failure. Findings has shown that pneumonia in dogs were commonly associated with leptospirosis. In the course of this study, the histopathological lesions and changes associated with the pneumonia seen in the leptospirosis cases include alveolar haemorrhages, edema, neutrophils and macrophages in the alveolar spaces and neutrophils in small pulmonary vessels. In lieu of this, pneumonia could be a major contributory factor to death associated with leptospirosis in the cases reviewed.

Keywords: Archival necropcy samples, Dogs, Incidence, Leptospirosis, Pneumonia

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Introduction

Dogs (*Canis lupus familiaris* L) are often kept for varying purposes (Dewey & Bhagat, 2002) such as pets, guard animals and for other purposes. The increased awareness of dog's usefulness has lead to dog breeding becoming a highly lucrative business however, it is faced with the issue of health and disease management. Of the many diseases miliatating against the growth of dog breeding and keeping, rabies, helminthosis, babesiosis, leptospirosis, parvoviral infection and canine distemper are a few of the disease often encountered (Dhein, 1988; Ford, 2009). Respiratory symptoms are prominent manifestations of some of the diseases of dog as such an emphasis on respiratory conditions which happened to be a major cause of mortality and morbidity of dogs worldwide is of paramount importance (Kohn, 2010).

Despite the worrisome problem of canine pneumonia due to the ease of transmission through the air or by direct contact, especially in kennels or among dogs living together (Sykes, 2009), in most

developing countries including Nigeria, canine pneumonia has not been accorded due attention.

Upper respiratory diseases have been reported to often lead to extreme breathing difficulties (Angus, 1997; Byun, 2009) which limits dog's activity and often progresses to pneumonia, which could be life-threatening (Lopez, 2004). The causes of canine pneumonia has been reported to be infectious which includes viruses (including *parainfluenza*) and bacteria (including *Bordetella*) which often is a mild infection, but may progress to severe pneumonia in young pups or old dogs (Dhein, 1988; Erles, 2004). Since the burden of infectious and non-infectious respiratory disease appears to be on the increase (Angela, 2012), the focus of this study is to investigate retrospectively diseases and type of canine Pneumonia diagnosed at Post-mortem at Veterinary Teaching Hospital, Ibadan, Nigeria.

Materials and methods

Study area and selection criteria

A retrospective survey for canine disease and type of pneumonia was carried out on necropsy records of dogs from 2000 to 2010. This was done using archived canine necropsy samples of dogs presented for post-mortem in the Diagnostic unit of the Veterinary teaching hospital, University of Ibadan. The Department of Veterinary Pathology Diagnostic Laboratory is an integral part of the Veterinary Teaching Hospital which receives cases from its environs and referrals from veterinarians all over Nigeria especially from the south-western part (Eyarefe & Amid, 2010). The animals used for the study were from both sexes with ages varying from six months to five year-old. The different breeds of dogs in the study were kept in homes, and they were often provided formulated dog feeds with adequate supplementation and household/kitchen leftovers. The dog breeds used for the study in order of prevalence were mongrels, Alsatians and Doberman. The breed, sex, identification of animals and gross pathological diagnosis of the cases were obtained from the post-mortem records. The gross diagnosis as recorded was based on the history and clinical signs presented prior to death and post-mortem examination of the carcass revealing macroscopic lesions. Confirmation of the diagnosis of some of the samples was based on histopathology while some were done with the use of special staining technique.

Assessment and histopathological classification of the pneumonic cases encountered

Histopathological diagnosis of the ramdomlyselected archival lungs block samples from carcasses of dogs submitted for post-mortem was carried out. The lung blocks were cut into 4 - 5µm thin sections and stained with haematoxylin and eosin before viewing it under the light microscope. The classification of the pneumonia from the histopathology was based on the exudates and the section of the lungs affected as described by Robinson and Huxtable, (2003) and Lopez (2004).

Results

The result (table 1) shows that 28.96% of the species necropsied were Alsatian, 14.35% were Rottweiler, 8.56% were Mongrels, 1.76% were Boerboel while 39.79% were classed as unspecified based on the post-mortem records. In terms of the age, 27.95% of the dogs were below the age of 1 (<1 years), 11.33% were between 1 to 2 years (1 – 2 years) of age, 8.81% were between 2 to 3 years (2 – 3 years) and 51.88% were above 3 years (>3years) (table 2). Based on this, the mortality was highest among the dogs above 3 years of age. The gross pathology diagnosis based on the necropsy record shows that 38.5% of the dogs died of Leptospirosis, Canine distemper 5.5%, Babesiosis 4.5%, Helminthoisis 2.77%, Parvovirus enteritis 3.2%, Rabies 5%, Poisoning 2.5%, Pulmonary edema 1.5%, Pneumonia 1.25%, Erhlichiosis 0.70%, others 13.09% while 0.5% died of infectious canine hepatitis (table 3).

Of the 397 canine cases diagnosed at post-mortem, leptospirosis was the most prevalent disease (38.5%) based on gross pathology examination followed by neoplasia (13.49%) while the least was infectious canine hepatitis (0.5%).

The histopathology of the selected pneumonia cases revealed haemorrhages and marked edema. The prevalent type of pneumonia was that of bronchointerstitial pneumonia with inflammatory changes marked with the presence of neutrophils, macrophages and lymphocytes around the terminal bronchioles and the alveoli wall.

Other common type of pneumonia observed was the fibrinous or suppurative pneumonia as in Table 3. The fibrinous bronchopneumonia was observed more in the adult dogs of Alsatian and the Rottweiler breeds which were diagnosed grossly of leptospirosis. Suppurative bronchopneumonia was observed more in the adult dogs (71%) than in those less than 1 year of age (Table 4).

Table 1: Breeds of dogs examined at post-mortem in the Veterinary Teaching Hospital, University of Ibadan from 2000-2012

Breed	Numbers	Percentage (%)
Alsatian	115	28.97
Rottweiler	57	14.36
Mongrel	34	8.56
Boerboel	7	1.76
Doberman	5	1.26
Pit Bull	1	0.25
Terrier	2	0.50
Poodle	1	0.25
Boxer	3	0.76
Labrador	1	0.25
Dalmatian	1	0.25
Bull mastiff	3	0.76
Great Dane	1	0.25
Cross	8	2.02
Unspecified	158	39.80

Table 2: Age distribution of dogs examined for post-mortem in the Veterinary Teaching Hospital, University of Ibadan from 2000-2012

Age	Total	Percentage %
<1 years	111	27.96
1-2 years	45	11.34
2-3 Years	35	8.82
>3 years	206	51.89

Table 3: Distribution and percentage of disease conditions diagnosed in dogs at post-mortem in the Veterinary Teaching Hospital, University of Ibadan from 2000-2012

Diseases	Number of occurrence	Percentage of occurrence (%)
Leptospirosis	153	38.54
Canine distemper	22	5.54
Babesiosis	18	4.53
Helminthosis	11	2.77
Parvo Viral Enteritis	13	3.27
Poisoning	10	2.51
TVT	9	2.27
Neoplasia	52	13.09
Liver hepatopathy	21	5.28
Pulmonary oedema	6	1.51
Pneumonia	5	1.26
Erhlichiosis	3	0.76
Rabies	20	5.03
Infectious hepatitis	2	0.50
Others	52	13.10

Table 4: Comparison of gross and histopathological diagnosis of selected cases with pneumonia in dogs examined at post-mortem in the Veterinary Teaching Hospital, University of Ibadan from 2000-2012

Disease	Age range	Breed	n (%)	Type of Pneumonia	Severity
Leptospirosis	8 mo- 3 years	Alsy	3 (16.7)	Fibrinous broncho pneumonia	++
Leptospirosis	12 wks – 3 years	Alsy & Rot	7 (38.9)	Suppurative broncho pneumonia	+++
Leptospirosis	2 – 14 mo	Alsy	3 (16.7)	Interstial pneumonia	+
Canine distemper	>3 years	Alsy	1 (5.6)	Suppurative bronchopneumonia	+++
Left sided heart failure	>3 years	-	2 (11.1)	Suppurative bronchopneumonia	+
ParvoViral Enteritis	3 – 11 mo	Rot	2 (11.1)	pneumonia	++
Total			18 (100)		

n-Number of dogs

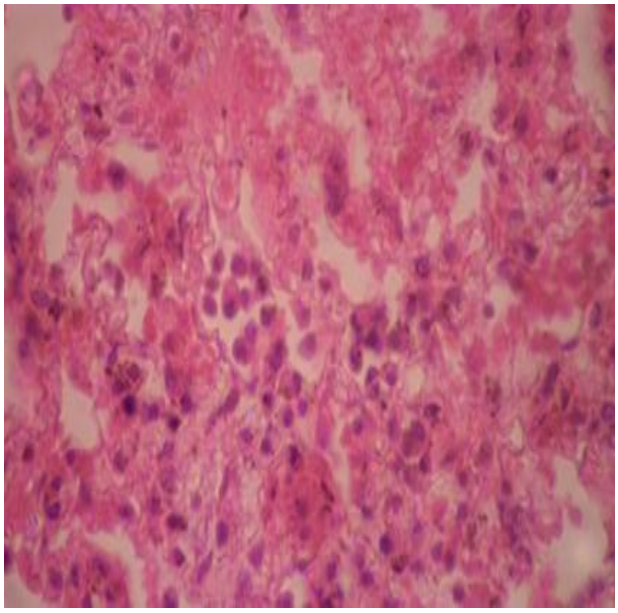

Plate 1: Photomicrograph of the lung showing an exudative pneumonia with mixed inflammatory cells in the alveolar spaces marked with asterisk (H&E X 400)

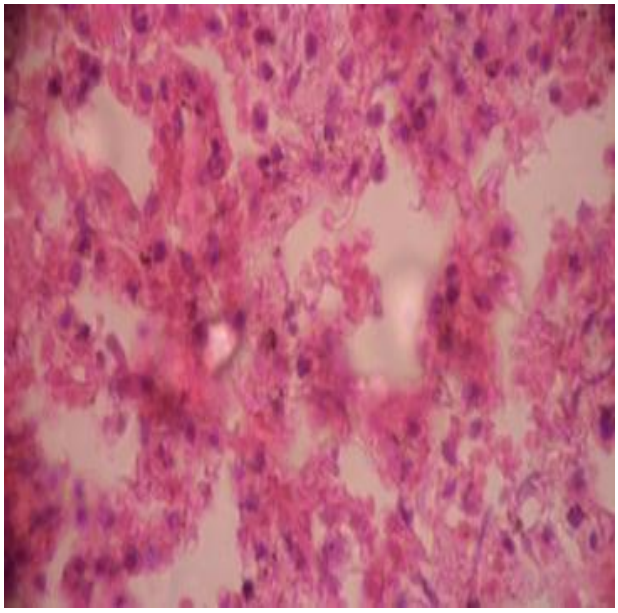

Plate 2: Photomicrograph of the lung showing an interstial pneumonia with mixed inflammatory cells in the alveolar spaces marked with asterisk (H&E X 400)

Discussion

The information on the pattern of canine diseases and that of canine pneumonia in Nigeria is scanty in literature. The study showed that Alsatian (28.96%) and Rottweiler (14.35%) breed of dogs are commonest breeds necropsied at the Veterinary teaching hospital, University of Ibadan and this could be as a result of the fact that these are the commonest exotic breeds of dogs in the Ibadan environ (Ohore, *et al* 2007). This investigation showed that most dogs necropsied were old (> 3 years old) and young dogs (<1 year old), which further showed that animals in this group could have compromised immunity or those associated with stress due to early weaning or absence of maternal immunity (Emikpe *et al*., 2013).

This study also confirmed that leptospirosis remain the most prevalent canine disease (38.50%) diagnosed grossly and histopathologically in dogs in Ibadan. This finding is in agreement with the report of Medeiros (2010) that canine leptospirosis is a widespread disease that is prevalent in tropical regions due to the favorable environmental conditions for the survival of its etiologic agent. The type of pneumonia observed shows that bacterial pneumonia or bacterial complicated viral pneumonia is the most common type of pneumonia of dogs in this environment. This could be associated with

some common diseases of dogs in this environment which include leptospirosis and canine distemper as observed in this study. This is in accordance with most reports on canine infectious respiratory disease and kennel cough which is often complicated viral pneumonia (Chalker *et al.,* 2004; Bhardwaj *et al.,* 2013) however the viral and bacterial entities involved in kennel cough in Nigeria needs further elucidation. The fact that pneumonia observed had higher occurrence in older dogs and most were associated with canine leptospirosis further reflect the fact that this group is often susceptible possibly due to age related decline in immune function broadly defined as immune senescene due to changes in the adaptive immune system and the innate immune system (Asquith *et al.,* 2012) while those observed in the young could be associated with stress due to early weaning or absence of maternal immunity (Miller, 1991). Brown (1996) reported the prevalence of leptospirosis in aged and very young dogs and in breed of dogs available in the region investigated where pulmonary involvement varied from 20% to 70%. This observation was further corroborated by reports of Nicodemo *et al.* (1997) and Greenlee *et al.* (2005) who reported severe pneumopathy in dogs suffering from leptospirosis.

In conclusion, this study revealed that leptospirosis is the most common disease of dogs in Ibadan and that bacterial complicated canine pneumonia are the common type of pneumonia. Hence further study should be carried out to evaluate the efficacy of leptospiral vaccine commonly used in dogs, the schedule of the leptospirosis used and to also confirm the aetiological agent or agents involve in canine pneumonia complex in Nigeria

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