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Age, breed and sex prevalence of epilepsy in dogs: A study in 148 dogs

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Abstract

Seizure is the most common neurological presentation in dogs. Epilepsy is defined as a disease of the brain characterised by enduring predisposition to generate epileptic seizures. The dogs less than 6 months and more than 6 years are diagnosed with structural epilepsy and between 6 months and 6 years are diagnosed with idiopathic epilepsy commonly with certain exceptions in co – morbid conditions. So, the prevalence of epilepsy in relation to age, breed and sex was carried out. Among the breeds the pure breeds were grouped together which was higher in percentage and compared with non – descript native breeds and in each breed and age group males dominated females and number of dogs in age group of 6 months to 6 years was higher. Chi – square analysis was done to find out significant association between Age and breed, breed and sex, age and sex. There was significant association between breed and sex which needs further detailed analysis. This may be of interest in future epilepsy research in dogs.

Keywords: Epilepsy, seizures, idiopathic epilepsy, structural epilepsy

Introduction

Seizures are the most common neurological presentation in dogs with prevalence of 0.5 to 5%^[1]. A seizure is defined as: “Any sudden, short lasting and transient event and does not imply that the event is epilepsy”^[2]. Epilepsy is defined as: “a disease of the brain characterised by an enduring predisposition to generate epileptic seizures. This definition is usually practically applied as having at least two unprovoked epileptic seizures more than 24 hours apart”^[3].

Epileptic seizures are a common cause for veterinary medical consultation. In human medicine, an epileptic seizure has been defined as a transient occurrence of signs, symptoms, or both due to abnormal excessive or synchronous neuronal activity in the brain. To fulfil the criteria for the diagnosis of epilepsy, an individual must have had at least one epileptic seizure, provoked or unprovoked, and the seizure has to be associated with an enduring alteration of the brain that increased likelihood for future seizures^[3]. Epileptic seizures were classified as primary, generalized, focal or focal seizure evolving to become generalised.

Idiopathic epilepsy is diagnosed if number of underlying cause other than a possible hereditary predisposition can be identified. Symptomatic epilepsy is the consequence of an identifiable disorder in the central nervous system (CNS). In cryptogenic epilepsy, a hereditary cause is unlikely and an underlying pathological change in the CNS is suspected but cannot be identified^[4].

Limited data concerning age, breed and sex specific prevalence of epilepsy is available in dogs. Male dogs dominated in hospital population; hence they reflect general sex distribution in the hospital population.

The purpose of this study is to determine prevalence of epilepsy in dogs in relation to factors age, breed and sex at the first onset of seizures individually and to find if there is an association between age and breed, breed and sex, sex and age. This will lead to further evaluation of outcome of the disease.

Materials and Methods

Analyses of the influence of age, breed and sex of epileptic dogs presented to the hospital during the study period of 18 months was carried out. The recruitment period lasted for 18 months from March 2018 to August 2019 and followed for a period of 6 months thereafter.

The study population consisted of client owned dogs with history of seizures. The dogs presented for the first time with history of seizures was excluded but with the instruction to the owners to report in case of recurrence with video evidence at the time of subsequent seizures. The same dogs when they had recurrence without treatment were included in the study. The cases were first identified based on history at the time of first presentation for the condition of seizures. This was confirmed by the video recording presented by the owner at subsequent visits to the hospital for the same condition. The detailed history of epileptic dogs included age, sex, breed, type of seizure, symmetry, seizure severity, interictal neurological deficits, length of seizure, time of seizure, inciting factors if any, precluding efforts by the owner or the dog, were collected with a framed choosing type questionnaire and the data was tabulated for further analysis. Informed consent was obtained from the owners. Dogs fulfilling the above criteria were chosen for the study. The total numbers of dogs that fulfilled the above criteria during the study period was 148. These dogs have been considered for this study. When evaluating epilepsy in dogs the information on age, breed and sex kept varying. The objective of this study is to evaluate the prevalence of epilepsy in dogs based on age, sex and breed and to find if there is any association between age and breed, breed and sex, age and sex which will favour conclusive diagnosis based on aetiology of epilepsy and hence tentative treatment strategy for epilepsy is initiated at the initial stages that is, even before the results of diagnostics are reviewed.

History, signalment and neurologic examination findings allow a standardised diagnostic approach based on the clinical picture to help determine the underlying cause of seizures. So, the general inclusion criteria was concerned to sex, breed and age at seizure onset, seizure type and seizure history. Only dogs with sufficient and well – documented diagnostic workup that led to the diagnosis according to defined criteria were eligible and included for this study.

The population was characterised with respect to signalment, history and diagnostic findings. The following informations were collected: Age, breed, sex, age of first onset of seizures, seizure type (Focal / generalised) with thorough neurological examination. Findings on general physical examination, neurologic examination, abnormalities prior to or after seizures, Complete blood count, and Serum biochemical analysis were considered to diagnose epileptic dogs. If diagnosis other than epilepsy was suspected relevant diagnostic tests such as Echocardiography, Ultrasonography, radiographs or additional special blood tests were performed. Specialised neurodiagnostic tests such as Computed tomography (CT) and CSF analyses were performed if warranted.

An event was classified as seizure if following all or any of the characteristics were mentioned by the owner in connection with the seizure episode:

- Salivation, urination or defecation
- Tonic or tonic – clonic posture or movements or rhythmic contractions of facial or appendicular muscles
- Decreased response intraictally
- Abnormal mentation during post ictal period

A Chi – Square (χ^2) analysis was used to evaluate association between age, breed and sex of epileptic dogs. Total numbers of dogs with epilepsy were 148, with 90 dogs constituting male and 58 constituting female. All dogs were grouped

according to the age at the time of the first observed epileptic seizure as 0 – 6 months, 6 months to 6 years and more than 6 years. The percentage was determined separately for each group. Results were presented as Chi – square test (χ^2).

Results and Discussion

The breedwise distribution of epilepsy was 149 dogs (Table 1). Non – descript native breed dogs constituted 46. Among pure breeds Labradors were 35 (23.6%) constituting the highest and Bull dog and Great Dane were 1 (0.7%) each constituting the least number of breeds presented with epilepsy. This may be coincidental; alternatively it may reflect predisposition for dogs of this breed to develop epilepsy. The breeds comprised, reflected the popularity of the breed among the clients and predisposition. Multiple studies have provided ample evidence for the existence of hereditary idiopathic epilepsy in various breeds of dogs, including German Shepherds [5], Labrador Retrievers [6], Border Collies [7], etc. They have further recorded Golden Retrievers and Beagles with significantly higher risk of developing epileptic seizures among the hospital population [8]. German Shepherds show a high disposition for a multitude of diseases other than Epileptic seizures, it may be difficult to distinguish between an actual increased risk caused by a lower threshold for seizures in German Shepherds and higher risk that is provoked by predispositions of this breed for disorders that cause more severe seizures [8].

Table 1: Frequency distribution of epileptic dogs

Particulars	Number of dogs	Percentage
Age group wise distribution of epileptic dogs		
Upto 6 months	15	10.1
6months to 6 years	93	62.8
above 6 yrs	40	27.0
Total	148	100
Breed wise distribution of epileptic dogs		
Bull Dog	1	0.7
Chow Chow	1	0.7
CS	1	0.7
Dachshund	3	2.0
Dalmatian	2	1.4
Dob	3	2.0
GD	1	0.7
GR	6	4.1
GSD	4	2.7
Husky	2	1.4
Lab	35	23.6
ND	46	31.1
Pitbull	2	1.4
Pug	13	8.8
Spitz	23	15.5
Terrier	3	2.0
Total	148	100.0
Sex wise distribution of epileptic dogs		
Male	58	39.2
Female	90	60.8
Total	148	39.2

Age wise grouping was done based on classification suggested by Sean Sanders 2015 [9] with modifying adults up to 6 years of age and geriatric patients from above 6 years. The epileptic dogs were grouped as, neonates and juveniles 0 – 6 months, Adults 6 months to 6 years and geriatric dogs 6 years and above. The number of epileptic dogs in these categories was 15 (10.1%), 93 (62.8%) and 40 (27%)

respectively (Table 1). In a study of non referral canine population structural epilepsy was statistically more probable in dogs < 1 year or > 7 years of age at seizure onset, whereas Idiopathic epilepsy as statistically more probable in dogs aged 1 – 5 years at first seizure and when the inter ictal period was longer than 4 weeks [10]. Most dogs with hereditary epilepsy have their first epileptic seizure as young adults, with individual animals infrequently having an onset of seizures at ≥ 7 years of age [11].

Sex wise details are the female dogs reported with epilepsy was 58(39.2%) and male dogs were 90 (60.8%) in numbers. It includes both neutered and intact male and female dogs. Breed related studies have shown a male sex predisposition in Australian Shepherds with idiopathic epilepsy [12]. Sofe *et al.* [13] reported 62% of male dogs with idiopathic epilepsy an over – representation among male population. They could not establish significant differences concerning the risk of developing epileptic seizures or status epilepticus between male and female dogs. For spayed females, the risk of developing epileptic seizures was significantly higher compared to sexually intact females [8].

The present study is in line with previous published reports. The higher incidence of epilepsy in the current study also ranges between 6 months and 6 years. The Males dominated. Though the male population was higher in general hospital cases a decisive conclusion could be arrived only after detailed centralised complete data compilation. Data of all the epileptic dogs reported in various hospitals should be compiled and analysed.

Age and breed

Table 2: Age group and breed wise distribution of epileptic dogs

Age group	Breed		Total
	Exotic	ND	
upto 6 months	10 (66.70)	5 (33.30)	15 (100)
6months to 6 year	66 (71.00)	27 (29.00)	93 (100)
above 6 years	26 (68.90)	14 (31.10)	40 (100)
Chi-square value =0.51 ^{NS} , ^{NS} -Non Significant (P>0.05) Figures in parentheses indicate percentage to the row total			

The relation between age and breed was analysed by grouping all the pure breeds together and the native non – descript to

Table 4: Age and sex wise distribution of epileptic dogs

Age group	Sex		Total
	Male	Female	
Upto 6 months	6 (40.00)	9 (60.00)	15 (100)
6 Months to 6 year	39 (41.90)	54 (58.10)	93 (100)
Above 6 years	13 (32.50)	27 (67.50)	40 (100)
Chi-square value =1.04 ^{NS} , ^{NS} -Non Significant (P>0.05) Figures in parentheses indicate percentage to the row total			

Frequency distribution of epileptic dogs revealed 6 females (40%) and 9 male (60%) in juvenile category. Adults in the age group of 6 months to 6 years was presented by 39 females (41.9%) and 54 male (58.1%) dogs. Geriatric dogs above 6 years had 13 female (32.5%) and 27 male (67.5%). Individually each category had more number of male dogs reporting with epilepsy and hence they were high in all the 3 categories. χ^2 value is 1.049. There was no significant

one group. Out of 15 dogs under 6 months of age 10 (66.6%) was pure breed and 5 (33.3%) was native non – descript dogs (Table 2). Among the 93 dogs in 6 months and 6 years of age group 66 (71%) was pure breed and 27 (29%) were native Non – descript dogs. A total of 40 dogs reported above 6 years of age out of which 26 (65%) were pure breed dogs and 14 (35%) were native non – descript dogs. χ^2 values are 0.505. There is no significant association (p > 0.05) between various age group and breed. The epileptic dogs are of various breeds irrespective of age group. Over presentation of native non – descript breed compared to various individual pure breeds might be because of increased number in population or they are genetically prone for it. The genetic studies regarding epilepsy of all the purebreds and native non – descript dogs only can help in diagnosing breed prone prevalence of epilepsy in dogs. For simplification pure breeds were considered as one category and compared with non – descript dogs. To establish that certain breeds are more prone for epilepsy the documentation of every related detail should be done.

Breed and sex

Table 3: Breed and sex wise distribution of epileptic dogs

Breed	Sex		Total
	Male	Female	
Exotic	56 (54.90)	46 (45.10)	102 (100)
ND	34 (73.90)	12 (26.10)	46 (100)
Chi-square value =4.80*, * -Significant at 5% level of significance (P<0.05) Figures in parentheses indicate percentage to the row total			

Among 102 pure breed dogs reported with epilepsy 46 (45.1%) were females and 56 (54.9%) were males (Table 3). Out of 46 native non – descript native dogs 12 (26.1%) were females and 34 (73.9%) were males. χ^2 analysis reveals significant association (p<0.05) between breed and sex. The individual breed studies in epileptic dogs which has been reported earlier should be carried out on native non – descript dogs. The study should be conducted in reference to sex, to find any association between the breed and sex of the particular breed.

Age and sex

association (p>0.05) between age and sex. With limited data it will be inconclusive to finalise that age and sex independent to each other. Further large scale data should be analysed for the same.

As per this study in 148 epileptic dogs the incidence is higher among adult group of dogs with male being higher. The age – breed and age – sex is independent to each other while breed – sex are dependent. Further studies in huge population will

add to the utility of ever advancing field of epilepsy in human and dogs.

Conclusion

Epidemiological studies of epileptic dogs should be conducted which is needed to confirm a higher prevalence of epilepsy in male dogs. Estimation of serum sex hormone at the age and time of first onset of seizures with detailed inheritance studies in breeds reported with epilepsy will give us a conclusive idea on influence of sex and breed on epilepsy. Age of onset of seizures provides a vital clue in diagnosing and treating the specific cause of the underlying aetiology. The owners' perception of epilepsy in their dogs dictates how aggressively the treatment should be initiated and how the affected dogs should be managed. The limitation of the current study is that all hospital animals were not screened. Systemic compilation and prior health problems will guide in deciding the management and treatment protocol. Our results might be of interest for future epilepsy analysis in dogs and human as dogs are epileptic research models for human epilepsy studies.

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References

- Podell M, Fenner WR, Powers JD. Seizure classification in dogs from a non referral – based population. *Journal of American Veterinary Medical Association*. 1995; 206:1721-1728.
- Berendt M, Gredal H, Ersboll AK. Premature death, risk factors, and life patterns in dogs with epilepsy. *J Vet Intern Med*. 2007; 21:754-759.
- Fisher RS, Emde BW, Blume W, Genton P, Lee P. Epileptic seizures and epilepsy definitions proposed by the International League Against Epilepsy (ILAE) and the International Bureau for Epilepsy (IBE), *Epilepsia*. 2005; 46:470-472.
- Engel J. A proposed diagnostic scheme for people with epileptic seizures and the epilepsy: Report of the ILAE task force on classification and terminology. *Epilepsia*. 2001; 42:796-803.
- Monteiro R, Adams V, Keys D. Canine idiopathic epilepsy: prevalence, risk factors and outcome associated with cluster seizures and status epilepticus. *J Small Anim Pract*. 2012; 53:526-530.
- Jaggy A, Faissler D, Gaillard P, Srenkt, Graber H. Genetic aspects of idiopathic epilepsy in Labrador Retrievers. *Journal of Small Animal Practice*. 1998; 39:275-280.
- Hülsmeier V, Zimmermann R, Brauer C, Sauter-Louis C. and Fischer A. Epilepsy in border collies: Clinical manifestation, outcome, and mode of inheritance. *J Vet Intern. Med*. 2010; 24:171-178.
- Zimmermann R, Hülsmeier V, Sauter – Louis C, Fischer A. Status epilepticus and epileptic seizures in dogs. *J Vet Intern Med*. 2009; 23:970-976.
- Sean Sanders, Diagnosis. In: *Seizures in Dogs and Cats*. PP 94 – 128. Wiley Blackwell, 2015.
- Thomas WB. Idiopathic epilepsy in dogs. *Veterinary Clinics of North America*. 2000; 30(1):183-206.
- Heynold Y, Faissler D, Steffen F, Jaggy A. Clinical, epidemiological and treatment results of idiopathic epilepsy in 54 labrador retrievers: a long – term study. *Journal of Small Animal Practice*. 1997; 38:7-14.
- Weissl J, Hülsmeier V, Brauer C, Tipold A, Kosikinen LL *et al*. Disease progression and treatment response of idiopathic epilepsy in Australian Shepherd dogs. *Journal of Veterinary Internal Medicine*. 2012; 26:116-125.
- Sofe AD, Holger AV, Matiasek K, Lee ML, Van Ham. The influence of sex hormones on seizures in dogs and humans. *The Veterinary Journal*. 2014; 201:15-20.