

Prevalence of Canine Juvenile Generalized Demodicosis in the Buenos Aires Region, Argentina

アルゼンチン・ブエノスアイレスにおける
若年性汎発性ニキビダニ症の発症頻度

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Abstract: Juvenile generalized demodicosis (JGD) is a common condition in dogs, and is associated with genetic and immunological factors. It is not a contagious or zoonotic disease, however, it is a serious disease, being potentially dangerous to affected animal's lives. JGD affects most breeds of dog, though the predisposition of certain breeds has been noted. In this study, we analyzed 499 records of the Small Animal Hospital (Faculty of Veterinarian Sciences, National University of La Plata, Argentina) covering the period 1998–2006. In all cases, the dogs tested were primarily considered have had some type of dermatological disease, and among them 28 cases were eventually diagnosed as demodectic mange. Twenty-eight out of 499 cases found juvenile generalized demodicosis. Coincident with the data reported by other research, this study evidenced that certain breeds, such as Boxer, German Shepherd and mixed breed dogs had a higher prevalence of JGD. These results support the hypothesis that certain breeds of dogs have a greater predisposition to JGD.

Key words: breed, canine, demodicosis, mange, prevalence

要約: 若年性汎発性ニキビダニ症は犬で頻繁にみられる疾患であり、遺伝的素因や免疫学的素因が関与する疾患である。本症は伝染性疾患でも人獣共通感染症でもないが、重篤で時に生命予後に影響することもある。本症はあらゆる犬種に発症しうるが、一部の報告では好発犬種に関する記載が見られる。本報告では1998年から2006年までの間に、アルゼンチン・ラプラタ国立大学獣医学部附属小動物病院で記録された499例について解析した。全ての症例において、ニキビダニ症があらゆる皮膚疾患よりも初発したと考えられ、最終的には本症と診断された。499例中28例が若年性汎発性ニキビダニ症と診断された。他の研究データと比較したところ、本研究ではボクサー、ジャーマン・シェパードおよび雑種犬に、本症が好発することが示された。本研究の成果は、若年性汎発性ニキビダニ症が一部の犬種に好発するという仮説を支持するものと考えられた。

キーワード: 品種, 犬, ニキビダニ症, ダニ, 発症頻度

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Introduction

Canine demodicosis, commonly called “red mange” or “demodectic mange”, is a disease caused by excessive population growth of the mite *Demodex canis* on a dog's

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body⁹⁾. This condition is one of the most important parasitic skin diseases affecting young animals, and is one of the ten most common canine skin diseases seen in the United States⁸⁾.

To date, three different species of *Demodex spp.* that affect dogs have been described. *D. canis* is the most common specie^{10, 15)} and the other two are a variety with shorter body, *D. cornei*³⁾, and a variety with a longer body, *D. injai*⁴⁾. Techniques based on genetic identification of the mites help taxonomic identification¹⁾.

Although mite transmission occurs by direct contact from the mother during breastfeeding in the first days of life of the animal, the initial proliferation of mites may be related to genetic or immunological disorder¹¹⁾. Two distinct age groups have been identified with the development of generalised demodicosis: juvenile-onset disease, Juvenile Generalised Demodicosis (JGD), occurs in animals up to 18 months of age and adult – onset disease is in animals generally older than 4 years of age with no previous history of disease. Dogs with adults – onset disease may have some forms of immunosuppressive disease present; hyperadrenocorticoidism, hypothyroidism, diabetes mellitus and lymphoreticular neoplasia have all been identified as causal factor. Generalised demodicosis is defined as any of the following: five or more areas of localized disease; pododemodicosis in which two or more feet are affected, and where an entire body region is affected¹⁵⁾.

Although JGD is one of the most common diseases reported, epidemiological reports of it are limited. According to surveys conducted in college veterinary hospitals in North America, the reported prevalence rates of JGD are 0.38 and 0.58%^{14, 16)}. In Korea and Mexico, surveys of dogs have reported prevalence rates of 5 and 23%, respectively^{2, 13)}. A study in India found a prevalence of 3% using data obtained from a combined practice with college veterinary hospitals^{6, 12)}. These studies show that some breeds, e.g. the American Staffordshire terrier, Staffordshire bull terrier and Chinese Shar-Pei, present higher prevalences of JGD⁶⁾. Due to the limited amount of epidemiological data for JGD in Argentina, the aim of the present work was to assess the current prevalence of this disease in the Buenos Aires region, Argentina.

Materials and Methods

The data from medical records of 499 dogs that were submitted for consultation at the Small Animal Hospital (Faculty of Veterinarian Sciences, National University of La Plata, Argentina) between 1998 and 2006 were analyzed. The information was sorted by disease type, and those cases with some type of dermal disorder including those who were treated for demodicosis were extracted.

The clinical diagnosis of JGD was performed by scraping the skin of the affected animals and the identification of parasites under a 10X optical microscope. The following details were recorded for each animal: clinical presentation, age, sex, breed, and therapeutic procedure.

Fisher's exact test and Woolf–Haldane OR were conducted to compare prevalence of JGD among breeds, and between the sexes. *p*-values less than 0.05 were considered significant. Statistical analysis was performed using R statistical computing software. For the control group, we included all cases without JGD filed at the Small Animal Hospital. Furthermore, average age and its standard deviation were estimated and compared between the control and JGD case groups.

Results and Discussion

Four hundred-ninety nine records of the Small Animal Hospital (Faculty of Veterinarian Sciences, National University of La Plata, Argentina) covering the period 1998–2006 were analyzed. Three hundred sixteen (63% of the total sample) of the studied cases had skin diseases, 28 (5.6%) of them were diagnosed as having JGD, representing 8.6% of all the skin disease cases (Table 1). The observed incidence of JGD in Buenos Aires region was in agreement with data reported for other geographical areas, confirming that JGD is one of the most important skin diseases affecting young animals⁵⁾. For example, in North America, Plant *et al.*⁷⁾ reported prevalence rates ranging from 0.38 to 0.58%, while in India, Korea, and Mexico, the prevalence rates of JGD have been reported as 3, 5 and 23%, respectively^{2, 6, 12, 13)}.

The average ages of our cases and control samples were 1.5 ± 1.38 (female=1.37, male=1.74) and 5.2 ± 4.28 (female=5.54, male=4.86) years, respectively, with a significant difference between them ($p < 0.01$).

Table 1. Cases filed to the Small Animal Hospital (Faculty of Veterinarian Sciences, National University of La Plata, Argentina), for the period 1998–2006

Breed	N° cases	Without skin diseases	Other skin diseases	Cases of JGD	M	F
Airdale terrier	4	2 (50%)	2 (50%)			
Basset Hound	4	2 (50%)	2 (50%)			
Beagle	3	1 (33.34%)	2 (66.66%)			
Belgian Shepherd	2	1 (50%)	1 (50%)			
Border Collie	3	0	3 (100%)			
Boxer	27	1 (3.71%)	19 (70.37%)	7 (25.92 %)	5	2
Briard	2	1 (50%)	1 (50%)			
Brittany Spaniel	5	0	5 (100%)			
Bull Terrier	1	0	1 (100%)			
Catalan Sheepdog	1	1 (100%)				
Chihuahua	1	0	1 (100%)			
Chow Chow	1	0	1 (100%)			
Cocker Spaniel	20	5 (25%)	15 (75%)			
Dachshund	2	1 (50%)	1 (50%)			
Dalmatian	6	2 (33.34%)	4 (66.66%)			
Dobermann pinscher	11	3 (27.27%)	8 (72.72%)			
Dogo Argentino	3	1 (33.34%)	2 (66.66%)			
English Setter	2	2 (100%)				
Fox terrier	3	0	3 (100%)			
German Shepherd	53	16 (30.19%)	32 (60.37%)	5 (9.44%)	1	4
Giant Schnauzer	1	0	1 (100%)			
Golden Retriever	3	1 (33.34%)	2 (66.66%)			
Great Danes	3	0	2 (66.66%)	1 (33.34%)	1	
Irish Setter	2	2 (100%)				
Labrador Retriever	13	2 (15.39%)	11 (84.61%)			
Maltese	2	0	2 (100%)			
Mixed breed	244	81 (33.19%)	152 (62.29%)	11 (4.52%)	2	9
Old English Sheepdog	9	4 (44.45%)	5 (55.55%)			
Pequines	14	6 (42.86%)	8 (57.14%)			
Pinscher	2	1 (50%)	1 (50%)			
Pit Bull Terrier	11	5 (45.45%)	5 (45.45%)	1 (9.1%)		1
Pointer	3	2 (66.66%)	1 (33.34%)			
Pomeranian	1	1 (100%)				
Rottweiler	13	7 (53.85%)	6 (46.15%)			
Samoyedo	1	0	1 (100%)			
Shar pei	4	0	3 (75%)	1 (25%)		1
Siberian Husky	4	1 (25%)	3 (75%)			
Spanish Greyhound	2	1 (50%)	1 (50%)			
St. Bernhardshund	4	2 (50%)	2 (50%)			
Toy Poodle	4	2 (50%)	2 (50%)			
Weimaraner	1	0	0	1 (100%)	1	
Yorkshire Terrier	4	0	3 (75%)	1 (25%)		1
Total	499	155 (31%)	316 (63.33%)	28 (5.67%)	10	18

JGD = Juvenile Generalized Demodicosis, M = males, F = females.

Table 2. Number of Juvenile Generalized Demodicosis cases within each breed analyzed in the Small Animal Hospital (Faculty of Veterinarian Sciences, National University of La Plata, Argentina), for the period 1998–2006

	Control ¹		Cases		OR	CI 95%	p
	F	M	F	M			
Boxer	14	6	2	5	7.517	2.862–19.74	<0.000000
Great Danes	1	1	0	1			
Mixed Breed	116	117	9	2	0.661	0.303–1.441	0.091
German Shepherd	22	26	1	4	1.915	0.696–5.271	0.1
Pit Bull Terrier	4	6	1	0			
Shar Pei	2	1	1	0			
Weimaraner	0	0	0	1			
Yorkshire Terrier	2	1	1	0			
Others Breeds	76	76	0	0			
	237	234	15	13	1.1392	0.530–2.447	0.146

OR = Odds ratio, CI = confidence interval. ¹Control group included all dog without JGD filed to the Small Animal Hospital (Faculty of Veterinarian Sciences, National University of La Plata, Argentina), for the period 1998–2006.

The observed average age value for the case group is in agreement with previously reported data (up to 18 months)¹⁵⁾. Statistical analysis did not reveal significant difference in ages between the sexes. There were significant differences among the prevalence rates of the breeds (Table 1). It has been reported that some breeds are predisposed to JGD, with the condition being more common in mixed breed dogs, Shar Pei, German shepherd, Boxer, Golden and Labrador retrievers⁷⁾, Doberman, Tibetan dog¹²⁾, and Chihuahua²⁾.

In the cases studied here, the breeds with higher JGD prevalence were Boxer (26%), German Shepherd (10%), and mixed breed dogs (5%) (Table 1). Odds ratio analysis showed that Boxer dogs had a significant risk of developing JGD ($p < 0.01$), while German Shepherd and mixed breed dogs exhibited a tendencies of developing JGD ($p < 0.1$) (Table 2). A few cases were diagnosed in the Pit Bull Terrier, Yorkshire, Shar pei, Great Danes, and Weimaraner breeds. However, it was not possible to evaluate the prevalence rates for these breeds due to the small sample number for these breeds (Table 1).

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References

- 1) Álvarezl, L., Menina, O.C., García, M.E. and García, H. 2007. First report of an unclassified *Demodex* mite causing demodicosis in a Venezuelan dog. *Ann. Trop. Med. Parasitol.* 101: 529–532.
- 2) Chee, J.H., Kwon, J.K., Cho, H.S., Cho, K.O., Lee, Y.J., Abd El-Aty, A.M. and Shin, S.S. 2008. A survey of ectoparasite infestations in stray dogs of Gwang-ju City, Republic of Korea. *Korean J. Parasitol.* 46: 23–27.
- 3) Chesney, C.J. 1988. An unusual species of *Demodex mite* in a cat. *Vet. Rec.* 123: 671–673.
- 4) Desch, C.E. and Hillier, A. 2003. *Demodex injai*: a new species of hair follicle mite (Acari: Demodecidae) from the domestic dog (Canidae). *J. Med. Entomol.* 40: 146–149.
- 5) It, V., Barrientos, L., López Gappa, J., Posik, D., Diaz, S., Golijow, C. and Giovambattista, G. 2010. Association of canine juvenile generalized demodicosis with the dog leukocyte antigen system. *Tissue Antigens* 76: 67–70.
- 6) Plant, J.D., Lund, E.M. and Yang, M. 2010. A case control study of the risk factors for canine juvenile-onset generalized demodicosis in the USA. *Vet.*

- Dermatol.* 22: 95–99.
- 7) Lemairé, S.L., Hosgood, G. and Foh, C.S. 1996. A retrospective study of juvenile and adult onset generalized demodicosis in dogs (1986–91) *Vet. Dermatol.* 7: 3–10.
 - 8) Lemaire, S.L. 1996. Canine demodicosis. *Compendium on Continuing Education for the Practicing Veterinarian.* 18: 345–369.
 - 9) Leydig, F. and Über Haarsackmilben und Kratzmilben. 1859. Demodex canis. *Arch. Naturg.* 25: 338–354.
 - 10) Mueller, R.S., Bensignor, E., Ferrer, L., Holm, B., Lemarie, S., Paradis, M., Shipstone, M.A. 2012. Treatment of demodicosis in dogs: 2011 clinical practice guidelines. *Vet. Dermatol.* 23: 86–96.
 - 11) Muller, G.H. 1990. Skin diseases of the Chinese Shar-Pei. *Vet. Clin. North Am. Small Anim. Pract.* 20: 1655–1670.
 - 12) Nayak, D.C., Tripathy, S.B., Dey, P.C. Ray, S.K., Mohanty, D.N., Parida, G.S., Biswal, S. and Das, M. 1997. Prevalence of canine demodicosis in Orissa (India). *Vet. Parasitol.* 73: 347–352.
 - 13) Rodriguez-Vivas, R.I., Ortega-Pacheco, A., Rosado-Aguilar, J.A. and Bolio, G.M. 2003. Factors affecting the prevalence of mange-mite infestations in stray dogs of Yucatan, Mexico. *Vet. Parasitol.* 115: 61–65.
 - 14) Scott, D.W. and Paradis, M. 1990. A survey of canine and feline skin disorders seen in a university practice: Small Animal Clinic, University of Montreal, Saint-Hyacinthe, Quebec (1987–1988). *Can. Vet. J.* 31: 830–835.
 - 15) Shipstone, M. 2000. Generalised demodicosis in dogs, clinical perspective. *Aust. Vet. J.* 78: 240.
 - 16) Sischo, W.M., Iheke, P.J. and Franti, C.E. 1989. Regional distribution of ten common skin diseases in dogs. *J. Am. Vet. Med. Assoc.* 195: 752–756.