

Mappe Parassitologiche

Series Editor

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Dirofilaria

MAPPE PARASSITOLOGICHE 8

Dirofilaria

***Dirofilaria immitis* and
D. repens in dog and cat
and human infections**



Editors

Claudio Genchi, Laura Rinaldi, Giuseppe Cringoli

14

Heartworm (*Dirofilaria immitis*) infection in dogs: current update in Spain

J.A. Montoya, M. Morales, M.C. Juste,
J.A. Corbera

Heartworm infection in dogs has been diagnosed around the globe. Relocation of infected, microfilaremic dogs appears to be the most important factor contributing to further dissemination of the parasite. The ubiquitous presence of one or more species of vector competent mosquitoes makes transmission possible wherever a reservoir of infection and favourable climatic conditions co-exist.

A climate that provides adequate temperature and humidity to support a viable mosquito population, and also sustain sufficient heat to allow maturation of ingested microfilariae to infective, third-stage larvae (L3) within this intermediate host is a pivotal prerequisite for heartworm transmission to occur. The length of the heartworm transmission season in the temperate latitudes is critically dependent on the accumulation sufficient heat to incubate larvae to the infective stage in the mosquito. The peak months for heartworm transmission in the Northern Hemisphere are July and August. Heartworm prevalence has increased dramatically during the latest years. The disease has extended from tropical or subtropical countries to others with more temperate climate. The more frequent animal international travelling could contribute to dissemination of the parasite. Heartworm transmission is related to the dog's life style, because outdoor permanence increases the possibility for mosquito contact. However, breed or hair length has not been correlated with the risk of heartworm infection.

Heartworm infection is entirely preventable in dogs, despite their high susceptibility. Since most dogs living in

heartworm endemic areas are at risk, chemoprophylaxis is a priority. Furthermore, some evidence strongly suggests that by reducing the reservoir population through increasing the number of dogs receiving chemoprophylaxis, a disproportionate decrease in the prevalence of infection among unprotected dogs may occur relative to the percentage of additional dogs receiving chemoprophylaxis. This collateral protection spreads the umbrella of chemoprophylaxis most effectively in communities where heartworm prevalence and dog population density are both relatively low.

During the latest years several epidemiological surveys on heartworm have been developed in many countries. The disease is distributed, mainly, in temperate climates in the World. The more prevalent countries are in America, Africa, Polynesia, Australia and Japan. In Europe the more prevalence (>10%) occurs in the Mediterranean countries. We must point out that several studies in the north of Italy, south of France and Spain have elucidated prevalence over 20%. Therefore, Spain is an endemic area of Heartworm (Genchi et al., 2005).

Inside Spain, the prevalence of the disease is higher in the southern coastal areas. Also, Canary Islands are considered an endemic area of the disease. Specifically, in the Canaries, sited in front of the north-western African coast, the available data has emphasized the highest prevalence of the disease in Spain (Valladares et al., 1987; Guerrero et al., 1989). Veterinary Surgeons in Canary Island include Heartworm Disease as the first differ-

Table 1. Prevalence of heartworm in Spain.

AUTONOMOUS COMMUNITY Province	Prevalence	References
ANDALUCIA	8.5%	Guerrero et al., 1989
Cádiz	12%	Guerrero et al., 1989; Ortega Mora et al., 1991
Cádiz-Málaga	5.5%	Rojo-Vázquez et al., 1990
Córdoba	18.0%	Anguiano et al., 1985
Córdoba	4%	Guerrero et al., 1989
Huelva	36.7%	Guerrero et al., 1989; Ortega Mora et al., 1991
Jaén	2.1%	Guerrero et al., 1989
Málaga	2%	Guerrero et al., 1989
Sevilla	1.5%	Guerrero et al., 1989
ARAGON	4.3%	Guerrero et al., 1989
Zaragoza	13.5%	Castillo et al., 1989
Zaragoza	8 %	Rodes, 2006
ASTURIAS	0 %	Guerrero et al., 1989
CANTABRIA	0%	Guerrero et al., 1989
CASTILLA-LA MANCHA	0%	Guerrero et al., 1989
CASTILLA-LEON	0%	Guerrero et al., 1989
Salamanca	12.0%	Pérez-Sánchez et al., 1989
Salamanca (ribera Tormes)	> 30%	Pérez-Sánchez et al., 1989
CATALUÑA	2.17%	Gutiérrez et al., 1995
CATALUÑA	0,6%	Solano-Gallego et al., 2006
Barcelona	1.2%	Rojo-Vázquez et al., 1990
Barcelona (bajo Llobregat)	12.8%	Aranda et al., 1998
Barcelona	2%	Solano-Gallego et al., 2006
Tarragona	0.85	Solano-Gallego et al., 2006
Tarragona (delta Ebro)	35.8 %	Anguera, 1995
Tarragona (delta Ebro)	26 %	Rodes, 2006
COMUNIDAD VALENCIANA		
Alicante	13%	Guerrero et al., 1989
Alicante	1.6%	Rojo-Vázquez et al., 1990
Alicante	18%	Rodes, 2006
Elche	2.6%	Cancrini et al., 2000
Valencia	4.1%	Guerrero et al., 1989
EUSKADI	0%	Guerrero et al., 1989
EXTREMADURA	6.7%	Guerrero et al., 1989
Badajoz	8%	Ortega Mora et al., 1991
GALICIA	0%	Guerrero et al., 1989
ISLAS BALEARES	6.3%	Guerrero et al., 1989
Mallorca	0.3%	Solano-Gallego et al., 2006
Ibiza	39%	Rodes, 2006
MADRID	2%	Ortega Mora et al., 1988
Madrid	1.1%	Guerrero et al., 1989
Madrid	1.9	Rojo-Vázquez et al., 1990
MURCIA	6.3%	Guerrero et al., 1989
MURCIA	9%	Rodes, 2006
NAVARRA	0%	Guerrero et al., 1989

Table 2. Prevalence of heartworm disease in Canary Islands.

Canary Island	Prevalence	Reference
CANARIAS (total)	28%	Guerrero et al., 1989
Gran Canaria	36%	Guerrero et al., 1989
Gran Canaria	58.89%	Montoya et al., 1998
Gran Canaria	23.87%	Sosa et al., 2002
Tenerife	34.4%	Valladares et al., 1987
Tenerife	20%	Guerrero et al., 1989
Tenerife	23%	Stenzenberger & Gothe, 1999
Tenerife	22.3%	Morales et al., 2001
Tenerife	21%	Montoya et al., 2006

ential diagnosis in dogs with cardiopulmonary signs.

Previous studies in Spain (Guerrero et al., 1989) showed that Huelva has the highest prevalence in Spain (36.7%). This study determined that the prevalence of *Dirofilaria immitis* in Gran Canaria was 36%. Later studies revealed prevalence over 30% in Salamanca (Muro et al., 1993) and the delta area of the river Ebro (Anguera, 1995). More recently, the highest prevalence (58%) of *D. immitis* in Spain has been described in Gran Canaria (Montoya et al., 1998). The prevalence in Gran Canaria is one of the highest described in the World; similar prevalence has been published in Cuba (Dumenigo et al., 1988) or Japan (Tanaka et al., 1985; Suenaga et al., 1978; Hatsushika et al., 1992). Otherwise, the highest prevalence ever described (86%) is in Papua-New Guinea (Hamir et al., 1986).

However, it is encouraging that the prevalence of *D. immitis* in Gran Canaria is decreasing: more recent surveys demonstrated prevalence under 23% (Table 2). In our opinion, this data could be due to the increasing use of effectiveness drugs to prevent the disease, and mainly a very important veterinarian task in order to make aware

of the disease to their clients. Also, it is more frequent that clients demand the use of the newest drugs for the treatment of their infected pets; this increasing demand is extending to rural areas where population is not aware as far as pet cares are concerned.

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