

Performances of Vaccines against vector-borne diseases (VBDs): An example with (CaniLeish®) in a comparative study, through a questionnaire-based survey with veterinary clinics in France

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Background/objective

Vaccines may play an important role, as a second line to effective ectoparasiticides, to prevent the development of vector-borne diseases (VBDs), like canine leishmaniosis (CanL). However, it is extremely difficult to assess their effectiveness as experimental or monitored studies are performed in artificial conditions or over a very limited period of time (the calculated efficacy is highly influenced by yearly variation in incidence). It may not reflect the influence of multiple parameters resulting in the “perceived field efficacy” in the hands of veterinarians.

The objective of this study was to assess certain aspects (such as usage and perceived efficacy) related to the use of CaniLeish® (Virbac Santé Animale), the first anti-*Leishmania* European vaccine (currently unavailable), in France and compare it with Pirodog® (Mérieux/Merial now Boehringer Ingelheim Animal Health), a *Babesia canis* vaccine that has been available for over 35 years.

Material methods

In 2017, a questionnaire-based survey on canine vector-borne diseases (VBDs), including CanL (*Leishmania infantum*) and babesiosis (*Babesia canis*), was emailed to veterinary clinics. The questionnaire inquired about 5 years of activity, from 2012 to 2017, and included questions related to various aspects, such as endemicity (whether the clinic was located in an endemic (E) or non-endemic (NE) area, as determined by autochthonous cases in their activity), as well as the utilization of insecticides/acaricides and the administration of one of the two vaccines available at the time.

Results

Information was collected from 650 veterinary clinics covering the entire country. However, not every clinic replied to all questions.

Insecticidal prevention against *Leishmania* infection primarily relied on pyrethroids, prescribed by 99% of the clinics surveyed. The peak usage of pyrethroids was observed in July and August, regardless of whether the clinics were located in endemic (E) or non-endemic (NE) areas. The period of prescription varied slightly between regions, with over 90% of clinics in endemic areas prescribing pyrethroids from May to October, while those in non-endemic areas prescribed them from June to September.

For *Babesia* prevention, the first choice was isoxazolines, prescribed by 71.3% of clinics, followed by pyrethroids at 23.3%. Overall tick prevention was administered annually by 56% of clinics, with two peak periods of usage observed: April to June and September to October, during which more than 90% of clinics utilized tick prevention measures. The results of the perceived performances of the vaccination are indicated in Table 1.

Over the 6-year period of the study, the CaniLeish® vaccine was used by 65.7% (285/434) of responders (E: 76.4%, NE: 46.3%). On average, each clinic primo vaccinated 15 dogs annually (E=19; NE= 3) (1 to 250). Notably, in six areas (departments), more than 1% of dogs were vaccinated, and in eight others, 0.3-1% of dogs were vaccinated, all located in endemic regions. Overall, 7 out of 100 dogs were vaccinated with CaniLeish® in more than 50% of the areas in the country. In comparison, Pirodog® was used by 82.5% of clinics (424/514).

Table 1: Compared perceived performances of the use of Canileish® and Pirodog® according to veterinary practitioners in France during the study period.

Did you use this vaccine during the study period (2012-2017)?			
	Canileish®		Pirodog®
Yes	285*		424*
No	149		90
	*65,7% of clinics vaccinated at least one dog/year		*82.5 % of clinics vaccinated at least one dog/year.
How many dogs did you vaccinate annually?			
Min	1	1	Average number of dogs vaccinated/clinic/year:
Max	250	1000	Canileish®: n= 15 Pirodog®: n = 50.1
Apparent failure of prevention of the disease (antiparasitic + vaccine)			
Yes	35	161	Canileish®: 10.8% clinics have experienced failure.
No	288	280	Pirodog®: 36.5% clinics have experienced failure.
What percentage of failure do you estimate among vaccinated dogs?			
Min	0.7%	0,25%	Calculation:
Max	20%	100%	Canileish® (1.1%) (estim. 45 from 4047) Pirodog® (5.2%) (estim. 1030 from 19902)

Cases of apparent failure in preventing CanL in vaccinated dogs, indicative of the failure of insecticides to protect against infective bites followed by a failure of the vaccine to prevent the disease, were reported by 10.8% of clinics (35/323), all situated in endemic areas. This corresponds to only 1.1% of the total vaccinated dogs. In comparison, a failure in preventing babesiosis was reported by 37.8% of clinics (169/447), distributed throughout the country, with a rate of less than 20% in 85.4% of clinics and over 50% in 8.9%.

Conclusion

In the context of a comprehensive prevention strategy combining insecticide use with vaccination, Canileish® (no longer available), demonstrated good efficacy during its period of commercialization in France compared to another vaccine used extensively in the country for the prevention of babesiosis. This comparative field approach provides more information through an indirect, independent, and practical evaluation of the overall effectiveness of preventive methods.

Funding: part of a study conducted by Lab DPM

Conflict of interest: None declared.