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Draft

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International Cooperation on Harmonisation of Technical Requirements for Registration of Veterinary Medicinal Products

VICH GL20 (ANTHELMINTICS FELINES)
May 2022
Revision at Step 9
For consultation at Step 4

EFFICACY OF ANTHELMINTICS: SPECIFIC RECOMMENDATIONS FOR FELINES (REVISION 1)

Revision at Step 9

Recommended for Consultation at Step 4 of the VICH Process
in May 2022
by the VICH Steering Committee

This Guideline has been developed by the appropriate VICH Expert Working Group will be subject to consultation by the parties, in accordance with the VICH Process. At Step 7 of the Process the final draft is recommended for adoption to the regulatory bodies of the European Union, Japan and USA.

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EFFICACY OF ANTHELMINTICS: SPECIFIC RECOMMENDATIONS FOR FELINES

INTRODUCTION

The present guideline for felines was developed by the Working Group that was established by the Veterinary International Cooperation on Harmonization (VICH), Anthelmintic Guidelines. It should be read in conjunction with the "VICH Efficacy of Anthelmintics: General Requirements (VICH GL7)" which should be referred for discussion of broad aspects for providing pivotal data to demonstrate product anthelmintic effectiveness. The present document is structured similarly to VICH GL7 guideline with the aim of simplicity for readers comparing both documents.

The aim of this guideline for felines is: (1) to be more detailed for certain specific issues for felines not discussed in VICH GL7; (2) to highlight differences with VICH GL7 on data requirements, and (3) to give explanations for disparities with VICH GL7 guideline.

It is important to note that technical procedures to be followed in the studies are not the aim of this guideline. We recommend that the sponsors refer to the pertinent procedures described in detail in other published documents e.g. WAAVP Guidelines for Evaluating the Efficacy of Anthelmintics for Dogs and Cats, Veterinary Parasitology ***52***: 179-202, 1994, and updated versions as they are published.

A. General Elements

1. The Evaluation of Effectiveness Data

The evaluation of effectiveness data is based on parasite counts (adults, larvae) in dose determination and dose confirmation studies; egg counts/larval identification is the preferred method to evaluate the effectiveness in field studies.

The controlled test is the most widely accepted of the testing procedures for the evaluation of anthelmintic drug effectiveness. However, the critical test may be appropriate for some intestinal species of parasites, e.g. ascarids.

Adequate parasite infection should be defined in the protocol according to regional prevalence or historical data and/or statistical analysis.

2. Use of Natural or Induced Infections

Dose determination studies should be conducted using induced infections with either laboratory strains or recent field isolates.

Dose confirmation studies should be conducted using naturally or artificially infected animals. Where possible, at least one study should be conducted in naturally infected animals; deviation from this requirement should be justified, e.g., applicable laws or regulations prohibit sourcing of naturally infected animals. Two studies should be conducted for each parasite claimed on the label. If both studies are conducted using experimentally infected animals, then parasites must have originated from naturally occurring infections from different geographical regions no older than 10 years prior to use for inducing infection. In addition to two dose confirmation studies, the efficacy and safety is generally confirmed by data from field studies. *Echinococcus multilocularis* and *Dirofilaria* spp. testing may be conducted using animals harbouring induced infections due to public health considerations for echinococcosis and the complexity

of the claims for heartworm. Due to the zoonotic potential of *E. multilocularis* trials conducted using this parasite should be carried out under high biosecurity provisions.

For the following helminths, induced infections may also be the only method to determine effectiveness of the product because of the difficulties in obtaining a sufficient number of infected animals: *Capillaria aerophile* and *Physaloptera* spp. For claims against larval stages, only studies with induced infections are acceptable.

The history of the parasites used in the induced infection studies should be included in the final report.

3. Number of Infective Parasitic Forms Recommended for Induced Infections

The number to be used is approximate and will depend on the isolate that is used. The final number of larvae used in the infection should be included in the final report. Table 1 shows the range of numbers recommended for common helminths.

Table 1. Range of infective stages used to produce adequate infections in felines for anthelmintic evaluation

Parasite Anatomical Location ***Genus Species***	**Range**
Small Intestine	
Toxocara cati	100 – 500
Toxascaris leonina	200 – 3,000
Ancylostoma tubaeforme	100 – 300
Ancylostoma braziliense	100 – 300
Strongyloides stercoralis	1,000 – 5,000
Taenia taeniaeformis	5 – 15
Large Intestine	
Trichuris campanula	100 – 500
Heart	
Dirofilaria immitis	30 – 100 *

* For adulticidal or microfilaricidal testing 5 to 15 pairs of adult worms can be transplanted.

4. Recommendations for the Calculation of Effectiveness

4.1. Criteria to Grant a Claim

To be granted a claim the following pivotal data should be included:

a) Two dose confirmation studies conducted with a minimum of 6 adequately infected non-medicated animals (control group) in each study. The infection of the animals in the study will be deemed adequate based on historical, parasitological and/or statistical criteria.

b) The differences in parasite counts between treated and control should be statistically significant ($p \leq 0.05$).

c) Efficacy should be 90% or higher and calculated and interpreted using the procedure described in Section 4.2 of VICH GL7. For some parasites with public health, animal welfare/clinical implications e.g. *E. multilocularis* and *D. immitis*, respectively, higher

efficacy standards (i.e. up to 100%) may be imposed. The regulatory authority of the region in which the product is intended to be registered should be consulted.

d) Effectiveness against helminths will be evaluated examining for the presence or absence of parasitic elements in faecal material or blood. An *E. multilocularis* claim does not require field studies due to public health concerns.

4.2. Number of Animals (Dose Determination and Dose Confirmation Trials)

The minimum number of animals required per experimental group is a critical point. Although the number of animals will depend on the ability to process the data statistically according to the adequate statistical analysis it has been recommended, to achieve harmonization, that the inclusion of at least 6 animals in each experimental group is a minimum.

In cases where there are several studies none of which have 6 adequately infected animals in the control group (for example, important rare parasites), the results obtained could be pooled to accumulate 12 animals in the studies; and statistical significance calculated. If the differences are significant ($p<0.05$), effectiveness may be calculated and if the infection is deemed adequate, the claim may be granted. Sampling techniques and estimation of worm burden should be similar among laboratories involved in the studies to allow adequate and meaningful extrapolation of the results to the population.

4.3. Adequacy of Infection

The minimum adequate number of helminths in individual control animals should be defined in the protocol. However, final conclusions regarding adequacy of infection will be made as part of the final report based on statistical analysis, historical data, literature review, or expert testimony. Generally, a minimum of 5 nematodes in individual control animals is considered an adequate infection. For *D. immitis*, adequacy of infection may generally be established if at least six control cats have 2 or more worms. In cases where efficacy and statistical criteria are met for an individual study, but the study does not meet the pre-defined adequacy of infection criterion, justification that the study is valid to support efficacy should be provided, using information about the infection model and isolate, and considerations from literature review and expert testimony.

Recommended counts (in individual control animals) to be considered adequate for example cestodes include:
Echinococcus spp. – 5 scolices
Taenia spp. – 2 scolices
Dipylidium caninum – 2 scolices

4.4. Label Claims

A claim for effectiveness against life stages of each parasite should refer to each stage in the case of natural infections, or age in days in the case of induced infection. Table 2 is provided as a guide for the recommended time of treatment of induced infections.

With the majority of parasites approximately 7 days is a sufficient time period from the termination of treatment until the test animals are necropsied. The following parasites are the exception to the above general recommendation:

Physaloptera spp.*, C. aerophila, E. multilocularis, T. taeniaeformis*, *Dipylidium caninum*: 10 to 14 days; *D. immitis:* varies by trial design.

Table 2. Recommended time of treatment after infection

Parasite	Adult Stages	Larval Stages
S. stercoralis	5 to 9 days	
T. campanula	84 days	
A. tubaeforme	> 21 days	
A. braziliense	> 21 days	6 to 8 days (L4)
T. cati	60 days	6 to 8 days (L4) 3 to 5 days (L3/L4)
T. leonina	70 days	28 days (L4/L5)
D. immitis	180 days	35 days (L4) 2 days (L3), 20 to 40 days (L4)
T. taeniaeformis	> 35 days	70 to 120 days (L5), 220 days (microfilariae)

For claims against transmammary transmission of *T. cati* somatic larvae of natural or artificially infected pregnant queens should be treated prior to or just after parturition and the efficacy checked by counting the larvae in the queen milk and/or the adult worms in the small intestines of the litter.

5. Treatment Procedures

The method of administration (oral, parenteral, and topical) and extent of activity of the product will influence the protocol design. It is advisable to consider the weather and animal relationship and bathing with regard to effectiveness of topical formulations.

For oral formulations, palatability studies should always be included in the evaluation of the effectiveness of the product. For products administered topically, the impact of weather (e.g. rainfall, UV light), bathing and coat length should be included in the evaluation of the effectiveness of the product.

6. Animal Selection, Allocation and Handling

Approximately 6-month-old felines are generally suitable for controlled studies, however, older and younger animals can also be used and the following exceptions have to be taken into account:

- *S. stercoralis*: less than 6 months;
- *A. braziliense, A. tubaeforme:* 6 to 16 weeks;
- *T. cati, T. leonina:* 4 to 16 weeks;
- *D. caninum:* 3 months or older.

Naturally infected animals are selected based on egg output or expelled proglottids in gastrointestinal parasites, and parasitological and/or immunological methods for *D. immitis*. Randomization to treatment group should be performed using an adequate method that should be described in the protocol and final report. Blocking should only be employed if it is expected to reduce residual error in the study. If blocking is used, blocks should be included as a random effect in the statistical model. Nevertheless, blocking is not always the most appropriate method for reducing residual error. Alternative methods may therefore be considered e.g. a suitably selected covariate. Animal housing, feeding and care should follow strict requirements of welfare for felines. Animals should be acclimated for at least 7 days to the experimental facilities and personnel. Animals should be monitored daily to determine adverse reactions.

B. Specific Evaluation Studies

1. Dose Determination Studies

No species specific recommendations.

2. Dose Confirmation Studies

No species specific recommendations.

3. Field Efficacy Studies

Field (clinical) studies should not be conducted with felines infected with *E. multilocularis* and *D. immitis.*

4. Persistent Efficacy Studies

Due to the differing biology of helminths in felines and the lack of experience with persistent efficacy for these parasites, no recommendations can be provided.