LABORATORY TESTS USED IN RABIES DIAGNOSIS AND THEIR REVEALING VALUE

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Abstract

Both in the past and the present, Romania was and still is one of the countries where rabies represented a special problem, tackling not only a series of aspects of epidemiological nature and also those connected to diagnosis.

Key words: rabies, diagnosis, species of animals.

INTRODUCTION

Rabies is currently the most feared disease considering its unrivalled lethality both in humans and animals and also the economical losses that are brought about by the implementation of prevention and control measures.

Although it represented a permanent concern which meant far-reaching studies and researches all over the world, this entity still contains a lot of unknown details and aspects that have not been fully clarified yet.

MATERIAL AND METHODS

In order to appreciate the value of rabies diagnosis methods we examined the results of the microscopic exam of the smears by impressions of SNC coloured using Seller method, histological examination, immunefluorescence and biosample on rats, on samples taken from different species of animals that were surely infected.

RESULTS AND DISCUSSION

By Seller's method, the percentage of infections was set after examining 28 animals, with a confirmed rabies diagnosis, belonging to foxes, cats, ovine and wolves. For the group of positive animals, this reached 70% in the case of foxes and 50% in cats. The 100% obtained in the wolf can be considered to be approximate because it reflects the sample taken from only one animal.

All the ovine tested fit in the group of negative animals which reflects the early stages of the disease, due to their breeding under the

human supervision; this observation stands for the proportion of 50% in cats.

The proportion of 60.7% represented by the group of positive animals points out the shortcoming of Seller's methods to establish the presence of rabies only in late stages of the disease.

The histological examination classified as positive 62.6% out of a total of 107 samples. The proportion of positive case is the highest in the cat (69.5%), having similar values in bovine and ovine (66.6%), followed by those characteristic to foxes (62.5%), wolves (50%) and dogs (44.4%). The first position held by the dog is surprising since it held the first place in the past, due to aspect of histological wounds.

The large difference between the maximum value of rabies cases proportion (69.5% in cats) and the minimum one (44,4% in dogs), reflects a large range of the variation that is of 25,1% (69.5%- 44.4%), that can be found in the group of the disease- negative animals.

The high value of the variation amplitude that was obtained (25.1%) in the present research and in the one that can be possibly estimated on the basis of the percents quoted in the specialty literature by other authors, we believe it to express a degree of variability that has to be considered because it induces the possibility of the species factor implication in the production of Babeş-Negri corpuscles.

The research regarding the detection capacity of rabies by immunefluorescence referred to a number of 65 animals (samples) out of which a proportion of 72.3% was positive. On the species level, the highest value was found in wolves (100%), followed in a decreasing order by the one found in cats (84.6%), foxes (72.5%), ovine (66.6%) and dogs (50%).

One can notice the low percentage in the case of dogs according to which the disease was confirmed in only half the number of the specimens that were declared to be certainly rabies-infected.

The percentage of 72.3% obtained for the group of disease-positive animals is below the one quoted in the specialty literature that reaches values of 98-100%.

When applying the biosample, all the 51 samples tested to detect the rabies were declared to be positive, therefore having a proportion of 100% (graph 1), whereas the data presented by other authors mention values of 99.2% and 99.4%. These last ones show that although it is considered to be a valuable method, the biosample does not allow the detection of animals infected with rabies.

Simultaneously with revealing the percent value obtained in each laboratory sample, we studied their diagnosis capacity in point of combined reports, by associating the well-known methods in different pairs and also those practiced nowadays.

This procedure, by using different pairs made by the combination of 4, 3 and 2 methods, was applied to a number of 111 samples taken from disease-positive animals. Out of the total of 111 samples for a percent of 48.6% (54 samples included in 5 groups), different combinations of laboratory methods led to concordant results and the association of one or more techniques using biosamples gave this type of results in all the situations. The expression of concordance in terms of the largest number of samples detected positive was done using the pair Histo+IFD+ (group I). According to this, the proportion set is of 33.3% for foxes, 12.9% for cats, 5.5% for dogs, and 3.7% for ovine. The confirmation of samples as positive using IFD technique can also be found in the pair made of Sellers+Histo+IFD+ (group B) and Histo+IFD+Inoc+ (group D).

Out of the total of 54 samples with concordant results, one can notice that a number of 36 samples (66.6%) is confirmed as positive using the Seller's technique, the histological examination and also using IFD.

The association of Seller's technique only with the histological examination (group G) revealed as positive a proportion of 9.2% for foxes and of 3.7% for cats.

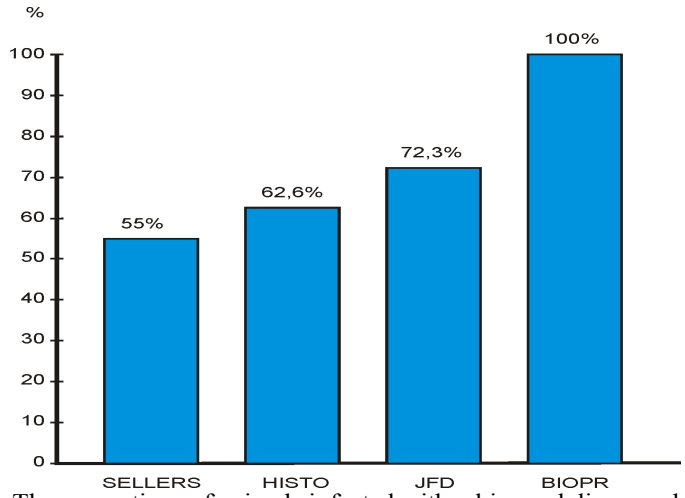
The concordance between the results obtained using IFD and the other laboratory techniques widely used up to one moment (Seller's and Histo) underlines the diagnosis capacity of the immunefluorescence test.

The discordant results of the laboratory methods were obtained using 57 samples (51.3% placed in 9 groups), their explanation being done by both the rabies pathogenesis and based on other causes mentioned in subchapters 7.1; 7.2 and 7.3.

Within the groups E and K, we notice a situation in which IFD is negative and Histo is positive (Histo +IFD-) thus resulting an inconclusive result from a test with a high diagnosis value.

CONCLUSIONS

The biosample proved its capacity of detecting all the animals infected with rabies in all the pairs in which it was included when the results of other methods applied were negative and also the capacity to confirm the positive results of those methods that reveal the more advanced stages of disease. (Histo and Sellers).



Graph 1. The proportions of animals infected with rabies and diagnosed by Seller's method, histological examination, direct immunefluorescence and biosample

After examining the columns that illustrate the proportions of animals that responded positively obtained using the 4 procedures, we get an extra difference of 39.3% for the biosample compared to Seller's method, one of 37.4% compared to the histological examination and of 27.7% compared to the immunefluorescence.

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