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Canine Rickettsiosis in the French Congo (Preliminary Note) by R. Mallieux

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During the year 1938, we had occasion, many times, to observe an ailment of dogs, which we had been at a loss for a long time to determine. The presence of certain symptoms and the discovery of micro-organisms morphologically similar to certain Rickettsia, in smears of the blood and organs, have definitely led us to consider the possibility of an infection due to these protista, but, being only slightly familiar with them, we were in doubt for a long time. Only at the beginning of 1939, were we given the occasion by MM. Donatien and Lestoquard at the Institut Pasteur d'Alger to confirm this diagnosis. Since then, these Rickettsia have been taken from several animals which presented the above mentioned symptoms at long intervals. This diagnosis has, only now, been confirmed by the Institut Pasteur d'Alger.

Although, for lack of a sufficient number of animals with these particular symptoms, the formal proof has not been made that the cause, which we originally called "Tropical typhus of the dog," is purely rickettsian, this specific origin hardly seems to be in doubt. Morphologically, the Rickettsia observed have resemblances to the Rickettsia canis Donatien & Lestoquard 1935. It remains then to show that they are specifically similar, since several of the noted symptoms of the affected dogs are noticeably different from those which have been noted in North Africa. The research, actually underway, will no doubt determine these different points. While carrying out a most complete study, we believe it useful to make known, at the present, the provisary conclusions which seem justified by our observations.

A. — SYMPTOMS.

1. The affliction of the dog as observed in the French Congo is generally very serious. The symptoms do not fall in the nosological framework of any known disease, setting aside the rickettsial afflictions. The clinical signs can be divided into three groups which seem to correspond to different forms of the disease.

a) Nervous form. — It appears that this is the superacute form of the infection and is expressed in general, grave symptoms (dejection, fever, loss of appetite), variable nervous manifestations (convulsions, paresis or paralysis, hyperesthesia, amaurosis, signs of cerebral congestion or of meningoencephalitis, etc. ...) and, sometimes, the appearance, on the abdomen and the internal side of the thighs, of exanthematous blemishes or of vesecant pustules. The evolution of the disease is always rapid: two

or three days on an average. It can even be extremely short and only last a few hours.

b) Typhic form. — Much more than the preceeding, this form presents in general the following clinical array: loss of appetite, variable fever (39.5°-41°), tachycardia with deepening of the heart beat, dyspnea and pulmonary signs more or less startling, ganglionic hypertrophy, hypersensibility of the loins to palpation. Variable cutaneous lesions have equally appeared: purpuric or exanthematous blemishes on the abdomen and the internal side of the thighs, vesicant pustules comparable to those of Carre's disease, circumscribed or diffuse depilations, oozing ulcerous spots, etc. Sometimes there is cutaneous hyperesthesia. The duration of the sickness is variable. The period varies gradually from some ten days to some weeks in the course of which a psychic depression of the disease takes place in a state of stupor and prostration. Death follows in the coma after one or two days of hypothemia.

c) Imperfect forms and chronic forms. — With these, the clinical table proceeds, often more attenuated, as that of the two preceeding forms. It is probable that these forms correspond either as an onset of a new attack among animals with natural premunition, or as an attack of the first invasion among animals offering a certain resistance to the infection.

B. — LESIONS.

The recorded necroscopic signs are almost constantly confined to a very sensible hypertrophy of the spleen, liver, heart and lymphatic glands, and by lesions of nephritis. In regards to the spleen, if the pulp of this organ always appears slightly nearly normal, we have observed many times a definite granitelike appearance of its surface. The liver is either congested or decolored and yellowish. The bone marrow is not noticeably changed. In spite of the pulmonary symptoms, perhaps strongly accentuated, which are present with many diseases, the parenchyma almost always proves intact.

C. — DIAGNOSIS.

This diagnosis is far from being always easy. The ailment of which we have outlined the symptoms can indeed be confused with Carre's disease, but the age of the animals (rickettsiosis attacks animals of all ages and, in the Congo, adult ones are stricken more often than the young), the polyadenitis, the tachycardia, the deepening of the heart beat which is very nearly constant, the absence of Lenz' bodies in the lymphocytes, and the hypersensibility of the kidney to palpation generally makes it possible to distinguish these two ailments. The injection of strong doses of anti-Carre's disease serum in addition remains without effect against a case of rickettsiosis.

The typhus of wild and domestic carniverous animals can hardly lend to the confusion, since in rickettsiosis, the gastroenteritic symptoms are exceptional, whereas in typhus, they are the rule.

In many cases, the discovery of Rickettsia in the blood smears or in the organs of suspected animals, furthermore makes possible a precise diagnosis. The search for these parasites, however, is often quite laborious.

D. -- RECEPTIVITY.

Dogs of the European race and their offspring by cross-breeding are, for the most part, the most receptive to the natural disease. Dogs of the indigenous race, in general only suffer from imperfect forms (of the disease). The experimental inoculations which we have made on three of these dogs have nonetheless decided the death of two of them after 23 and 29 days, although the disease manifested itself under an atypical form.

The guinea-pig also show itself receptive to the Congo canine ricketsiosis. The ailment is most often indicated in the guinea-pig by a feverish outbreak which can become manifest from the third to the tenth day (on an average of four to five days), by the animal getting thin (average body wastes noted: 97 g. for guinea-pigs of an average weight of 471 g.), by lesions more or less marked with orchitisvaginalitis, The necroscopic signs most frequently present are hypertrophy and congestion of the liver and congestion of the adrenals.

On several occasions, a germ of the type Proteus has been able to be obtained by haemoculture of the guinea-pigs of the passage. The proofs of sero-agglutination taken with the germ and with serum of dogs suffering with rickettsiosis have in many cases given strongly positive results.

The rabbit also appears to be receptive, although the small number of inoculations given does not allow this point to be made categorically.

As far as monkeys are concerned, we have not obtained formal proof that these animals are sensitive to the affection under study.

E. — NATURE OF THE VIRUS.

As has already been said, we have found in blood smears of animals having the natural disease, some particular micro-organisms which were revealed later to be Rickettsia. Since the confirmation of this diagnostic by the Pasteur Institute of Algiers, these protista have been discovered in several cases among the diseased animals.

The observed Rickettsia have a great resemblance to the Rickettsia canis of North Africa. Just like the latter, they are found in the monocytes of the peripheral blood, of the liver and of the lung, and also in the spleen where they are perhaps free. Alongside the granulous inclusions (colored in pale violet according to the method of Lestoquard) which seem to be the most frequent and constitute a real collection of elementary bodies, and alongside the well defined granulations always included in the monocytes, we have observed some other forms, darker in color, large, lodged in a cavity of a nucleus of the cells, which seem to correspond to the initial bodies described by Donatien and Lestoquard. These initial bodies are often broken in several parts.

To find these Rickettsia is often laborious and almost always required a prolonged examination.

The exact identity of these micro-organisms remains to be determined. Morphologically, they resemble Rickettsia.

On the other hand, the clinical and necroscopic signs are different in the North African rickettsiosis, the only nervous sign is psychic depression. The bone marrow always reacts strongly.

Yet, all attempt to infect the guinea-pig by inoculation with Algerian R. canis have regularly failed. The opinion can thus be offered that the Algerian Rickettsia and the Congo Rickettsia are not specifically alike.

Finally it remains to be proven that the ailment presently studied here is actually caused by the Rickettsia encountered in the sick animals. Past experiments seem to demonstrate this, but, before it can be said definitely, a larger number of inoculations will have to be given, as the number of dogs with which we have experimented is not sufficient. Although improbable, it could be that the observed Rickettsia are a type of parasite and lack any great pathogenic effect.

At least let us note that with the exception of two cases dealing with preagonic germs, the numerous hemocultures done on sick dogs have always been negative, which seems to indicate that this is not a case of bacterial infection.

F. -- MISCELLANEOUS OBSERVATIONS.

As we have noted, a Proteus type germ has been isolated in several blood samples taken from guinea-pigs inoculated with virulent products originating from infected dogs. Sero-agglutination tests, whether with this germ and different serums of dogs suffering with rickettsiosis, or with different Proteus (OXK, OX_{19}, OX_2,) and serums of different sick dogs, have given in certain cases some important agglutination titres (maxima constates: serum of dogs suffering with rickettsiosis and isolated Proteus from the guinea-pig ≠ up to 1/2,000; different serums of dogs suffering with rickettsiosis and Proteus OX_2 ≠ up to 1/500; ibid. and Proteus OXK ≠ up to 1/100; ibid. and Proteus OX_{19} ≠ up to 1/200). Although no conclusion can be drawn from these results, they do deserve mention since they present some points of comparison whith those obtained in certain human typhuses.

We should finally note that the virus carried in passage on the guinea-pig appears to present filterable forms (several inoculations from virulent organs after Seitz filtration have shown up positive).

G. -- MODES OF TRANSMISSION.

The affection reveals, at least in certain circumstances a contagious aspect. The majority of the sick dogs observed were carriers of ticks (of the genus Rhipecephalus, more often) and of lice. They had equally often been submitted to mosquito bites. These three vectors can be suspected, but by analogy with the North African rickettsiosis, one can suspect that it is the ticks which more probably deserve the blame.

H. — TREATMENT.

Most of the treatments tried have remained without results. Only with the arsenics (novarsenobenzol, stovarsol) have we noted any improvements and some cures.

CONCLUSION

There exists in Equatorial French Africa a disease of the dog, likely caused by a Rickettsia. The Congo disease seems different from the Algerian disease. Serology tests show similarities with certain human typhuses.

Pasteur Institute at Brazzaville and
Zoctechnical Service of Equatorial French Africa
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