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EPIDEMIOLOGICAL PARTICULARITY OF ANTHRAX IN RUMINANTS IN KANKAN AND KOUBIA PREFECTURES (REPUBLIC OF GUINEA)

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ABSTRACT

This research was carried out in the period from 3 to 30 November 2017 in certain localities of the prefectures of Kankan (district Kankan Koura) and Koubia (Districts: Dayan and Linguere-Katia). The main methods of investigation were: the study of the documentation available and the archives of the veterinary services, the field surveys of breeders and managers of the livestock and health services, the epidemiological study, the health indices, the evaluation of the means of prevention and to fight with their impact on the incidence of the disease and the study of clinical and post mortem features. During the decade 1995 - 2016, there were a total of 1093 outbreaks of anthrax per year, including 6776 patients for 4645 dead and 2176 destroyed corpses of cattle, while in sheep, 690 patients were registered for 597 dead and 529 corpses destroyed whereas, there are 406 patients for 367 dead and 283 corpses destroyed in goats. The symptoms observed on the 6776 sick animals by breeders, livestock and veterinary agents working in the field, have consecrated the existence of anthrax in Guinea. Morbidity and mortality rates vary according to animal species. The highest peak was observed respectively in cattle, sheep and goats in 1997 while the lowest was reported in 2016. This indicates a continuous improvement in vaccination coverage. Lethality ranges from 99% in 2007 to 32% in 2015 in cattle and 100% in small ruminants. This would be the consequence of the resistance of cattle compared to sheep and goats. The incidence of anthrax is linked to the socio-economic conditions of the country and its ability to effectively fight animal diseases. The various unsuitable practices for managing animals, the sick or corpses are the basis of the disease's endemic.

KEYWORDS: Particularities, epidemiological, ruminants, anthrax.

INTRODUCTION

Anthrax is a zoonosis caused by a Gram-positive bacillus, Bacillus anthracis[1,2]. This zoonosis is transmitted in certain regions of the world, in particular in the Middle East, in West Africa, in Central Asia, part of India, South America.[3,4] In these regions its incidence is poorly understood. However, anthrax has become a re-emerging disease in western countries where the outbreak may be intentional. The classification distinguishes natural anthrax and bioterrorist anthrax.[5] Humans are most often infected by exposure to infected animals or their products such as meat, animal skins, bones and other materials. It is estimated that there are 2000 to 20000 cases of human anthrax occurring worldwide each year.[6] In the United States, 235 cases of human anthrax have been reported between 1955 and 1994, of which 224 cases were skin forms and 11 cases were inhalation forms.

Anthrax is rare in France, the last human cases dating back to 1997 where three people were infected during an epidemic in a herd of cattle.[7] In Africa, there is very little published data on anthrax. In Zimbabwe,[2] between 1979 and 1985, 9445 cases were reported. In 2014, a case of cutaneous anthrax was described in Morocco, which was complicated by cerebromeningeal involvement.[8] In March 2014 after the death of several animals was noted, in the prefecture of Koubia, Guinea[9], an investigation made it possible to count several cases

of death, essentially linked to human anthrax, the departure of which was animal.[10]

The Republic of Guinea is a country with a strong pastoral tradition, with immense natural potentials thanks to the diversity of its agroecological conditions. Livestock remains the second activity in the rural sector after agriculture. It concerns 283 thousand breeders identified in 2000 and their families, whose numbers owned in 2016 are estimated at 6.759 million cattle, 2.38 million sheep, 2.851 million goats, 130 thousand pigs and 30 million poultry. It provides income for 30% of the rural population.[11,12] The herd is almost exclusively made up of local breeds: Ndama cattle (99.9% of cattle), Djallonke sheep and goats (99.7%) characterized by their hardiness, their ability to adapt to their environment and to enhance natural pastures and especially their resistance to trypanosomiasis. Other species such as rabbits and grasscutters also exist, but in very small numbers. A part from pigs which are mainly found in Forest Guinea and Lower Guinea, the other species are distributed over all-natural regions.[12]

This insufficient production could grow to meet domestic demand and that of neighboring countries if our animals are healthy, well fed and well housed. Unfortunately, the health problems which beset the livestock constitute a major obstacle to the increase in production. Animal diseases contribute more than 20% to production and productivity losses.[13] Among the health problems that beset livestock farming in Guinea, anthrax, mainly because of its zoonotic nature, is positioned as one of the most deadly and dangerous diseases from an economic and social point of view.

This is why, it is necessary to conduct appropriate research to elucidate the epidemiological situation of Bacillus anthracis in Guinea with a view to programming control and prevention measures at the level of all the actors that are breeders and breeders' groups, veterinarians and managers. in charge of livestock management and animal health.

MATERIAL AND METHOD

Material

This research was carried out in the districts of Dayan and Linguere-katia (prefecture of Koubia) and the district of Kankan Koura (prefecture Kankan), during the period from 2016 to 2017.

Epidemiological information collection material

The epidemiological information collection material consists of archives (livestock services, clinics and veterinary surgery) and investigation sheets (of suspicion and sampling of the Animal Disease Network in Guinea).

Material for collecting clinical and necrotic information

The material for collecting clinical and necrotic information is made up of corpse collection equipment, namely: collection kit (pots or tubes, swabs), Personal Protective Equipment (a pair of boots, a pair of plastic slippers, two pairs latex or rubber gloves, helmet, protective goggles), disinfectant solution (70° ethyl ether, alcohol swab on sterile tape), sampling rods, plastic bags, plastic fastening belts.

Method

Collection of epidemiological information

The epidemiological information collected was obtained using investigation or suspicion cards accompanied by samples and sample cards. These epidemiological data were compared with those obtained using monthly files made by livestock agents, veterinarians and annual reports of the Prefectural Directorates of Livestock as well as the Statistics of the Epidemiological Surveillance Service of the National Directorate of veterinary Services.[14]

Collection of clinical and necrotic information

Clinical suspicions and samples were taken according to the guide or monitoring protocol and were recorded on a suspicion sheet and a sample sheet.

A suspicion card contains information on the locality, the species affected, the transhumance axis when it comes to transhumant, the numbers of animals from a farm affected, the number of dead and sick, symptoms and lesions observed by the veterinary agent or reported by the breeder concerned, as well as information on watering points and blood-sucking insects present in the locality.

The sample card, for its part, contains information on the identification of the place, the breeder, the species affected and especially the identification of the animal sampled (age, sex, symptoms or lesions observed as well as the nature of the samples taken). As part of the processing of the data obtained, we used Excel software.

RESULTS AND DISCUSSION

Clinical symptoms and lesions observed

The symptoms and lesions observed in the field are presented in table 1.

Table 1: Symptoms and lesions observed in Kankan and Koubia from 2016 to 2017.

Species	Symptoms	Lesions
Cattle	- Hyperthermia ; - Tachycardia ; - Sudden death ; - Bloody discharge from natural holes ; - Oedema (shoulder, chest) inappetence.	- Painful, non-crackling hot tumor; - Splenomegaly ; - Adenitis ; - Blackish and incoagulable blood ; - Congested carcasses.
Small ruminants	- Brutal death ; - Bloody discharge from natural holes ; - Oedemes (of the chest).	- Petechiae ; - Congestion of the spleen ; - Blackish and incoagulable blood.

From the symptoms observed in domestic ruminants, we were able to detect the existence of anthrax. The absence of characteristic symptoms in certain other animals examined does not exclude the existence of this disease in the areas visited.

Epidemiological investigation

The results of the epidemiological survey on the management of anthrax during the period 1995 to 2016 are illustrated in Figures 1 and 2. These results made it possible to establish the situation of direct impact (pathological effect) of the disease on animals (intensive health indices).

The evolution of the number of disease cases in ruminants according to the years of observation (1995 to 2016) in Guinea is shown in figure 1.

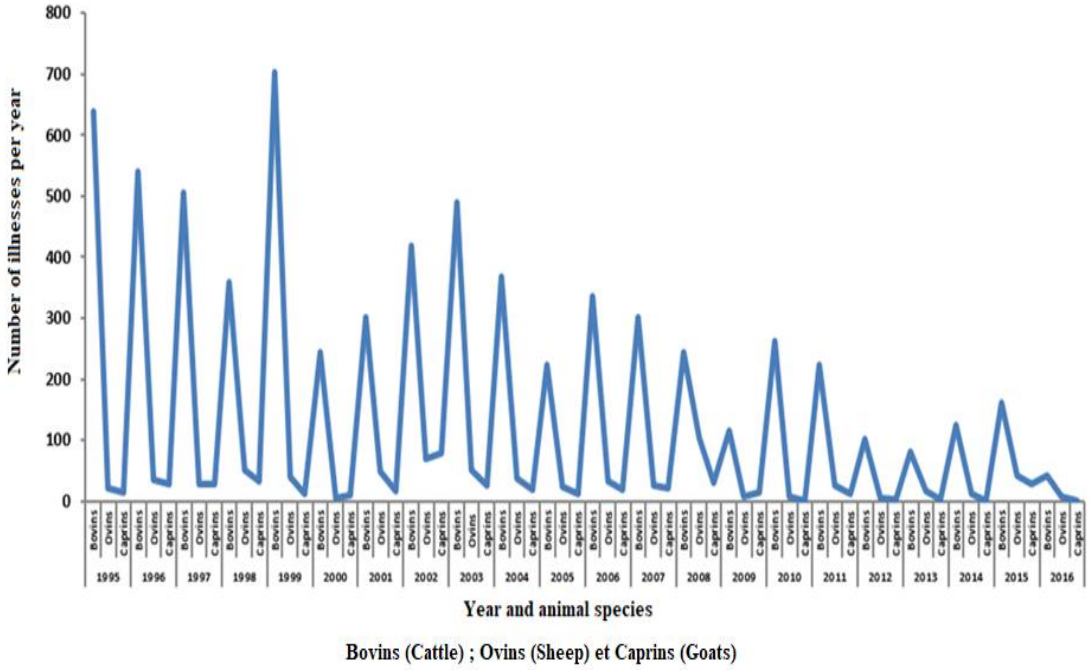

Figure 1: Annual distribution and by species of the number of anthrax disease cases from 1995 to 2016.

The number of dead anthrax animals over the years of observation may indicate the pathogenetic nature of Bacillus anthracis existing in Guinea, figure 2.

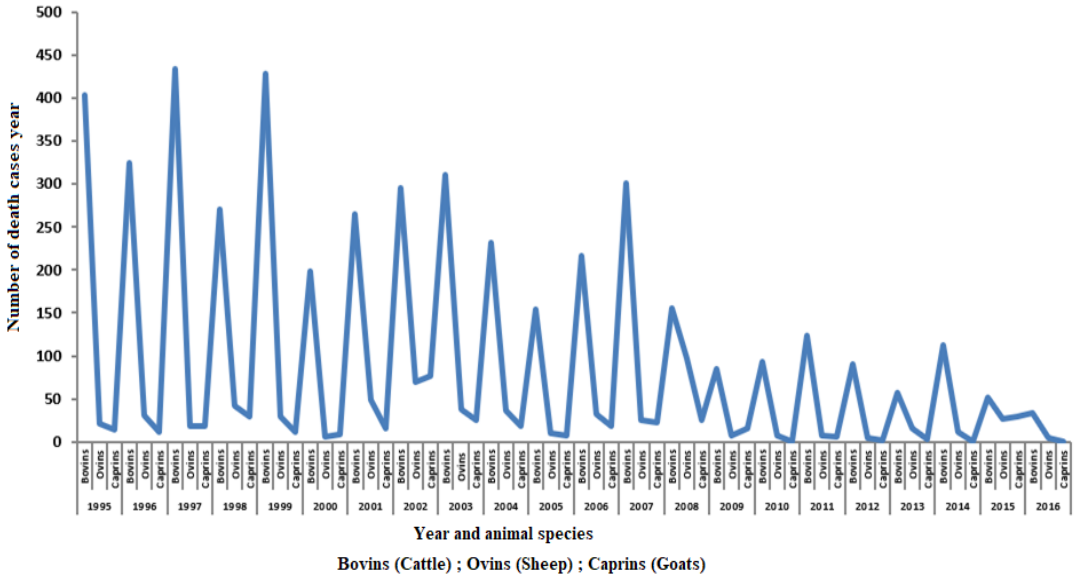

Figure 2: Annual and species distribution of the number of deaths from anthrax from 1995 to 20.

DISCUSSION

Figure 1 shows that the highest peaks of disease in the different species are respectively: cattle 702 cases in 1999, followed by sheep 103 cases in 2008 and goats 78 cases in 2002. The lowest cases were observed respectively in 2016 in cattle 42 cases, sheep 5 cases in 2012 and goats 0 cases in 2010, 2014 and 2016.

The permanent frequency of this disease in these areas of Kankan and Koubia is due to the hydrotelluric reservoir almost impossible to eradicate and the farming system practiced.

The curve in Figure 2 shows that 1997 was the deadliest year for the various species with 434 deaths in cattle, 18 deaths in sheep and goats. However, in 2016 the lowest number was recorded with respectively 33 deaths, 4 deaths and 0 deaths. The decline in the number of dead animals in 2016 is due to a certain trend towards the application of anti-epizootic measures by breeders, the breeding and veterinary services operating in the field. In this case, vaccination played an important role.

The very high number of deaths in the infected herds as well as the lightning character of the disease indicate the high virulence of Bacillus anthracis and contribute to confirm the diagnosis of presumption where no laboratory analysis had been made.

Lethality fluctuates between 99% in 2007 and 32% in 2015 in cattle and 100% in small ruminants. The relative resistance of cattle to the disease compared to sheep and goats may be responsible for this.

Epidemiological data show that morbidity and mortality rates decrease as we approach 2016 and also varies from one species to another. The peak of morbidity and mortality appears respectively in cattle, sheep and goats in 1997 while the regression rates were recorded in 2016. This indicates an unceasing improvement of the vaccination coverage and the strengthening of the vigilance of the agents of the Animal Diseases Network in Guinea (in endemic areas). These results are less alarming than those described in epidemics in which even wild animals are not spared.[15]

Anthrax is very common in Middle and Upper Guinea and more rarely in Lower and Forest Guinea. The farming system practiced, the hydrotelluric reservoir impossible to eradicate and the edapho-climatic particularities are the causes of the high frequency of anthrax in these two zones. This is in line with the ideas of the National Directorate of Livestock and the FAO (1990) which stipulate that coals (bacterial and symptomatic) and Pasteurellosis constitute a permanent health problem in the whole of Guinea with a more marked frequency in Koubia in the Middle Guinea. However, there is practically no policy for controlling these diseases. Interventions are made at the request of breeders.[16]

Morbidity and mortality rates vary according to animal species. The highest peak was observed respectively in cattle, sheep and goats in 1997 while the lowest was reported in 2016. However, some authors indicate in the Pan African animal health directory that, 22 African countries declared 155 outbreaks, 4253 cases and 2,301 dead animals linked to anthrax. Niger had the highest number of outbreaks 22%, followed by Zimbabwe 20% and Guinea 14.8%. The largest number of cases was recorded in Ethiopia, 68%, followed by Niger 8.3% and by Guinea 4%.[17]

Because of the enzootic nature of this disease, the level of socio-economic development and the farming method practiced, it is obvious that anthrax is a public health problem in Guinea. These reflections are the same in

other authors, who claim that anthrax is a major zoonosis controlled in Europe while in Africa and Asia, it continues to rage in enzootic or epidemic form causing, each year victims within animal populations and human.

CONCLUSION

Anthrax is still an endemic and sporadic disease across the various regions of the country, despite the efforts of the veterinary and livestock services. This situation is very strongly linked to the nature of the pathogen (Bacillus anthracis), the hydrotelluric reservoir and the farming method practiced in the country.

It constitutes a zoonosis of great importance, one of the health problems which assail the livestock of our country and a major obstacle to the increase in production. Anthrax due to its socioeconomic impact with some other pathologies contributes to more than 20% in production and productivity losses. These losses are caused by high morbidity and mortality, by expenses in the application of anti-epizootic measures and the treatment of the sick.

In Guinea, the evolution of this disease in certain regions of the country is not only activated by the edapho-climatic conditions but also the ruminants face enormous difficulties among which: food insufficiency in the dry season, the unexistence of adequate housing, which could constitute the secondary forces (engine) of the epizootic process.

Epidemiologicalsurvey, vaccination and the correct application of anti-epizootic measures are the main ways in which we could manage the development of anthrax in herds of farm animals and limit its transmission to humans.

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