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Case report

First Reported Case of Dog Associated Cattle Rabies in Koinadugu District, Northern Sierra Leone

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ABSTRACT

Cattle rabies is uncommon and often associated with vampire bats, dog and foxes however there is paucity of information on this condition in other West African countries other than Nigeria. This communication presents a case of dog associated cattle rabies in Koinadugu district, Sierra Leone. Case history, antirabies vaccination and dog management assessment in adjoining communities, human exposure, clinical presentations and mortality in affected cattle were evaluated using standard techniques. Laboratory screening of brain samples collected was by Real time polymerase chain reaction technique. Stray dog bitten affected cattle showed anorexia, barking, hyper excitation, hydrophobia, foaming and paralysis with resultant category 1 and 11 human exposure, 7.6% mortality and 100% case fatality rate. Laboratory examination of cattle brain specimens tested positive for Rabies virus. This report described the first documented case of dog associated cattle rabies in Sierra Leone. This communication emphasizes on continued advocacy for antirabies vaccination and education of herdsmen and community on proper dog management.

Keywords: *Dog associated Rabies, Cattle, Sierra Leone*

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INTRODUCTION

Rabies is a serious devastating zoonotic disease that affects all warm blooded animals. Globally, more than 95% of human rabies cases are attributed to a dog bite and the rest are associated with cat, fox and other carnivores (Aga et al., 2015). Rabies virus is often released in the saliva of an infected animal hence bites or contact with virus laden saliva can result into rabies (Reta et al., 2014). Universally, over 8.6 billion dollars is spent on the diagnosis and control of rabies. Generally, human mortality from endemic rabies had been estimated to be 55,000 death per year and 30,800 of the estimated death occurs in Asia while 24,200 occur in Africa. In most developing countries, stray dogs are responsible for 98% of human rabies cases (Jemberu et al., 2013).

Dogs are often reported as the main reservoir of rabies in many parts of the world and they transmit rabies to most domestic animals including pigs (Tasiame et al., 2016). Rabies in cattle is uncommon and where it occurs is often associated

with vampire bats (Kobayashi et al., 2006, Delpietro *et al.*, 2009, Gomes et al., 2010,) while in some, dogs and foxes are more associated (Liu et al., 2016).

In West Africa, there is very little information on rabies in cattle (Owolodun, 1968, Okoh, 1981). This paper presents the first dog associated cattle rabies in Sierra Leone.

CASE HISTORY

A caretaker in the guesthouse at Sinkunia in Koinadugu district in the northern Sierra Leone (Figure 1) reported that 8 of his uncle's cows dies strangely in the last week of February to March 2017 in Modoiya cattle settlement, 8 miles from Sinkunia, the chiefdom headquarters town. The cattle were reported foaming, paralyzed before death. The findings were reported to the district livestock officer based in Koinadugu for further action.

In December 2016, a cattle owner reported that a stray dog entered a holding pen and bites some cows. Six weeks

after the incident, one of the affected cows was reported bellowing throughout the night. In the morning, it was taken to the swamp, but was unable to drink water and chew grass. By the close of the day, the animal was foaming and became paralyzed. This sequence of clinical signs was observed for another eight cows that died: foaming, bellowing, hazing at people and other cows, hitting and biting any object on their way. A few died in the bush, foaming while some were viscous, attacks and sometimes broke their neck and horns. Those that became paralyzed were killed and meat sold to recover losses.

According to WHO standard on categories human exposure, the first category was those that slaughtered the cow and those who bought the suspected rabid cows' meat while the second category are those that went to the swamp where rabid cows attempt to drink, to collect drinking and bathing water and those who walk in the bush where the affected animals graze.

History of dog bite pattern, dog and antirabies vaccination assessment in communities: Dog assessment was conducted in these communities in 2013 using questionnaires, focus group discussion and personal interview. It was discovered that the entire Koinadugu districts often care less and hardly

feed their dogs. The people explained that stray and rabid dogs that often appear in these towns and cattle settlement communities bite people and animal. In Musaia, a neighbouring chiefdom, 18 miles from Sinkunia chiefdom, a cattle owner reported that rabid dog bites and killed six of his sheep. In other villages, similar stories of occasional appearance and disappearance of rabid dogs were reported. This information prompted the vaccination of over 1,000 dogs in 2013. During this investigation, it was confirmed that the appearance of stray rabid dog subsided in the community after the vaccination until December 2016.

Farm History: Koinadugu district where the farm is located has the highest number of livestock especially cattle sheep and goats. The community is predominantly muslims (96%) and they are engaged in animal rearing and vegetable production. The largest border cattle market is situated in this district where cattle from Republic of Guinea and Mali are traded. The total number of cattle group was 118. They are reared under the free range system (Figure 2A). This outbreak involved 9 cows with similar signs which include bellowing, foaming, barking, hydrophobia, chasing people, maniac, hitting objects on their way and paralysis before death. In all, the farm lost 7.6% of his total herds (9 out of 118 cows).

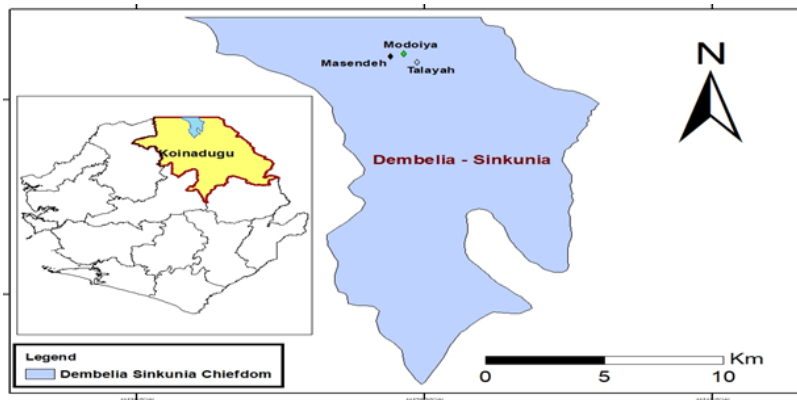


Figure 1: Map showing Modoiya village and Sinkunia chiefdom in Koinadugu district in the northern Sierra Leone



Figure 2: 2A: Other cows in the affected herd, 2B: Decapitated head of the affected cow

LABORATORY INVESTIGATION

The decapitated whole head of the last suspected rabid cow (Figure 2B) was dispatched to the Animal Science serology and Molecular Diagnostics Laboratory, Njala University where the brain was removed and tested for rabies virus (RABV) using real-time Polymerase Chain Reaction technique and was found to test positive for Rabies virus (RABV)

DISCUSSION

This report describes the first documented case of dog associated cattle rabies in Sierra Leone where the mortality was 7.6% and case fatality 100% with category I and II human exposure.

This outbreak may be connected with bull and other cows being bitten by stray dog which may commonly used for hunting and other purposes. The bull and eight other cows bitten showed clinical sign at different periods and died of the disease. This further elucidated the fact that stray dogs harbor rabies virus (Olugasa et al., 2011, Oluwayelu et al., 2015) however the possible spread of the disease may be connected with transmission of rabies virus through saliva of infected dog during the vicious attack on bull and cows. This transmission observed in this case is in sharp contrast with vampire bat or fox associated cattle rabies reported elsewhere (Lui et al., 2016) where bite marks of bats are seen

The incubation period of about 4-6 week observed in this investigation falls within the period suggested for deer (Delpietro et al., 2009). The clinical signs observed in this outbreak were also in line with those manifested elsewhere which include the prodromal, excited and paralytic stage (Chernet and Nejash, 2016) of rabies in livestock and humans in Ethiopia (Semayat and Bekele, 2017).

Although there were no human cases of rabies in Modoiya, the investigation clearly shows category 1 and II exposure especially people who killed the rabid cow, bought and ate the meat and people who drank from the swamp where rabid cow was forced to drink.

The periodic exposure of cattle and the community to rabid dogs' calls for concern and it also shows that people in these communities are at high risk of being exposed to rabies virus despite the uncoordinated vaccination which took place in the area in 2013.

The fact that the public consumed rabies associated carcasses, calls for education of the community on the danger associated with such unusual behavior. This public enlightenment was embarked on by engaging the paramount chief of Sinkunia chiefdom where the outbreak occurred, Chiefdom authorities, town elders and most cattle owners on the possible causes of the outbreak and they were encouraged to allow for the vaccination of cattle around Modoiya community.

In conclusion, this report describes the first documented case of dog associated cattle rabies in Sierra Leone with mortality of 7.6% and case fatality of 100% hence prompt reporting of any abnormal behavior in cattle and other livestock to appropriate authorities for rapid and immediate action was encouraged

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