Rabies in a Six-Week Old Bunaji-Bull Calf in Zaria: A Case Report

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Abstract

The occurrence of Rabies in Nigeria has been under reported and this has contributed to the claim of World Health Organization (WHO) that there is no rabies in Nigeria, but animals and humans are dying of the disease. On the 23rd of January 2017, a client brought a bull calf of six months old from a sedentary herd to the Veterinary Teaching Hospital, Ahmadu Bello University Zaria, which was bitten by a dog eight years ago and started showing nervous signs and inability to suckle. The bull calf was showing the following clinical signs during clinical observations, hyper salivation, straining and bellowing. The calf was euthanized; saliva and portion of the brain were taken and sent to laboratory for analyses. The laboratory results were positive for Rapid Immunochromatographic Test (RICT) for Rabies antigens and the saliva was positive for Direct Fluorescence Antibody Test (DFAT) +++. A confirmatory diagnosis of Rabies was made. The implication of the above findings concluded that Rabies should be taken into account in ruminants showing neurological symptoms besides anorexia and apathy.

Keywords: Rabies; Immunochromatography; Cattle; Human; Pastoralists

Introduction

Rabies is a viral disease that causes fatal encephalomyelitis in animals and humans [1] caused by a bullet shaped single stranded RNA virus, belonging to the genus lyssavirus and the family Rhabdoviridae. A recent global estimate indicates that rabies is responsible for approximately 60,000 human death cases annually [2]. Most of these cases occur in Asian and African countries and domestic dogs serve as the main transmitters of the rabies virus, while cattle are considered dead end host [2,3]. In Africa, rabies has also been reported as a potential problem for cattle raised in free-range, mixed crop-livestock and pastoral production systems. In these systems dogs are kept in close contact with cattle [4], providing an opportunity to transmit the virus to cattle through a bite of an infected dog. Rabies affecting cattle in subsistent systems is said to have extensive economic impacts at the level of the household, the country and human health [5]. It causes direct losses due to mortality and reduced milk yield and this affects the livelihoods of people through lower food security, due to the loss of protein resources and draught power as reported by [6]. The incubation period of the disease varies inversely with the proximity of a bite to the central nervous system, with ranges being from 21-80 days in dogs and up to 209 days in horses and cattle [2]. However in laboratory infections in cattle, rabies has been shown to occur within 21 days. It is widely held that Bos taurus breeds of cattle succumb faster to rabies than Bos indicus breeds [5]. Furthermore, young animals are more susceptible than adults. The clinical disease first manifests as change in natural behaviour, excessive salivation, excitability, mania and ends in motor paralysis and death. In man and cattle mortality is approximately 100% and susceptibility depends on region and the biotype of the virus. The disease can be prevented through vaccination of domestic dogs and cattle. However, it is controlled through quarantine and test and slaughter of confirmed cases.

Case History

A 6-week old male Bunaji-calf weighing 23 kg, from a sedentary herd of 33 cattle, was presented to the Large Animal Clinic of the Veterinary Teaching Hospital, Ahmadu Bello University, Zaria on the 23rd January, 2017 with complaint of inability to eat and suckle. The condition was first noticed a day prior to presentation and the client tried to force
Clinical manifestation was first noted on 21st January, 2017, findings were drooling saliva, inability to drink water and inability to suckle, restlessness and excessive hoarse bellowing with head pressing. Salivation became more profuse and frothy (Plate 1). The calf would charge and make aggressive postures and fall down. The ocular mucous membranes and sclera were highly congested, dehydration was 7% and incoordination of the gait in the hind legs with knuckling were noted (Plate 2). These signs steadily grew in intensity by the second day of quarantine the calf had lost the anal sphincter reflex and there was total incoordination of the hind legs (Plate 3). Saliva sample was collected using a sterile swab and inserted into a tube containing buffer and was then taken to the Virology Laboratory of Department of Veterinary Medicine for Rapid Immunochromatic assay test. Rabies antigen Screening test result was positive (plate 4). Considering the danger this posed on the people at the Clinic, the calf was euthanized after seeking the consent of the owner. Brain of the calf was extracted as described by Kaplan and [7]. Briefly, the decapitated head was firmly held in a vice fitted on the operation table in the postmortem room. A midline incision was made on the dorsal surface of the head using scalpel and blade. The skull was then sawed to expose the brain after dissection of the skin, Apo neurosis and reflecting the temporal muscles laterally. Two medio-lateral cuts were made at the occipital bone, temporal bones and finally joining the two cuts at a mid- point just above the eyes. The calvarium was lifted with the aid of a pair of strong thumb forceps to expose the meninges and optic nerves; these were then cut using a pair of pointed scissors while holding it with a rat toothed forceps. The extracted brain was transferred into a petri dish and a representative sample was sent to the Virology and Viral Zoanoses Laboratories Department of Veterinary Public Health for rapid Immunochromatographic test for rabies antigen and Direct Fluorescent Antibody Test (DFAT) respectively.

Plate 1: Showing the calf with drooling salivation

Clinical Findings

Clinical manifestation was first noted on 21st January, 2017, findings were drooling saliva, inability to drink water and inability to suckle, restlessness and excessive hoarse bellowing with head pressing. Salivation became more profuse and frothy (Plate 1). The calf would charge and make aggressive postures and fall down. The ocular mucous membranes and sclera were highly congested, dehydration was 7% and incoordination of the gait in the hind legs with knuckling were noted (Plate 2). These signs steadily grew in intensity by the second day of quarantine the calf had lost the anal sphincter reflex and there was total incoordination of the hind legs (Plate 3). Saliva sample was collected using a sterile swab and inserted into a tube containing buffer and was then taken to the Virology Laboratory of Department of Veterinary Medicine for Rapid Immunochromatic assay test. Rabies antigen Screening test result was positive (plate 4). Considering the danger this posed on the people at the Clinic, the calf was euthanized after seeking the consent of the owner. Brain of the calf was extracted as described by Kaplan and [7]. Briefly, the decapitated head was firmly held in a vice fitted on the operation table in the postmortem room. A midline incision was made on the dorsal surface of the head using scalpel and blade. The skull was then sawed to expose the brain after dissection of the skin, Apo neurosis and reflecting the temporal muscles laterally. Two medio-lateral cuts were made at the occipital bone, temporal bones and finally joining the two cuts at a mid- point just above the eyes. The calvarium was lifted with the aid of a pair of strong thumb forceps to expose the meninges and optic nerves; these were then cut using a pair of pointed scissors while holding it with a rat toothed forceps. The extracted brain was transferred into a petri dish and a representative sample was sent to the Virology and Viral Zoanoses Laboratories Department of Veterinary Public Health for rapid Immunochromatographic test for rabies antigen and Direct Fluorescent Antibody Test (DFAT) respectively.

Laboratory diagnosis

Rapid Immunochromatographic test for brain sample

Brain samples were tested using the rapid Immunochromatographic test as described by the manufacturer. Briefly, a 10% suspension of the brain sample was made in the buffer tube. The Immunochromatographic test cassette was then removed from the foil pouch and placed horizontally on the table. Using a sterile dropper, three drops of the 10% sample was then dripped into the sample hole in the cassette and result was interpreted within five to ten minutes.
Direct Fluorescent Antibody Test

A working dilution of 1:40 of the rabies direct titration Fluorescent Antibody assay was achieved following titration assay reagent (Monoclonal antibody-conjugate) by Fujirebio Inc. Diagnostic in accordance with Manufacturer’s recommendations and as described by [2]. Briefly, a small fraction of the brain sample was smeared using wire loop on one part of a slide pressed on a disposable tissue to allow for an even spread and make the smear light and then air dried and fixed in cold acetone for one hour at -20 °C. The slides were then air dried and then the rabies conjugate was applied to cover the smear and incubated for 30 minutes at 37 °C in a humid chamber, after which excess conjugate was removed from the slides by rinsing it with 7.4 pH PBS solution about 3-5 minutes and then allowed to air dry. Then cover slips were mounted with buffered Glycerol Mounting medium and the slides were examined using a Fluorescent microscope (Carl Zeiss, Germany) within 2 hours after staining. The test is considered positive when there is an appearance of brilliant apple-green fluorescence coloured exhibited against a black background. If no specific apple-green fluorescence is exhibited the test is negative.
The laboratory results were positive for Rapid Immunochromatographic Test (RICT) for Rabies Antigen and Direct Fluorescent Antibody Test (DFAT) ++++. A confirmatory diagnosis of rabies was made.

Discussion

The occurrence of clinical rabies in a 6 week old calf was rather unusual for in this case the incubation period was only eight days. Unlike the widely held view that *Bos indicus* breeds do not quickly succumb to rabies. This case was unique in that, though it was a zebu, it came down with clinical rabies within only eight days. This report has further exposed the dangers the pastoralist herds are exposed to. The rabid dog that bit this calf was from unknown sources. It is also not the tradition in Nigeria for people to vaccinate their dogs against Rabies. Thus, the pastoralist dogs are also at risk and this can lead to exposure of cattle, small ruminants and even people in the community to rabies with untold consequences. The calves were supposed to be protected for at least 8 weeks by passive immunity; this case shows there was no maternal immunity protection because it’s not in the practice of pastoralist to vaccinate their livestock against rabies. Rabies is a rapidly fatal disease threatening livestock and human beings country wide; it has become one of the most serious Zoonoses in Nigeria; this report is the second of such cases we reported [8-10]. Earlier on, reported an outbreak of rabies in a cattle herd in Kano State, Nigeria. There might have been similar reports that might not have been reported in Nigeria.

In Nigeria, control and prevention of rabies lies with the dog owners. There has been law/regulation to force vaccination of dogs against the disease but unfortunately the laws are not being enforced. The presence of the disease in livestock as reported is significant and should be appreciated by the veterinary authorities through public education and purposeful animal vaccination campaigns in dogs and cats against the disease.

Conclusion

Therefore the current vaccination campaigns that ordinarily target dogs should also be extended to include other livestock particularly cattle; there is the need for serious awareness campaigns to enlighten the public on the serious nature of the disease in both human and livestock. Particularly in all the communities in Zaria and its environs. There should also be education of pastoralists to vaccinate their guard dogs and report all suspected cases promptly.

References