



Rabies in a two-year-old post-partum doe

IG Opaluwa – Kuzayed^{1*}, RE Edeh², DO Omoniwa², GP Karaye², GY Gurumyen³ & MO Bakare⁴

1. Department of Theriogenology and Production, University of Jos, Plateau State, Nigeria

2. Department of Veterinary Medicine, Surgery and Radiology, University of Jos, Plateau State, Nigeria

3. Department of Veterinary Pathology and Microbiology, University of Jos, Plateau State, Nigeria

4. Nigerian Police Force, Jos, Nigeria

5.

*Correspondence: Tel.: +2347030143405; E-mail: oimabengraces@yahoo.com

Copyright: © 2024

Opaluwa – Kuzayed *et al.* This is an open-access article published under the terms of the Creative Commons Attribution License which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract

Rabies is a viral disease that is fatal to infected animals. A 2-year-old post-partum doe was presented to the Veterinary Teaching Hospital, University of Jos, Plateau State, Nigeria, with complaints of exhibiting strange behaviours of biting and attacking anyone approaching it. History revealed the doe kidded a set of triplets a week before the presentation. Clinical evaluation revealed aggression, attempting to bite and bite itself, and self-mutilation, among others. The doe was humanly sacrificed and the brain sample was sent to the Rabies Laboratory of the National Veterinary Research Institute, Vom, Plateau State, Nigeria. Rabies was confirmed using a direct fluorescent antibody test (FAT). The implication of the case is discussed in the article.

Publication History:

Received: 17-07-2024

Revised: 27-08-2024

Accepted: 11-09-2024

Keywords: Bite, Fluorescent antibody test, Goat, Post-partum, Rabies virus

Introduction

Rabies is a neglected zoonosis disease infecting all mammals and caused by an RNA virus belonging to the family Rhabdoviridae genus *Lyssavirus* (Nurumal *et al.*, 2022). It is transmitted through contact with an infected animal's saliva, usually through bites from a rabid animal (Nurumal *et al.*, 2022). This virus affects the neurological systems of animals and is known to cause severe and fatal neurologic disease. Cases of rabies exposure during pregnancy are uncommon in

both humans and animals, but there are cases of animal bites on women during pregnancy requiring them to receive a post-exposure prophylactic treatment as in non-pregnant women (Windrim *et al.*, 2018). However, there is no such report on animals. Rabies in pregnancy is capable of causing premature rupture of membranes leading to the termination of pregnancy and pre-term labour. It is also possible for a rabid-bitten pregnant individual to give birth to a

clinically healthy baby (Windrim *et al.*, 2018). Domestic and wild dogs, cats, and foxes are the primary hosts of the rabies virus, while bats are susceptible hosts serving dual purposes of being reservoir hosts and sources of infection to livestock and humans. Rabies in goats has been considered as an infrequent disease, but regardless of the animal species affected, it can be suspected when a goat shows any abnormal change in behaviour. There are a few clinical reports on rabies in food animals (Ahmad *et al.*, 2017), while cases of rabies in pregnant or post-partum goats worldwide lack clinical data. The existing literature on rabies in food animals is sparse and the few clinical reports available do not provide sufficient information for effective diagnoses and management strategies. This paucity of information highlights a critical knowledge gap that needs to be addressed to improve the understanding and control of rabies in food animals, particularly goats.

Case Presentation

Case history

A 2-year-old post-partum cross bred doe was presented to the Large Animal Clinic of the Veterinary Teaching Hospital, University of Jos, Plateau State, Nigeria, with complaints of the animal exhibiting strange behaviours of biting and attacking anyone approaching it after giving birth to triplets a week before presentation. History revealed the loss of two of the 3 kids immediately after birth. The owner had no prior knowledge of dog bite to the doe but lives in a community with frequent reports of dog bite cases.

Clinical manifestation

The doe was lactating evident by an engorged mammary gland. There were signs of aggression,



Plate I: A goat restrained using a dog catcher

restlessness, attempting to bite anyone approaching it, mutilation of its skin and a teat of its mammary gland. Based on the history and clinical manifestation, rabies was tentatively diagnosed pending a confirmatory laboratory finding.

Investigation

The doe was restrained using a dog catcher (Plate I) and its head was decapitated (Plate II). The brain was extracted from the decapitated head, placed on ice packs and transported to the National Veterinary Research Institute, (NVRI), Vom, Nigeria for post-mortem examination and a confirmatory diagnosis. Rabies direct fluorescent monoclonal antibody-conjugate reagents from Fujirebio Diagnostic Inc Malvern, P. A 19355 was used as previously described (Mshelbwala *et al.*, 2013).

Results

There were viral antigenic reactions of the brain tissues and the specific antibodies of the RABV allowing for the visualization of rabies virus-specific antigens using fluorescent microscopy technology, the result showed brilliant apple green fluorescein which was round/oval or dust/sand-like fluorescent particles on direct fluorescent antibody test (FAT) indicating a positive test for rabies viral antigen as shown in Plate III.

Discussion

The fluorescent virus-specific antigens observed in this case are similar to those reported by Tekki *et al.* (2014) in the brains of sheep, cattle and goats. It is also similar to those found in dogs (Karshima *et al.*, 2013) and horses (Shinwari *et al.*, 2014). There is no known or reported case of post-exposure prophylaxis for rabies

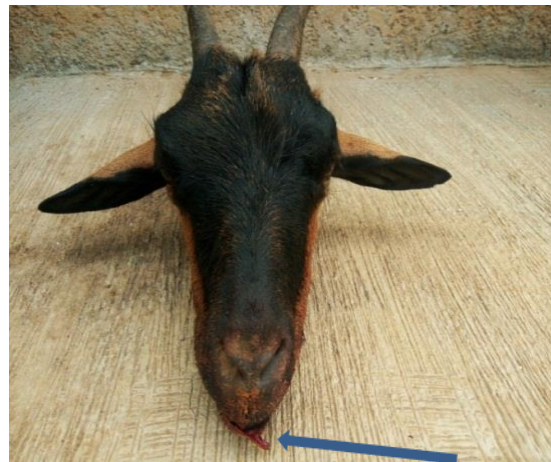


Plate II: Decapitated head of a goat suspected to be rabied

in pregnant or post-partum animals aside from this to the best of our knowledge, this is probably the first report of rabies virus infection in a pregnant goat in Nigeria.

The conceptus suffers various diseases at various stages which may be the reason why the doe may have lost her three kids following delivery which were disposed of before the case was reported. Most organisms that cause embryopathy do that either by direct or indirect effects on the reproductive system. Direct effects on the embryo may result in early embryonic death and those that infect the advanced fetus or its placenta usually result in abortion, stillbirths or the birth of weak babies. Indirect effects on embryo survival may also be through adverse effects on uterine function and those that infect the maternal component of the placenta resulting in embryonic death, fetal death with abortion, mummification or stillbirth. The loss of any pregnancy or fetus represents a significant loss of potential income to the producer therefore appropriate actions should be taken to prevent this. Though there is no documented information as to the effect of rabies on a fetus, the report of Windrim *et al.* (2018) involving a pregnant woman bitten by a bat, who received 4 doses of rabies vaccine and a dose of rabies immunoglobulin but went into preterm labour 30 weeks after been bitten by a bat. The report shows that pregnancy is not contraindication for post-exposure prophylaxis and treatment can be discontinued if there is proof that the animal that bit is not infected as suggested by Windrim *et al.* (2018). In an earlier report, Sudarshan & Ananda (2007) reported that post-exposure prophylaxis during pregnancy had no impact on both mother and child in humans after tracking 14 cases of post-exposure prophylaxis administered to pregnant women and children till they were a year old and found with no negative outcomes. Toovey (2007) also reported a case of 251 pregnancies in humans, where post-exposure prophylaxis was given and there were also no negative outcomes. However, the same cannot be said for animals since such reports are not available. In addition, Zhen *et al.* (2016) reported a case where a pregnant woman appearing in labour was earlier bitten by a rabid dog and died after delivery though the baby survived without rabies infection. The phenomenon that the newborn infant survived and was healthy may be attributed to the protective role of the placenta in resisting the invasion of the rabies virus or the absence of systemic viraemia. The prompt administration of vaccines and antirabies immunoglobulin to the infant may have also contributed to his survival.

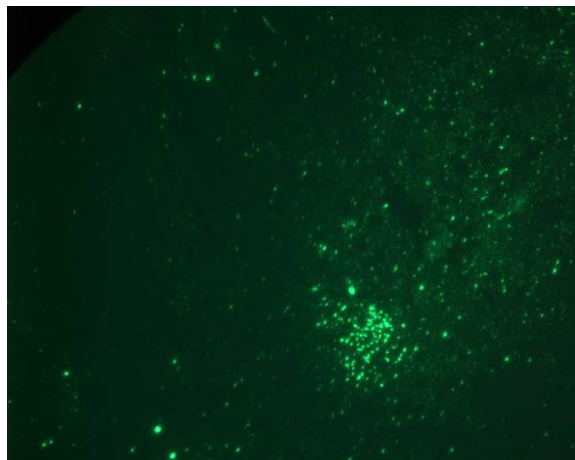


Plate III: Photomicrograph showing brilliant apple green fluorescein particles on direct fluorescent antibody test (FAT) indicating a positive result for rabies viral antigen

Dog bite cases in both humans and animals should be duly and promptly reported and properly investigated. It is, therefore, recommended that preventive measures be taken with utmost importance such as duly and promptly vaccinating animals against the virus, proper housing of animals to protect them from bites from infected animals, and pre-exposure vaccines should also be encouraged for people at risk of bites or coming in contact with infected animals. Public enlightenment campaigns should be encouraged to sensitize the public on the dangers imminent of bites from animals and also post-exposure protocols to be taken into consideration in case of any eventualities. There is a need for more comprehensive clinical studies on rabies in food animals particularly goats to understand the disease presentation and develop diagnostic and treatment protocols. In addition, research on the safety and efficacy of PEP in pregnant animals is urgently needed to inform public health guidelines and ensure the protection of these vulnerable populations. By filling these gaps, researchers can contribute to a more effective and sustainable approach to a more effective and sustainable approach reducing the burden of this deadly disease on both human and animal populations.

Acknowledgements

The authors are very grateful to the staff of the rabies Diagnostic Laboratory of the National Veterinary Research Institute (NVRI) Vom, Nigeria, Dr. James Ahmed for his prompt attention to the case.

Conflict of Interest

The authors declare that there is no conflict of interest.

References

- Ahmad I, Kudi CA, Anka MS & Tekki IS (2017). First confirmation of rabies in Zamfara State, Nigeria in a sheep. *Tropical Animal Health and Production*, **49**(3): 659–662.
- Karshima NS, Kujul NB, Ogbu KI, Abdullateef MH, Dung PA, Salihu AA, Obalisa A & Paman ND (2013). Incidence and risk factors associated with rabies and dog bites among dogs involved in bites in Plateau State, Nigeria between 2011 and 2012. *Journal of Animal Science Advances*, **3**(3):114-120.
- Mshelbwala PP, Audu SW, Ogunkoya AB, Okaiyeto SO & Abdullahi SU (2013). A case study of rabies in a six-month-old calf in Zaria, Nigeria. *Journal of Experimental Biology and Agricultural Science*. **1**(4):218-222.
- Nurumal ST, Mansor J, Ghazali M, Pakhurdin NAM, Atil A, Jeffree MS, Abdul-Rahim SSS & Hassan MR (2022). Animal rabies: A systematic review. *Malaysian Journal of Public Health Medicine*, **22** (3):145-152.
- Shinwari MW, Annand EJ, Driver L, Warrilow D, Harrower B, Allcock RJN, Pukallus JH, Bingham J, Kung N & Diallo IS (2014). Australian bat lyssavirus infection in two horses. *Veterinary Microbiology*. doi./10.1016/j.vetmic.2014.08.001.
- Sudarshan MK & Ananda GMS (2007). Assessing the safety of post-exposure rabies immunization in pregnancy. *Human Vaccine*. doi./10.4161/hv.3.3.4007.
- Tekki IS, Meseko CA, Omotainse SO, Atuman YJ, Chukwukere OS & Okewole PA (2014) Incidences of rabies in domestic animals and consequent risk factors in humans. *Journal of Medical Microbiology and Diagnosis*, doi./10.4172/2161-0703.1000143.
- Toovey S (2007). Preventing rabies with the verorab vaccine. *Travel Medicine and Infectious Diseases*. doi./10.1016/j.tmaid.2007.09.006.
- Windrim C, Allison JM & Kellie EM (2018). Exposure to rabies during pregnancy. *Canadian Medical Association Journal*. doi./10.1503/cmaj.180338.
- Zhen YQ, Guo WL, Qjao GC, Peng J, Chang L & Alfred L (2016). Survival of a newborn from a pregnant woman with rabies infection. *Journal of venomous animals and toxins including Tropical Diseases*. doi./10.1186/s40249-016-0078-y.