

# Canine rabies in Belford Roxo City, Rio de Janeiro, Brazil: a case report

Raiva canina no Município de Belford Roxo, Rio de Janeiro, Brasil: relato de caso

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## Abstract

Rabies is a highly lethal disease and is considered one of the most important zoonoses worldwide. In Brazil, the rabies cycle in domestic animals is under control. However, there is feedback from the wildlife cycle as many bats are present in the cities and rural areas of the country. This paper reports a case of a dog receiving veterinary assistance that presented with misbehavior and other unusual signs. After clinical evaluation by two veterinarians and a period of hospitalization to perform tests and treatment, the dog died, and the Municipal Health Department was contacted due to the suspicion of rabies. After laboratory testing and sample analysis, the diagnosis of rabies was confirmed. This case demonstrates the importance of veterinarians' qualifications in performing clinical and laboratory diagnoses, such as their knowledge concerning surveillance measures and preventive steps before and after exposure. Reinforcing the significance of maintaining vaccination coverage for rabies and promoting public and private vaccination campaigns in areas that lack vaccination campaigns are useful.

**Keywords:** rabies, dog, spillover, bat.

## Resumo

A Raiva é uma doença de elevada letalidade e é considerada uma das mais importantes zoonoses do planeta. Seu ciclo urbano está praticamente controlado no Brasil, porém, é constantemente retroalimentado pelo ciclo silvestre devido à presença de morcegos tanto nas áreas rurais como urbanas. Este trabalho relata o caso de um cão que foi levado para atendimento veterinário apresentando comportamento e outros sinais incomuns. Após a avaliação de dois profissionais veterinários e uma internação para exames e tratamento, o animal foi a óbito e o serviço municipal de saúde foi acionado devido à suspeita de Raiva. Após os devidos exames laboratoriais, a Raiva foi confirmada nas amostras analisadas. Este caso demonstrou a importância não só da capacitação dos profissionais veterinários para suspeitar, realizar o diagnóstico clínico e laboratorial da Raiva como o conhecimento acerca das medidas de vigilância, prevenção e controle e os esquemas de profilaxia da raiva humana pré e pós exposição. Ressalta-se ainda a importância da manutenção da cobertura vacinal contra a Raiva, seja ela realizada por campanhas públicas de vacinação, seja por iniciativa dos tutores onde as campanhas não mais ocorrem.

**Palavras-chave:** raiva, cão, "spillover", morcego.

## Introduction

Rabies is one of the oldest diseases in the world (Baer, 2007), and it is currently considered one of the most important zoonoses at present (Moutinho et al., 2015; Nyberg et al., 1992). However, rabies remains one of the leading causes of mortality in thousands of people worldwide (World Health Organization, 2018).

Rabies is an endemic disease that has spread randomly across Brazil. Tens of documented cases were reported before 2005; since 2006, the number of rabies cases has reduced, and the rate has remained currently stable (Brasil, 2019).

In 2021, 17 cases of canine and feline rabies were confirmed, eight of which were caused by wild variants, five by variant "3" (AgV-3), two were not identified, and the other two remain under investigation (Brasil, 2022). In 2020, two cases of human rabies were reported. One was due to a fox attack in a rural area of Paraíba, and the other was an accident with a bat in Angra dos Reis,



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Rio de Janeiro State (Brasil, 2022). The most recent cases, which were related to bats, occurred from April to May 2022 among four indigenous children in northern Minas Gerais (Brasil, 2022).

The Brazilian Ministry of Health established preventive measures against rabies in 1973. It includes an annual immunization program organized in campaigns and epidemiological monitoring of possible cases (Bahia, 2021). These actions caused the rate of rabies from variant 2 (AgV-2), which is responsible for urban cycle transmission, to decline today (Brasil, 2011).

Nevertheless, the virus remains present in our environment in wildlife animals, such as bats. Hematophagous bats are of pivotal importance for rabies transmission to animals and people, both in wildlife and in rural areas (Bastos et al., 2021). In urban areas, common bats, hematophagous or not, perish from rabies and fall on the ground, thereby exposing dogs, cats, or even people and causing infection in a process known as "spillover".

"Spillover" is the transmission of the variants from bats to dogs and cats, which consequently infects humans (Kotait et al., 2007). In addition, Moutinho et al. (2015) have reported that transmission through the air cycle has been increasing not only in the country, but also in the state of Rio de Janeiro. A constant high risk of accidents is associated with bats, regardless of the species or the severity of the injury. Therefore, every accident involving bats is considered serious.

This paper reports a case of rabies in a dog with previous contact with a bat in Belford Roxo City, Rio de Janeiro, in 2021.

## Case report

The animal in this report was a mixed-breed male dog, aged approximately 1 year and 6 months from Belford Roxo, Rio de Janeiro state. The dog was taken for veterinary assistance in a local clinic on May 4, 2021, due to a "stiff neck," open mouth, and excessive salivation. The veterinarian suspected a foreign body obstruction and degenerative disk disease. However, the owner was not confident regarding the diagnosis, so she visited another clinic located in Duque de Caxias City for a second opinion. The animal presented with a stiff neck, left-sided head tilt, and salivation.

Initially, the second veterinarian assumed that the salivation was a consequence of a previous morphine injection, which was administered in the first clinic to induce vomiting as the previous veterinarian suspected a foreign body obstruction. The animal was very calm, which made performing the physical examination easy. Gloves were used for protection while evaluating the dog, and upon examination, no neck or mouth injury was detected. Following standard practice, several questions were asked: for example, if the animal had previous contact with bats, and the owner answered affirmatively. When asked regarding vaccine protocols, the owner answered that the animal was not vaccinated against rabies. Hence, she was advised to take the animal for radiographic examination as required in the first clinic to evaluate the neck and return as soon as possible. The veterinarian searched for diagnostic information on rabies, and the radiographic report did not indicate any injuries in the vertebral column or temporomandibular joint.

On the following day, May 5, the owner sent a message and a video through "WhatsApp" informing that the animal had a staggering pace. The veterinarian requested that the animal be brought to the clinic immediately for hospitalization and explained his clinical suspicion and severity.

Upon admission, the animal entered the clinic at a staggering pace. Venous access was made to inject medications and antibiotics as the blood test revealed signs of infection. A sample was collected for the distemper polymerase chain reaction test, which was later reported to be negative.

The animal then stayed under supervision, and as the hours passed, serious signs of aggressiveness and hostile behavior started to appear, complicating the medical team in handling his attendings. The dog growled and hit the canine box whenever someone attempted to approach it. Incoordination worsened during the night, and the dog struggled to stand and fell repeatedly. Then, it spent the rest of the night lying on the box. On May 6 at 10 am, the dog died after 24 h of hospitalization.

The veterinarian on duty was oriented to put on personal protective equipment (PPE), while handling the animal to place it inside a plastic bag and keep it refrigerated until the veterinarians from the municipal government of Duque de Caxias took the animal to the Rabies Laboratory of Diagnostics.

## Discussion

The reported case and its development are not surprising. Rabies testing should always be considered a standard procedure since the transmission pattern has changed over the years (Moutinho et al., 2015). The rabies cycle in urban areas, described as the transmission of the AgV-2 responsible for cat and dog rabies and subsequent transmission to humans, was almost eliminated as a consequence of massive animal vaccination campaigns. Currently, occasional cases of rabies caused by bat variants are observed in dogs, cats, and humans. The AgV-3 (*Desmodus rotundus*) variant is the most common, followed by AgV-4 and AgV-5 (Brasil, 2022). Bats are natural reservoir hosts for the rabid virus, and they ensure its maintenance in the environment through air cycle transmission (Brasil, 2011).

In this cycle, rabies transmission has two forms: one by blood-feeding bats of *D. rotundus* species, and the other by indirect contact between infected bats and domestic animals or humans. The first had already caused two major outbreaks of human rabies in Brazil from 2004 to 2005 in Pará and Maranhão, and again in Pará in 2018 (Brasil, 2022). The second may occur indirectly when infected bats are hunted in mid-flight by cats or found lying on the ground while still alive by domestic animals or people. In this way, the bats may bite their captors as a form of defense, thereby transmitting the virus. Thus, domestic animals, including dogs and cats, may become infected; such animals often do not have the immunological ability to respond to the infection because of the absence of a recent vaccination and may then transmit the virus to their owner.

Technical Note No. 19 (Brasil, 2012) provides guidelines and protocols for the exposure of dogs and cats to bats in urban areas. This document is specially intended for healthcare epidemiological surveillance departments of municipal diseases, and contains important information on vaccination and observation protocols for pet animals. This should be implemented in daily clinical practice. Although this document was published in 2012, only a few veterinarians are aware of its statements, complicating not only the epidemiological surveillance actions to prevent the disease in animals but also making it difficult for public organizations to take care of the assistance and prophylactic actions toward the population.

## Conclusions

In this case, being aware of the epidemiology and of protocol action plans in the face of a potential rabies occurrence serves to properly adopt biosecurity measures, such as the proper use of PPEs, and to notify the healthcare authorities. These actions are crucial to assist professional in establishing a correct diagnosis and taking preventive actions concerning those who are involved with the animal.

Despite rabies in domestic animals being under control, there will always be a risk for new occurrences as wildlife animals shed the virus, and their actions keep the virus ongoing. This study demonstrates the importance of the veterinarian's qualification to perform clinical and laboratory diagnosis, along with possessing the required knowledge on surveillance measures, including preventive steps before and after exposure. Reinforcing the significance of maintaining vaccination coverage for rabies and promoting public and private vaccination campaigns in areas that lack vaccination campaigns remain useful.

## Ethics statement

All procediments were consented by the animal owner

## Financial support

None.

## Conflict of interests

There are no conflict of interest

## Authors' contributions

PCF - Development of methodology; preparation and writing the initial draft. RMAL - Writing, Review and Editing manuscript. CBG - Writing, Review and Editing manuscript.

## Availability of complementary results

<https://data.scielo.org/>

The study was carried out at Veterinary Clinic at Belford Roxo city, RJ, Brasil.

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