

## Case Report

# Probable paralytic rabies in a dog: ante-mortem clinical diagnosis implications in limited resource settings

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## Abstract

**Introduction:** Rabies is a dreadful zoonotic viral disease that affects animals and humans with a fatality rate of 100%. This report aims to create awareness among the veterinarians and general public about the paralytic form of rabies in order to understand the antemortem clinical diagnosis implications in limited resource settings, so as to follow the post-exposure prophylaxis at the golden hour period of rabies transmission.

**Case presentation:** A one-year-old female dog was presented to the Ambulatory Clinic Unit, Veterinary Clinical Complex, Veterinary College and Research Institute, Theni, Tamil Nadu, India with the ailment of a dropped jaw and was unable to swallow food and water for the past three days. Epidemiological investigations revealed that the animal had dog-bitten wounds from a week ago. On clinical examination, facial distortion, changes in the vocal cord, and paralysis of the throat muscle were noticed. Based on the anamnesis, clinical, and epidemiological investigations, the animal was diagnosed to be a probable case of paralytic form of canine rabies. In the limited resource settings, antemortem clinical diagnosis was practiced to suspect rabies-infected dogs. Further, the owner was advised to implement preventive measures to safeguard against rabies infection. The dog was kept under isolation and succumbed on day two with evidence of progressive paralytic signs.

**Conclusions:** This report emphasizes the importance of paralytic rabies, alongside of furious form of rabies, further creating awareness among the general public about the antemortem clinical diagnosis under limited resource settings.

**Key words:** rabies; canine; dumb; awareness; antemortem; diagnosis.

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## Introduction

Rabies is an incurable zoonotic viral disease of animals and humans with endemic prevalence all over the world. Human rabies cases are mainly due to dog bites (about 95%), and are preventable by adopting an appropriate strategy [1]. Though the disease is considered to be dangerous, an effective reporting system is not practiced in developing countries like India. Around 25,000–30,000 human rabid fatalities are reported annually, and dogs are considered to be the primary reservoir for rabies transmission in India. Every year, approximately 15 million people seek anti-rabies treatment after dog bites [2]. The World Health Organization (WHO) has proposed that government

and private health agencies across the world set a target for the elimination of dog-mediated rabies in humans by 2030 [3].

Public awareness on rabies in combination with the one health approach is a major step towards achieving this target. Despite the alarming rate of incidence of rabies all over the world, people are not aware of the pre- and post-exposure prophylaxis of dog bites [4]. The furious form of rabies is considered the major form of rabies and masks awareness on other dumb forms of rabies in animals [5]. Therefore, dogs with paralytic rabies are overlooked and this increases the incidence of rabies in humans and other animals.

There is a lack of standard laboratories, and antemortem clinical diagnosis of rabies is practiced in limited resource settings [3]. Antemortem clinical diagnosis is a diagnostic approach practiced especially in countries with a high endemic load of the primary reservoir host (dogs) and where laboratory confirmation is limited. Researchers worldwide have generated data using laboratory-confirmed rabies cases and an antemortem risk index profile is created from this data. This profile, along with suggestive clinical signs, provide the probability of a case being a suspected or probable case of rabies. This strategy assists the physicians in clinical decision-making. In rabies, the golden or zero hour is pivotal for the physician to effectively adopt post exposure prophylaxis, as defined by WHO.

There are numerous sources of information available in online platforms regarding rabies and its clinical forms. However, there are limited case reports published on the dumb or paralytic form of canine rabies. Therefore, this report is aimed to discuss the dumb form of rabies in dogs and the implications of clinical diagnosis in limited resource settings, to create awareness among the public and veterinarians for better surveillance and implementation of effective preventive strategies during the golden hour of rabies transmission.

### Case presentation

A one-year-old female dog was presented to the Ambulatory Clinic Unit, Veterinary Clinical Complex, Veterinary College and Research Institute (VC and RI), at Dharmapuri village, Theni, Tamil Nadu, India.

The case was presented with a history of dropped jaw and oropharyngeal dysphagia for the past three days. An epidemiological investigation was performed and it was revealed that the dog was not yet vaccinated for any diseases and was raised under community type of rearing. Further, the dog had dog-bitten wounds from a week ago, over the neck area and post-exposure prophylaxis was not followed as the owners were not aware of rabies. On clinical examination, the animal was reported with facial distortion, cyanosis of the tongue, salivation, changes in vocal cords, paralysis of throat muscles, reluctance to lick the provided water, and absence of biting instant. Based on the anamnesis, clinical, and epidemiological investigations, the animal was diagnosed to be a probable case of paralytic form of canine rabies. In order to differentiate from canine distemper disease, a commercial chromatographic immunoassay field test (Anigen Rapid CDV Ag Test Kit, Catalogue No. 1103D153, BioNote Inc., Hwaseong, Republic of Korea) was performed on the

ocular swab sample collected from the case, following the manufacturer's guidelines and the test result was negative.

Due to the lack of availability of rabies diagnostic laboratories, antemortem clinical diagnosis was adopted and the owners and the neighbors were briefed about the dumb form of rabies based on previous studies [3,6]. Further, the suspected animal was isolated in a separate room to keep under observation for rabies at the owner's home. The owner was instructed to take post-exposure prophylaxis to avoid further disease transmission.

On day one of isolation, the animal was found to have quadriplegia, lateral recumbency, and respiratory difficulty; and on the evening of the following day, the animal collapsed. Proper preventive and control strategies were instructed to dispose the dead animal and to disinfect the room used for isolation as per the guidelines of WHO [7].

### Discussion

Rabies is a disease of global concern, with 100% case fatality rate. Due to the zoonotic nature of rabies, there is a need for a strong multi-directional approach to eliminate the disease through the one health approach [1]. In countries like India, > 95% human rabid fatalities occur due to dog-mediated rabies. The drastic effects caused by the disease may be prevented by adopting an appropriate preventive strategy in dogs and humans. Rabies has ancient origins dating back to around 3000 BCE, and has been well documented for over 4300 years. Yet, there is no effective treatment to cure the infected animals and humans. Dogs are the major reservoir and host for human rabies transmission in countries like India [3]. Awareness among the public is an effective way to prevent dog-mediated human rabies transmission.

Dogs are raised under community type of rearing in most parts of India. When unvaccinated reservoir hosts (dogs) are available, rabies becomes a threat to humans and other domestic and wild animals [2]. This is an important factor for the high numbers (25,000-30,000 humans per year) of human rabid fatalities in India.

An understanding of rabies dynamics in dogs may facilitate the development of a suitable preventive strategy by researchers and policymakers. Despite its long history, only the furious form rabies is commonly known. Awareness on the dumb or paralytic form of rabies is limited. The most known clinical signs of rabies are biting instant and hyperactive behavior of infected dogs. These signs may be not prominent or may be absent in the dumb form of rabies [5].

Due to the lack of availability of standard tests, rabies diagnosis through tests is still a cumbersome process [7]. However, in rabies-endemic countries like India, veterinarians have adopted antemortem clinical diagnostic approaches in limited resource settings. This helps to direct the suspected or infected animals to isolate immediately and control spread of the infection. The owners and other animals that are exposed to the suspected rabies animal are directed to adopt post-exposure prophylaxis for prevention. In addition, rabies immunoglobulins are administered as treatment at the “0<sup>th</sup>” hour (golden hour) of rabies disease transmission. Administering immunoglobulins and cleaning the wound with suitable disinfectant under the tap water during the golden hour helps neutralize the viral particle over the bitten wound area or the virus-body contact area [3].

This case report was documented to sensitize public about the less common form of rabies, i.e., paralytic rabies in dogs. Clinical evidence of affected animals may vary based on the species and the type of rabies. Rabies in animals can have two types of clinical manifestations: dumb and furious. The furious form of rabies is well described and is known for its mad dog behavior clinical progression. The violent clinical manifestations of the furious form of rabies are more evident than the dumb form [8].

In this case report, the dumb form of rabies was suspected with the characteristic antemortem clinical signs such as dropped jaw, drooling of saliva, facial distortion, dysphagia, oropharyngeal paralysis, progressive paralysis, and respiratory distress [9]. The antemortem clinical diagnosis that was practiced for the diagnosis of rabies in limited resource settings has been documented by earlier researchers [2,6]. As per the guidelines of the National Centre for Disease Control (NCDC), India, clinical rabies diagnosis in dogs needs to differentiate between the following diseases or conditions: distemper, hepatitis, epilepsy, poisoning, brain tumors, and head injury [10].

The negative results of commercial chromatographic immunoassay for canine distemper, combined with characteristic clinical signs exhibited by the dog, strengthened the present case report as a probable dumb form of canine rabies. Other diseases or conditions from the differential diagnosis list may not exhibit these typical clinical progressions. Therefore, the present case was assumed to be a probable dumb form of canine rabies. The use of bleaching powder disinfection (1:10 sodium hypochlorite) was adopted to clean the isolation room [7].

In this case, the owner’s lack of knowledge and awareness on rabies is one of the important factors for the occurrence of rabies in the dog. In spite of advancement in research, rural people are not aware of rabies and its consequences, thus resulting in increased human fatalities. Hence, this report highlights the need for spreading awareness on rabies among populations [11]. Combined efforts by government and private organizations to spread rabies awareness among rural and urban people may facilitate the achievement of elimination of dog-mediated human rabies death, which is the 2030 target set by WHO [3].

## Conclusions

Rabies is a global concern and needs special attention due to its zoonotic implications and 100% case fatality rate. The present case was evaluated through antemortem clinical diagnosis and found to be a probable case of canine rabies, a specifically a dumb or paralytic form of rabies. Due to its endemic nature and a large population of unvaccinated dogs that exist under community type of rearing, rabies is a major concern and there is need for community awareness programs on rabies in countries like India. Information on the dumb and furious form of rabies should be disseminated to the general public. The elimination of dog-mediated human rabies death by 2030 may be facilitated by implementing strict pre- and post-exposure prophylaxis, as well as adopting the multi-directional approach to control rabies through developing a strong one health system.

## References

1. Sudarshan MK, Madhusudana SN, Mahendra BJ, Rao NSN, Narayana DA, Rahman SA, Meslin FX, Lobo D, Ravikumar K (2007) Assessing the burden of human rabies in India: results of a national multi-center epidemiological survey. *Int J Infect Dis* 11: 29–35. doi: 10.1016/j.ijid.2005.10.007.
2. Menezes R (2008). Rabies in India. *Can Med Assoc J* 178: 564–566. doi: 10.1503/cmaj.071488.
3. Naveenkumar V, Bharathi MV, Kannan P, Selvaraju G, Vijayarani K, Kharkwal P, Chanda MM (2022) Temporal pattern and risk factors for occurrence of canine rabies in Chennai. *Comp Immunol Microbiol Infect Dis* 90: 101903. doi: 10.1016/j.cimid.2022.101903.
4. Dodet B, Tejiokem MC, Aguemon AR, Bourhy H (2015) Human rabies deaths in Africa: breaking the cycle of indifference. *Int Health* 7: 4–6. doi: 10.1093/inthealth/ihu071.
5. Evans JS, Horton DL, Easton AJ, Fooks AR, Banyard AC (2012) Rabies virus vaccines: is there a need for a pan-lyssavirus vaccine? *Vaccine* 30: 7447–7454. doi: 10.1016/j.vaccine.2012.10.015.
6. Tepsumethanon V, Wilde H, Meslin FX (2005) Six criteria for rabies diagnosis in living dogs. *J Med Assoc Thai* 88: 419–422.

7. World Health Organization (2018) Chapter 3. Biosafety. In Rupprecht CE, Fooks AR, Abela-Ridder B, editors. Laboratory techniques in rabies, Volume 1. 26–32.
8. Gadre G, Satishchandra P, Mahadevan A, Suja MS, Madhusudana SN, Sundaram C, Shankar SK (2010) Rabies viral encephalitis: clinical determinants in diagnosis with special reference to paralytic form. *J Neurol Neuros Psychiatry* 81: 812–820. doi: 10.1136/jnnp.2009.185504.
9. Fekadu M (1991) Canine rabies. In: Baer GM, editor. The natural history of rabies: 2nd edition. Boca Raton: CRC Press. 367–387
10. National Centre for Disease Control, Directorate General of Health Services, World Health Organization Collaborating Centre for Rabies Epidemiology, Ministry of Health and Family Welfare Government of India (2022) Rabies: general aspects and laboratory diagnostic techniques. Available: <https://ncdc.mohfw.gov.in/WriteReadData/linkimages/RabiesGeneralAspectsLaboratoryDiagnosticTechniques2022.pdf>. Accessed: 6 November 2023.
11. Singh T, Mahajan S, Dahiya N (2020) A cross-sectional study of awareness and practices regarding animal bites in rural community, North India. *J Fam Med Prim Care* 9: 2751. doi: 10.4103/jfmpe.jfmpe\_158\_20.

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