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# A Rare Case of Paralytic Rabies; an Uncommon Presentation of a Daunting Disease

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## Abstract

Rabies is a fatal zoonotic disease. Timely and complete post-exposure prophylaxis can prevent the disease. A 10-year-old boy presented with a history of fever and altered mentation for 6 days. There was no history of hydrophobia or aerophobia. The child had features of raised intracranial tension and hypotonia of all limbs with absent deep tendon reflexes. Parents revealed the history of an unprovoked dog bite on the right arm (category III) 1 month ago, for which he received 4 intramuscular doses of anti-rabies vaccine, but did not receive anti-rabies immunoglobulin. Based on this history, he was clinically diagnosed with paralytic rabies, and the diagnosis was confirmed by the presence of rabies antibody in cerebrospinal fluid. He was started on Milwaukee protocol, however the child succumbed after 10 days of hospital stay. This case report highlights the importance of history-taking to make a clinical diagnosis of rabies. Health care workers' awareness is crucial for accurate categorization of the animal bite, and ensuring timely post-exposure prophylaxis.

**Keywords:** Rabies, rabies vaccine, paralytic rabies

## Introduction

Rabies is caused by a bullet-shaped, negative-sense, single-strand, enveloped RNA virus from the family Rhabdoviridae, genus Lyssavirus. It is a vaccine-preventable disease which occurs in over 120 countries and 40% of the victims are children[1].

Around 30-35% of people who get bitten by the rabies-infected animal and do not receive post-exposure prophylaxis contract the disease[2]. After the bite, the virus directly enters the peripheral unmyelinated axon terminals and migrates retrogradely towards the cell body and then spreads via synaptic junctions. After reaching the central nervous system, the virus spreads within the axons centrifugally to the peripheral and autonomic nervous system, and peripheral organs[3]. There are two forms of rabies, furious and paralytic. Furious rabies is characterised by its classical signs of hydrophobia, aerophobia, etc., and constitutes about 70% of human rabies cases, making it easy to diagnose[4]. The diagnosis becomes difficult,

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when the characteristic features like aerophobia and hydrophobia are lacking, as in the present case. Additionally, paralytic rabies may mimic Guillain-Barré syndrome, where the history of animal bite and details of post-exposure prophylaxis play an important role in making a clinical diagnosis of rabies. Herein, we present a case of paralytic rabies that presented with features of Guillain-Barré syndrome.

## Clinical Description

A 10-year-old boy presented with the chief complaints of fever and altered sensorium for the last 6 days. There was a history of irrelevant talk 2 days prior to the hospitalization. There was no history of convulsions, vomiting, or headache, hydrophobia, or aerophobia. On asking leading questions, parents revealed that the child had a history of category III unprovoked stray dog bite on the right arm one month ago. The wound was cleaned thoroughly with soap and water. The child had received 4 doses of purified Vero cell rabies vaccine on day 0, 3, 7, and 14 (intramuscular); however, he did not receive any immunoglobulin. At admission, he was haemodynamically stable. There was neck rigidity; bilateral pupils were equal and reacting; cranial nerve examination was normal; Glasgow coma scale (GCS) was E4M5V2. There was hypotonia in all the limbs; power was grade 2/5 in all 4 limbs; all deep tendon reflexes were absent; plantar reflex was unresponsive. There was no facial palsy. Fundus examination was normal. Respiratory and cardiovascular system examination was unremarkable. This patient had features of Guillain-Barré syndrome and meningoencephalitis with a background history of dog bite (in the absence of aerophobia and hydrophobia); therefore, he was diagnosed clinically with paralytic rabies. The nerve conduction study could not be done due to logistic issues.

The child was kept nil by mouth and started on 3% NaCl in view of the raised intracranial pressure (ICP). Complete blood count, serum electrolytes, and blood glucose were normal. Cerebrospinal fluid (CSF) analysis showed 37 cells/mm$^3$ with 40% neutrophils and 60% lymphocytes, a sugar level of 71 mg/dL, and protein 4000 mg/dL. A computed tomography scan of the brain was unremarkable. The child was put on the Milwaukee protocol (as per institutional protocol), which consisted of a midazolam drip, amantadine, zinc, and vitamin C. On day 2 of hospitalization, the child developed tachycardia, and fluid refractory shock requiring inotropes. Broad spectrum antibiotics were initiated, suspecting septic shock. On day 3, the GCS deteriorated further and the child developed respiratory failure, requiring mechanical ventilation. A corneal impression smear, done on day 2 of hospitalization, was positive for Rabies virus nucleoprotein antigen. The Rabies virus neutralising antibody (RVNA) titre, as measured by the Rapid fluorescent focus inhibition test (RFFIT), was 256 in CSF and 4096 in serum, which were sent on day 2 of hospitalization. However, CSF and saliva tested negative for rabies viral RNA by real-time polymerase chain reaction (PCR). The child required a higher fraction of inspired oxygen and ventilatory pressure. Chest X-ray revealed haziness on the right upper zone, likely due to ventilator-associated pneumonia. Antibiotics were escalated to piperacillin-tazobactam. For increased ICP, a child was given 20% mannitol intermittently. The child had no improvement in the respiratory parameters or raised ICP; eventually, he succumbed on day 10 of hospitalization due to probable refractory raised ICP, sepsis, and multi-organ failure. Post mortem studies were not done.

## Discussion

Rabies encephalitis is a fatal disease with a preventable cause. The present case is “dumb rabies”, which presented with features of encephalitis, without any aerophobia or hydrophobia. Our patient had received 4 doses of anti-rabies vaccine, but had not received anti-rabies immunoglobulin, resulting in an increased risk of the disease. Thus, clinical history is vital to diagnose a case of paralytic rabies. For serological diagnosis, there are tests for antigen detection (rapid Rabies enzyme immunodiagnosis, direct rapid immunohistochemical test, real-time PCR, viral isolation (rapid tissue culture infection test), mouse inoculation test and antibody detection tests like fluorescent antibody test, RFFIT and the fluorescence antibody virus neutralization test[5]. Antibody in CSF is rarely detected after vaccination and is considered diagnostic of rabies regardless of immunization status[2]. Guillain-Barré syndrome is known to be associated with old rabies vaccines, which were cultured in the neural tissues[6]. Our patient had not received neural vaccine and the diagnosis was confirmed by high titre of RVNA in CSF and positive rabies virus nucleoprotein antigen in corneal impression smear.

Human rabies is almost 100% fatal. The initial report of survival of an adolescent girl using the Milwaukee protocol received quite an interest but subsequently met with a lot of criticism[7,8]. In our patient, the Milwaukee protocol was used as it was the institutional policy at that time. It consists of the administration of ketamine, midazolam, amantadine, ribavirin, and phenobarbitone, targeting the N-methyl-D-aspartate receptors. We could not fully implement the protocol due to logistic issues. Our patient developed refractory raised ICP and fluid refractory shock, which resulted in his death on day 10 of hospitalization.

This case illustrates the need for history-taking in a case of acute meningoencephalitis so that a diagnosis of rabies is not missed even in the absence of characteristics features of aerophobia and hydrophopbia. Awareness among healthcare workers needs to be improved for correctly categorizing the wound and administering post-exposure prophylaxis. Prevention of clinical rabies with early post-exposure prophylaxis with the use of anti rabies vaccine and immunoglobulin (when indicated), remains the only proven method to prevent rabies.

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### Ethics

**Informed Consent:** Written informed consent was obtained from the parents before writing this case report.

### Footnotes

**Author Contributions:** Ghosh U: Surgical and Medical Practices, Concept, Design, Analysis or Interpretation, Data Collection or Processing, Literature Search, Writing; Verma B: Surgical and Medical Practices, Concept, Design, Analysis or Interpretation, Data Collection or Processing, Literature Search, Writing.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

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