An 8-year-old child with encephalitis rabies due to delayed case finding, proper post-exposure prophylaxis for rabies infection: a case report

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ABSTRACT

Background: Until April 2023, it has been documented about 31,113 cases of animal rabies-borne bites, of which 23,211 cases were given Post Exposure Prophylaxis (PEP) Anti Rabies Vaccine and 11 death cases in Indonesia, and 95% of them were caused by dog bite. This case report was conducted to describe a rare case of an 8-year-old child presenting with the late complication of encephalitis in Borong General Hospital due to the delayed case finding, management, and proper prophylaxis for Rabies infection.

Case Presentation: One day before admission, an 8-year-old girl with irritability, aggressive behavior, and severe speech abnormalities was reported to the emergency room. These symptoms quickly escalated to confusion and disturbed mental status. One month before to presentation, the patient’s parents stated that his right arm had been bitten by a stray dog. Because there were no obvious bite marks and the family was not aware of the dog bite, PEP was not requested. In the previous five days, her parents described experiences of hydrophobia, photophobia, and aerophobia. The patient’s health deteriorated two hours after admission, and palpating the carotid artery revealed that there was no pulse. Despite performing cardiopulmonary resuscitation, ROSC was not reached.

Conclusion: Animal rabies control and surveillance are essential, particularly in locations where the disease is endemic. PEP is extremely effective and ought to be given as soon as possible following exposure to reduce the high fatality rate.

Keywords: aware, irritability, mortality, PEP.


INTRODUCTION

Acute and progressive encephalitis is rabies’ typical complication and has a very poor prognosis. In the majority of nations, it is a serious issue of public health. Because most humans contract rabies after being bitten by an animal with the disease, rabies is classified as a zoonotic disease. Due to widespread vaccination of domestic animals, the incidence of rabies has drastically decreased in high-income nations like the United States. Furthermore, poor countries like Asia and Africa still have high rabies prevalence rates. This may be brought on by domestic animals that are not immunized. Significant health issues could arise as a result for both the local population and visitors.  

Asia and Africa account for the majority of the estimated 59,000 human deaths from rabies each year worldwide. In areas where canine rabies is widespread, the rabies virus (RABV), which is often spread by dog bite exposure, is responsible for around 99% of cases. Children account for over half of all human rabies cases.  

The Rabies agent of infection is a virus from the genus Lyssavirus and originated from the Rhabdoviridae family. This virus is neurotropic, bullet-shaped with lengths of 130-300 nm and 70 nm in diameter. It is comprised of RNA Nucleus (Ribonucleic Acid) single-channeled and lipoprotein-enveloped. There is glycoprotein G on the outer envelope which plays an important role in activating immune reactions induced by vaccines and identification of Rabies virus serology.

Although current research is presenting new alternatives, the tools usually used to detect rabies virus (RABV), as well as the vaccines and post-exposure prophylaxis (PEP) used to protect against rabies disease, have largely remained unchanged for decades. Children are more likely to be bitten by animals, especially dogs. They tend to be bitten to the head or neck, which can result in more serious injuries and even death. Compared to people without pets, households with dogs and persons with two or more dogs are more likely to get bitten. Depending on the destination and associated activities, travelers may potentially be more susceptible to dog attacks.

Based on data from the Indonesian Ministry of Health, in 2021 there are 57,257 cases of Animal Rabies-Borne bites in Indonesia. The fatality rate also increased by about 64% from 2020 to 2021 (from 40 to 62 of deaths case by rabies infection, respectively). The highest regions affected by the cases are Bali Province, East Nusa Tenggara, and South Sulawesi. The high fatality rate is thought
to be the cause of delayed case finding and VAR (Anti Rabies Vaccine) Prophylaxis delayed management. Until April 2023, it has been documented about 31,113 cases of animal rabies-borne bites, of which 23,211 cases were given Post Exposure to Prophylaxis Anti Rabies Vaccine and 11 death cases in Indonesia, and 95% of them were caused by dog bites.6

This case report was conducted to describe a rare case of an 8 years old child presenting with late complication of encephalitis in Borong General Hospital, Flores, East Nusa Tenggara Province due to the delayed case finding, management, and proper prophylaxis for Rabies infection. This case is unique because even invisible dog bite wounds can be a source of rabies infection in children who are poorly supervised by parents.

CASE PRESENTATION

An 8-year-old child was referred from Lebi Public Health Center to the Emergency Department of Borong Public Hospital in late May 2023, with the chief complaint of irritability 1 day before admission. She appeared with a day’s worth of aggressive behavior and speech troubles, which quickly led to confusion and altered mental status. Her parents claimed that the patient had been bitten by a stray dog on her right arm about a month before her presentation. She did not notify her parents about the bite and the dog’s subsequent escape; as a result, no rabies postexposure prophylaxis (PEP) was sought because there were no apparent bite marks and the family was ignorant of a dog bite. The parents were just aware of the incident 2 days before admission after a neighbor who witnessed the incident reported it.

Her parents also mentioned incidents of hydrophobia, photophobia, and aerophobia in the previous five days. Fever, malaise, dysphagia, and anorexia were also present as prodromal signs. The patient has no prior history of any illnesses. The patient’s family history revealed no similar problems, and after being bitten by a dog, no medicine was administered.

Afebrile (36.6 °C), with a respiratory rate of 24 breaths per minute, a heart rate of 160 beats per minute, a blood pressure of 100/60 mmHg, and a saturation level of 97% room air, the patient presented with ill-appearing and altered mental condition. The patient is 118 cm tall and weighs 16.8 kg. Her nutritional status was poor because these data were displayed in the range of -2SD to -3SD based on the WHO Z Score Weight-for-Length. Kernig’s sign was unfavorable and the neck was flexible. The pupils were dilated and had light hypersensitivity. The patient exhibited no tremor, strabismus, dysarthria, or other symptoms of meningeal irritation, yet her deep tendon reflexes were exceedingly weak. Significant hypersalivation was seen. Her right arm had no apparent bite marks because the bite had already vanished. The results of the other physical examinations were within normal limits.

In a facility with limited resources, rigorous critical care management was started. An intravenous rehydration was planned, but due to the patient’s small vein, aggressive behavior, and irritability, the attempt failed after three tries. As a result, blood samples were also unable to be taken. Then, parents were warned that their child’s illness had a poor prognosis and that a sudden deterioration could have grave consequences. The only measure taken was to transport the patient to a dark, isolated area. The patient intervenes by restraining the patient’s hands and feet to prevent injury to the limbs. Her health worsened two hours after admission, and a carotid artery palpation revealed no pulse. Cardiopulmonary resuscitation was performed, but unfortunately, ROSC was not achieved. The family then claimed the patient’s body and cared for the body. The body was treated and disposed of by the Indonesian Standard Protocol for burial.

DISCUSSION

As an endemic illness, rabies kills about 59,000 people a year, largely in developing and middle-income nations. Children under 15 account for 40% of all dog bite incidences and 35–50% of all rabies deaths. Dog bites are the primary method of transmission for the disease.7 A study conducted in Bouake and San Pedro has revealed the facts that maintain rabies in Cote’Ivoire regions, indicating that numerous risk factors could contribute to the increase in occurrence. These include issues with category III exposure from unvaccinated dogs occurring frequently, geographic accessibility of anti-rabies clinics, and low PEP compliance due to PEP’s high cost and lack of availability to those who require it. These elements continue in an environment of ignorance.8

In a case report from Gabon, researchers examined the molecular analysis of two cases of rabies virus associated with pediatric encephalitis. They found that both patients had experienced dog bites in the weeks before the onset of symptoms and had not received post-exposure rabies vaccination. Rabies virus sequences also clustered with Gabonese dog viruses. They found that dogs are the most likely cause of human rabies.9 In a rare Texas example, a 7-year-old boy was bitten by a bat while playing in his Medina County apartment building. On hospital day 7, the patient began experimental intrathecal human Arabic immunoglobulin therapy. This treatment was unsuccessful and the patient died on the 16th day in hospital.10

If antivirals for rabies could stop and destroy viral replication in patients who...
exhibit the earliest neurological symptoms of the disease, they would likely have a significant impact. Additionally, given their restricted availability, RIGs may be able to be replaced by potent antivirals. None of the antivirals tested on humans that have exhibited in vitro, in vivo, or both activities have shown good efficacy yet. Understanding healthcare trends about both human and animal hosts is necessary for the design of solutions treating diseases that are spread between animals and humans. A notable illustration of this requirement is the management of canine-mediated rabies. In Tanzania, where children are particularly at risk and over 40% of mortality is in those under 15 years old, rabies is still a serious issue. Although protecting dogs from rabies is an effective way to reduce the disease, dog vaccination coverage is too low and is dependent on dog owners’ willingness to vaccinate.

Several years ago, high-quality rabies vaccines became available to protect the dog population against rabies. To prevent the spread of rabies virus among dog populations, high vaccination coverage and herd immunity must be maintained until the next vaccination campaign. However, in dog populations on Flores Island, Indonesia, it is not known what proportion of dogs maintain adequate levels of rabies antibodies after one year of vaccination and what factors influence this maintenance. According to a randomized, open-label trial in Thai children, primary rabies immunization with a 2-dose intramuscular regimen on days 0 and 28 can provide acceptable antibody titers after primary vaccination, especially after revaccination. The findings support WHO guidelines for a two-dose rabies vaccination program.

In owned free-ranging domestic dogs that were vaccinated in Indonesia in field conditions, a study found a strong immunological response. The development of rabies antibodies at day 30 and the existence of rabies antibodies at day 0 were both substantially correlated with vaccination histories. Given the strong correlation between vaccination and creating detectable immunity, an educational campaign emphasizing excellent dog management practices is anticipated to improve the health and well-being of the dogs.

Although it has been claimed that rabies Pre-exposure prophylaxis (PrEP) is extensively marketed to international travelers, we argue that there is a double standard at play: why is PrEP made available to visitors to locations where rabies is endemic but not to residents, who are at an equal or higher risk? Morally speaking, this access disparity is even more troubling now that reduced regimens can reduce prices and make PrEP more feasible. According to Indian research, rabies-related mortality in school-aged children has significantly decreased in India as a result of shorter PrEP regimens. According to the study, shorter PrEP regimens are more cost-effective than longer PEP regimens for preventing rabies-related mortality in children in India. In areas with a high prevalence of animal bites and limited access to PEP services after exposure, it is necessary to conduct feasibility and acceptability trials of PrEP.

An unusual case report of an 11-year-old Tunisian child who received post-exposure prophylaxis but ultimately died of rabies. This example reminds the doctor of the importance of wound care at this time and waiting for immunoglobulin injections. Immunoglobulin and vaccine failure could have been avoided, and rabies in this child could have been prevented by extensive wound debridement, with which doctors are not familiar (immediate and thorough washing and washing of the wound for at least 15 minutes with soap and water, detergent, povidone-iodine, or other agents that kill the rabies virus). Another study in Bali found that most respondents had a strong awareness of rabies, followed by positive attitudes and good practices (66 respondents, 37.7%). However, 21.7% of the respondents have insufficient knowledge, unfavorable attitudes, and worse behavior about rabies. A limitation of this study is that it is due to bite scars that have not been able to detect. In addition, the availability of inadequate hospital facilities accelerates the deterioration of the patient’s condition and the difficulty in definitively diagnosing the causative agent of infection.

CONCLUSION
Animal rabies control and surveillance are essential, particularly in locations where the disease is endemic. Rabies encephalitis is lethal. This case should serve as a warning that the rabies virus is still present in East Nusa Tenggara, more specifically in Borong, Eastern Manggarai, and that any exposure to dogs or other mammalian species should always result in a consultation with public health officials or medical professionals. When stray dogs go inside or close to inhabited areas, it is crucial to alert animal control or local public health officials. Every dog owner should understand the significance of receiving a rabies vaccination. PEP is extremely effective and ought to be given as soon as possible following exposure to reduce the high fatality rate.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

FUNDING
None.

AUTHOR CONTRIBUTION
The author contributed to literature searching, data collecting, and manuscript preparation.

ETHIC STATEMENTS
The parents have given consent to participate and publish the data.

REFERENCES
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