

Clinical rabies in an HIV-positive pregnant mother with surviving newborn

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ABSTRACT

In South Sudan, rabies is a serious public health burden with an estimated 204 deaths per year. According to the Global Alliance for Rabies Control 2024 report, this is exacerbated by limited dog vaccination coverage and high annual cost of rabies treatment and control, with approximately 9,290 people receiving post-exposure prophylaxis (PEP) annually. In Pariang and the surrounding area, dog bites are very common. In the last two years, four patients died in the hospital due to clinical rabies. Reported cases of clinical rabies in pregnancy with surviving infants are very rare. A 2019 non-systematic review reported only 16 cases worldwide, with four identified in Africa. There are few reported cases of rabies exposure among Human Immunodeficiency Virus (HIV) positive individuals, but none of them was in pregnancy. This is a case report of an HIV-positive pregnant mother who was referred to Pariang Civil Hospital at 37 weeks of gestation with a history of a dog bite six weeks previously, restlessness, inability to swallow, hydrophobia, vomiting, fear, hypersalivation, and fever. Diagnosis of clinical rabies in pregnancy was made, and an emergency Caesarean Section was done with a live baby girl. The mother died 49 hours after delivery. The baby received nevirapine syrup at birth and tested negative for HIV at six weeks and at nine months but does not seem to have received rabies vaccine. One year later, she has no symptoms of rabies. This case report highlights the unique co-occurrence of clinical rabies and HIV infection in a pregnant mother, with a good outcome for the newborn. Community awareness, ensuring the availability of rabies vaccines in all health facilities, plus mass vaccination of dogs and the elimination of street dogs may help reduce rabies cases in Greater Pariang and South Sudan at large.

Keywords: rabies; Human Immunodeficiency Virus; pregnancy; newborn; South Sudan.

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Introduction

Rabies is a viral zoonotic disease responsible for an estimated 59,000 human deaths every year globally. It is almost invariably fatal once clinical signs appear, because of acute progressive encephalitis.^[1] Rabies is very rare in developed countries but still affects resource-limited countries.^[2]

In 2018, the World Health Organization (WHO), the Food and Agriculture

Organization of the United Nations (FAO), the World Organization for Animal Health (WOAH), and the Global Alliance for Rabies Control (GARC) set the global target of zero human deaths from dog-transmitted rabies by 2030 ("Zero by 30").^[3]

In South Sudan, rabies is a serious public health burden, with an estimated 204 deaths per year. This burden is exacerbated by limited dog vaccination coverage and the high annual cost of rabies treatment and control. Furthermore, approximately 9,290 people receive post-exposure prophylaxis (PEP) annually.^[4] In Pariang and its surroundings, dog bites are very common. In the last two years, four patients died in the hospital from clinical rabies after being bitten by rabid dogs.^[5]

Reported cases of clinical rabies in pregnancy with surviving infants are very rare, and a literature search revealed only four cases reported from Africa and 16 cases from around the globe.^[6] There are few reported cases of rabies exposure among HIV (Human Immunodeficiency Virus) positive individuals, but none occurred during pregnancy.^[7,8]

We report the case of an HIV-positive pregnant woman who presented with signs of clinical rabies after a dog bite at Pariang Hospital in South Sudan.

Case Report

A 23-year-old mother was referred to Pariang Hospital from Jamjang Primary Health Care Center (PHCC) on 1/11/2024. She was Gravida 3 Para 2+0 (one previous Caesarean Section), known HIV positive for four years and on Anti-retroviral therapy (ART). The viral load and CD4 count were unknown.

She presented with a history of restlessness, inability to swallow, hydrophobia, vomiting, fear, hypersalivation and fever for two days. She had been bitten by a dog on the anterior aspect of her left forearm one and a half months previously. The same dog had bitten four other people in the village and was later killed by villagers.

When she was bitten by the dog, she immediately went to the Primary Health Care Centre, where the health worker cleaned her wound with antiseptic, but no rabies vaccine was available. She was also told by some community members that pregnant women should not receive rabies vaccine, making her reluctant to seek further medical help. The wound healed a few days later, and she was stable until the symptoms appeared.

On examination, she was irritable but oriented to time

and place, spoke with difficulty due to throat pain, and was febrile with a temperature of 38.3 °C, BP 100/60 mmHg, pulse rate 80 bpm, and respiratory rate 22 per minute. Obstetrics examination showed a symmetrically enlarged abdomen with a Pfannestiel's scar, symphysio-fundal length of 37cm, and the foetus in a longitudinal lie, cephalic presentation; heart sounds were audible and regular at the rate of 110bpm, and the presenting part was 5/5 palpable above the symphysis pubis. There were no uterine contractions. The patient had increased limb tone and exaggerated tendon reflexes. There was no neck stiffness.

The laboratory at Pariang Civil Hospital does not have the capacity to isolate rabies virus or perform rabies virus antigen testing. The diagnosis of clinical rabies in an HIV positive pregnant mother was made based on the history, clinical presentation, and examination findings. She was isolated immediately, given IV Ringer Lactate 2,000ml and IV ampicillin 2g stat. A full blood count was carried out (Hb. 10.4g/dl) with Blood grouping and preparations made for an emergency Caesarean Section. A live baby girl was delivered with an Apgar score of 4/10 at 1st minute, 8/10 at 5th minute, and 10/10 at 10th minute, with a weight of 2.8 Kg. The amniotic fluid was meconium-stained. Precautions were strictly followed to ensure blood and other maternal body fluids did not come in contact with foetal mucous membranes. The operation was uneventful. All reusable anaesthetic equipment used during the operation were immediately decontaminated and sterilized. The baby was given nevirapine syrup immediately after delivery. Maternal vital signs were monitored regularly.

When recovering from anaesthesia she became irritable and was sedated again with diazepam 10 mg every 4 hours. The following morning, she was stable and oriented to time and place, with no adverse changes in vital signs. The lower abdomen was slightly distended with a fundal height of 18 cm from the symphysis pubis. A few hours later she developed vomiting, fear, restlessness, and hypersalivation despite being on diazepam.

On the second postoperative day, her condition deteriorated, and she was unresponsive to diazepam: BP 100/60 mmHg, PR 80 /min, RR 16 /min, and temperature 38.3 °C. Her clinical condition worsened with very severe difficulty in breathing. She died 49 hours after the delivery.

All co-patients who had direct contact with the patient were advised to receive the rabies vaccine; the father was advised to vaccinate the baby against rabies, but

there was no confirmation that this had occurred. The baby was enrolled in the Early Infant Diagnosis (EID) program. A Polymerase Chain Reaction (PCR) HIV test was performed at six weeks, and a Rapid Diagnostic Test (RDT) at nine months: both were negative. The baby is now one year old and progressing well.

Discussion

Post-exposure prophylaxis (PEP) administered after the exposure is highly protective against the development of rabies symptoms. However, in low-resource settings, the availability and sustainability of this lifesaving vaccine's supply are frequently a challenge. In this case, the exposed mother did not receive PEP.

Previous case studies indicate that infants have survived birth from rabies-infected mothers without immediate infection and some even without vaccination.^[2,6,9] However, prompt administration of rabies PEP is highly recommended for all infants born to infected mothers.^[6,10] For this reported case, the relatives were unable to buy the expensive vaccine, which would have had to have been purchased from Juba, far from Pariang.

Even though the baby did not receive PEP, she survived without manifesting any symptoms of rabies infection, and is now one year old. This supports previous reports about the role of the placenta in protecting the foetus against the rabies virus.^[6] There is only one case reported in the literature of confirmed transplacental rabies transmission. [11] This finding reinforces the rarity of vertical (in utero) transmission of the rabies virus, which could be attributed to a lack of maternal viremia or to the protective role of the placenta, as reported earlier.^[10,12] This baby was born with a low Apgar score and meconium-stained amniotic fluid; similar findings were reported by other authors.^[12] Only a few cases of HIV positive individuals with rabies exposure have been reported in the literature, and the discussions are always centered on immunity, specifically regarding how effective the rabies vaccine is in an HIV positive individual.^[7,8]

Without PEP, the risk of developing rabies after a bite from a rabid animal is high, and being an HIV-positive patient, particularly with low CD4 (<200 cells/ μ L), may have a weak or nonexistent immune response to rabies vaccination.^[13] In this case, we could not assess the effectiveness of PEP because the mother did not receive it; we also could not assess her CD4 count or viral load, nor obtain laboratory confirmation of rabies infection due to poor laboratory setup. So, the fact that she did not receive

PEP, coupled with poor laboratory capacity, has made it very difficult for me to come up with any fruitful discussion regarding clinical rabies in HIV-positive individuals.

Recommendations:

- Community awareness should be enhanced in the Ruweng Administrative Area and elsewhere in South Sudan where rabies is endemic. The importance of PEP in preventing clinical rabies should be emphasised, and it should be noted that rabies vaccines and Rabies Immunoglobulins (RIG) are not contraindicated in pregnancy.
- The most common types of human rabies vaccines available in South Sudan are Purified Chick Embryo Cell Vaccine (PCECV) and Human Diploid Cell Vaccine (HDCV), which are often manufactured by global pharmaceutical companies located in India and supplied via international health organizations and commercial companies. Because these vaccines are predominantly administered intramuscularly, the cost of the full multi-dose course remains prohibitively high for many in rural communities. Although the World Health Organization recommends Rabies Immunoglobulin (RIG), it remains unavailable nationwide. To align with global standards and prevent avoidable deaths, the National and State Ministries of Health, in collaboration with partners, must prioritize the procurement, subsidization, and distribution of rabies vaccines while actively adopting the cost-effective Intradermal (ID) route and expanding access to RIG in high-risk, endemic areas.
- The Ministry of Health and the Ministry of Livestock and Fisheries, together with relevant partners, should develop a plan for mass dog vaccination and the elimination of street dogs.
- All babies born to rabid mothers should receive PEP immediately regardless of the mode of delivery. All precautions taken to prevent mother-to-child transmission of rabies may not be 100% protective. Rabies is invariably fatal when the symptoms appear.
- Although laboratory confirmation of rabies infection by PCR on saliva or skin biopsy samples, or by detecting rabies antibodies in serum or cerebrospinal fluid (CSF), is helpful, the government hospitals' laboratories in South Sudan do not have the capacity to perform these tests. Therefore, State and National Ministries of Health should endeavour to equip these laboratories.

- Although rabies is a notifiable disease in South Sudan, cases are not being reported due to miscommunication between the surveillance officers. The Integrated Disease Surveillance and Response needs strengthening.

Conclusion

This case report highlights the co-occurrence of clinical rabies and HIV infection in a pregnant mother, with a good outcome for the baby. This underscores the critical need for heightened awareness and prompt intervention in similar cases, as rabies remains a preventable yet fatal disease. The findings also emphasize the importance of thorough clinical evaluation and vaccination strategies for high-risk populations, particularly in regions such as the Ruweng Administrative Area, which has limited access to healthcare resources. This report calls on healthcare providers, healthcare managers, local and national governments, and all concerned stakeholders to prioritize rabies prevention measures for vulnerable populations.

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