



Bio Vet Innovator Magazine

Volume 1 : Special Issue 1 : World Rabies Day - 2024

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Rabies Day Special: Bridging the Gap between Science and Safety

Popular Article

Breaking Rabies Boundaries: Merging Scientific Insights with Practical Safety Measures

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DOI - <https://doi.org/10.5281/zenodo.13879893>

Received: September 20, 2024

Published: September 28, 2024

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Abstract:

Rabies remains a significant health challenge, claiming thousands of lives annually predominantly in Asia and Africa. The disease caused by Lyssa virus can infect all mammals with mild symptoms initially but progresses to a severe encephalitis and death after onset of symptoms. Transmitted mostly by bites and scratches from infected dogs, rabies is a preventable disease with effective vaccination and community awareness strategies. This article highlights the critical need for community education, timely medical interventions, and public health policies to bridge the gap between scientific knowledge and its practical applicability in combating the disease. Preventive measures include vaccination of pets, stray animals, and individuals at high risk, along with immediate post-exposure prophylaxis (PEP). PEP involves thorough wound cleansing and a vaccination regimen based on the severity of exposure. Collaborative efforts among healthcare workers, policymakers, and communities are essential to achieve the World Health Organization's goal of "Zero human rabies deaths by 2030." By enhancing awareness and implementing comprehensive strategies, we can work towards a future free from rabies, ultimately transforming public health and safeguarding vulnerable populations.

Keywords:

Rabies, Vaccination, Post-Exposure Prophylaxis (PEP), Prevention, Community Awareness

Introduction:

Rabies is a vaccine-preventable, zoonotic, viral disease that still continues to take thousands of lives globally every year. The disease has been predominantly reported in African and Asian countries, with limited access to basic healthcare facilities. According to World Health Organization, 99% of human cases occur as a result of bites and scratches from infected dogs. This article aims to bridge the gap between scientific knowledge and the practical measures, emphasizing the necessary precautions to take before and after potential viral exposure as well as the

importance of community education and vaccination programs. Through comprehensive awareness initiatives, timely medical interventions, and robust public health policies, we can aim to break the cycle of rabies transmission and work towards a future free from the disease.

Understanding Rabies:

1. What is Rabies?

Rabies is a viral, zoonotic, fatal however neglected tropical disease which claims approximately 59,000 lives annually, of which 40% are children aged 5 to 14. In India, the disease fatality rate is around 20,000 annually; that accounts for almost one-third of the global human deaths. The first significant breakthrough in the prevention of this disease in humans, occurred in the year 1885, when Louis Pasteur saved the life of a 9-year-old boy Joseph Meister, who had been bitten by a rabid dog through pre-immunization with the inactivated virus.

Rabies is caused by virus of genus Lyssavirus, family Rhabdoviridae and can infect all mammals, including dogs, cats, human, livestock and wildlife. The virus transmission occurs through bites or scratches from infected dogs, but it can also occur via exposure of open wounds or mucous membranes to the saliva of infected animals. Rarely, rabies can be transmitted through organ transplants, consumption of raw meat/milk and aerosol inhalation, particularly in bat caves.

The development of the disease post exposure can range from 2-3 weeks to as long as a year; however, it is 100% fatal once the virus enters the central nervous system. The onset of symptoms varies based on the location of the virus entry (closer proximity to the CNS) and the viral load. Initial signs include fever, pain, unusual tingling or burn sensations at the wound site. In mammals, rabies manifests in two forms: the furious form, characterized by hyperactivity, excitable behavior, lack of coordination, hydrophobia and aerophobia, often leading to death due to cardio-respiratory arrest; and the paralytic form, which presents as gradual paralysis of muscles, slow developing coma and eventual death.

2. Prevention:

Rabies is a wholly preventable disease, achievable through a multifaceted approach that incorporates pre-exposure prophylaxis and vaccination schedules for both animals and humans. Key strategies encompass trainings for healthcare workers, enhanced surveillance, community awareness initiatives, control of stray animal populations, mass vaccination campaigns for dogs, and educational efforts tailored for both children and adults at various levels. Vaccination of pet dogs and livestock can be started at the age of 3 months, followed by annual booster shots. When combined with mass vaccination efforts for stray dogs, this approach has proven effective in reducing human fatalities from dog-mediated rabies in endemic regions.

Moreover, pre- exposure prophylaxis and vaccination is critical for individuals at heightened risk of exposure to the virus, such as laboratory scientists working with live or attenuated strains, veterinarians, animal handlers and disease control personnels. Currently, three WHO pre-qualified human vaccines are available globally: RABIVAX-S, VaxiRab N and VERORAB.

3. Treatment:

In addition to preventing exposure to the virus, understanding the critical post-exposure measures following an encounter with a potentially rabid animal is essential for preventing the progression of the disease. Post-exposure prophylaxis (PEP) should be initiated immediately after a bite or exposure incident to prevent entry of the virus into the central nervous system (CNS). The bite wounds should be thoroughly washed with soap or povidone-iodine

and running water for at least 15 minutes. This should be followed by a shortened 2-sites intra-dermal rabies vaccine regimen on days 0, 3 and 7; accompanied by an injection of rabies immunoglobulins (RIGs) for individuals who have never been vaccinated, immunocompromised or those living in rabies endemic regions. For individuals who have been previously vaccinated, only a 4-sites intradermal rabies vaccine shot is required on the day of the bite, as per World Health Organization (WHO) recommendations.

The WHO has specified the need of post-exposure prophylaxis based on three categories of exposure severity to the suspected rabid animal:

Category I- This includes situations where an individual has fed or touched the animal or has had animal lick on intact skin. In such cases, thorough washing with soap and water for 15 minutes suffices, and no PEP is needed.

Category II- Involving minor scratches, abrasions or nibbling of skin, this necessitates wound washing followed by immediate vaccination.

Category III- Characterized by transdermal bites or scratches, contamination of mucous membranes with saliva from animal licks, or exposure to bats, this severe exposure requires immediate wound washing, vaccination and administration of immunoglobulins or monoclonal antibodies.

4. Control:

Effective management of canine rabies is crucial for the elimination of the disease, as it can disrupt the transmission pathways in endemic areas, thereby reducing the reliance on human post-exposure prophylaxis (PEP). This can be achieved through a combination of strategies, including control of stray dog populations, mass vaccination campaigns, proper reporting, and the quarantine and treatment of suspected animals.

Furthermore, preventing the spillover of rabies from wildlife into established areas is essential. Collaborative efforts among researchers, scientists, veterinarians, policymakers, and other stakeholders are necessary to implement effective preventive measures.

Additionally, precautionary vaccinations of individuals working in high-risk environments are vital, along with the development of efficient laboratory diagnostic facilities to ensure early detection of the disease. Lastly, establishing reliable surveillance systems, coupled with educational campaigns and awareness programs, is fundamental in informing the public about rabies—a disease that is both 100% preventable and potentially fatal.

Conclusion:

Considering the dismal fact that rabies is a fully preventable disease thousands of humans succumb to this disease annually. In the light of such pressing needs to eliminate this disease the collective goal achieving “Zero human rabies deaths by 2030” set forth by the WHO, the World Organisation for Animal Health (OIE), the Food and Agriculture Organization of the United Nations (FAO) and the Global Alliance for Rabies Control (GARC) and the theme of “Breaking Rabies Boundaries” for the World Rabies Day 2024 align seamlessly, emphasising the critical importance of collaboration across various sectors to eradicate this disease. India, as well, with its National Action Plan for Dog Mediated Rabies Elimination by 2030 (NAPRE) aims to eradicate human rabies transmitted by dogs through improved public health and veterinary services. It also promotes community engagement in both urban and rural setting across the country.

By implementing comprehensive vaccination strategies, enhancing community awareness, and ensuring timely medical interventions, we can break the cycle of rabies transmission. Together, we can foster a future where rabies is no longer a threat to human health, transforming the landscape of public health for generations to come.

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