Human Rabies: Resurgence of a Fatal Neurotropic Viral Disease

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Editorial

Rabies is a 100% fatal zoonosis. There are very few survivors due to experimental therapies, a prior history of vaccination, etc. However, rabies poses a huge burden of disease in the Indian subcontinent. In the past two years alone, 300–400 people have died due to rabies, and in particular, southern states have reported the highest number of cases. It is intriguing to note that many of them had a full course of vaccination and rabies immunoglobulin post-bite or exposure. It is still a subject of scientific investigation if there were lapses in wound management, aggressive suturing of the wound, or perhaps failure of vaccination and immune prophylaxis. Whatever the cause, the awareness of rabies among the general population is abysmally low. The dissemination of information on rabies prevention could be the first step in the long series of measures formulated to control rabies.

Rabies as a disease has been reported since antiquity, dreaded for its symptoms as victims show abnormal swallow reflexes and make strange sounds reminiscent of a dog's barking behavior. Louis Pasteur’s landmark discovery of the rabies vaccine in 1885 was a milestone in virology and medicine. Today, even after several years, rabies remains a formidable foe, a neglected tropical disease, and a viral disease that is fully fatal. The science of vaccines and biologicals has evolved greatly since the Middle Ages. Today, we have safe and effective vaccines, immunoglobulins, and monoclonal antibodies to prevent the onset of rabies after exposure. However, though an effective armamentarium against rabies, it does not fully answer the puzzle of disease control. There are several gray areas, starting with poor wound management. The rabies-prone bite site has to be washed with soap and water, detergent-based povidone-iodine, or any surfactant that can break the virus's lipid layer. Secondly, suturing should be avoided as it can drive the virus (if present at
the bite site) into deeper tissues. The next issue is seeking a full series of vaccinations and infiltration of the wound site with immunoglobulins or monoclonal antibodies. Though the WHO classifies wounds according to their severity, many times it is hard to elicit accurate responses from the patient. The timing of the vaccine/immunoglobulin administration is also of central importance. Many dog bite victims report several days or weeks after the bite or exposure. The huge presence of unvaccinated stray dogs, wildlife (like wolves, jackals, and foxes), and some intermediate animals that can transmit the virus presents a unique problem in the Indian subcontinent. Sometimes even pet animals like dogs and cats can carry the virus if they are not vaccinated and in contact with other rabid animals. The sporadic availability of vaccines and immunoglobulins, poor literacy on the disease, and beliefs in magical remedies further compound the problem.

While in India dogs are the major vectors of disease transmission, in colder countries raccoons, bears, squirrels, badgers, and even bats can carry any one of the rhabdoviruses capable of causing clinical rabies. There have been spillover events from wildlife to humans, and vaccine coverage in these countries can be low due to a lower incidence of human rabies. However, rabies presents a danger even in the field of transplantation; there are reports of people developing rabies after corneal and organ transplants from donors with undetected rabies infections. Rabies has remained an enigma due to the slow transportation of the virus to the brain and nervous system, the unique way in which the virus affects the brain (encephalitis), and the way in which it causes death by respiratory infections, muscle weakness, paralysis, and death. The morbid fear of water (hydrophobia) caused by throat muscle spasms and the fear of air (aerophobia) are some of the well-documented hallmark symptoms of rabies.

However, there is a light at the end of the tunnel; a few experimental therapies have been partially successful. One such therapy is the Milwaukee Protocol, where a rabies victim is put under a chemically induced coma, and the person’s own antiviral antibodies eventually clear the virus. There are further modified versions of the protocol, but it has not been uniformly successful. Similarly, rabies cure research is gaining momentum, and a few antiviral drugs like Favipiravir, Galidesivir, and Ranpirnase have shown rabies virus neutralization at the laboratory level. It will take time to translate such trials into real-life therapies. Until then, mass vaccination of vectors (like dogs), prompt wound management, and proper human vaccination and biologicals administration could be the only protective measures effective against this deadly disease.

Rabies remains a stark reminder of an existential threat posed by a viral disease. According to the WHO, nearly 60,000 people worldwide die every year due to rabies. We are at the crossroads of prevention and the eventual cure or elimination of human rabies. The prospects of success are bright, but until then, the specter of rabies cannot be ignored.
References: