Current Medicine Research and Practice 9 (2019) 83–84

Contents lists available at ScienceDirect

Current Medicine Research and Practice

journal homepage: www.elsevier.com/locate/cmrp

Discussion

# Rabies

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ARTICLE INFO

*Article history:*
Received 18 March 2019
Accepted 19 March 2019
Available online 25 March 2019

Rabies is a devastating neurological disease caused by a virus transmitted by contact with saliva of an infected animal directly through a bite or contamination of a scratch or wound. It is vaccine preventable and listed as a 'neglected tropical disease'. Asia and Africa account for 95% of total 59,000 rabies deaths worldwide. Around one-third of the total global deaths are seen in India alone, and 40% cases are seen in children younger than 15 years. Domestic dogs are responsible for 99% of all human cases. In the Americas, bat and raccoon rabies is an emerging problem.

The incubation period is 2–3 months but may be delayed to 1 year or even more. Clinically, it may exhibit signs of hyperexcitability, or 20% of cases may manifest as paralytic (dumb) rabies. Death is almost certain once clinical manifestations appear within a few days, often due to cardiorespiratory arrest. Global data suggest that more than 15 million people receive rabies prophylaxis every year, the majority in India and China. The other most important viruses, that is, herpes simplex and varicella zoster, should be ruled out.

Laboratory diagnosis is made in animals by the presence of cerebral Negri bodies (100% diagnostic but seen in 80%) or the rabies antigen in the brain by immunefluorescence. Diagnosis in infected humans is made by polymerase chain reaction of saliva or skin biopsy, presence of rabies antibodies in cerebrospinal fluid or serum or immunohistochemical demonstration of the rabies antigen in the cutaneous nerve.

There are three types of rabies vaccines: outdated nerve tissue vaccines, cell culture vaccines and embryonated egg vaccines. The latter two are safe, well tolerated and effective. The cell culture vaccines are human diploid cell vaccine (HDCV), purified chick embryo cell vaccine (PCECV), purified vero cell vaccine and primary hamster kidney cell vaccine. Mild local reactions may occur, more often with intradermal administration.

## Prevention

Animal vaccination for rabies is given between 4 and 6 months and age booster after 1 year and then every 3 years. A series of 3 preexposure rabies vaccinations for people who work with dogs is advised.

Postexposure prophylaxis in humans requires prompt wound care, vaccination (3 injections) and passive immunisation using specific human rabies immunoglobulins. The preferred vaccines are HDCV or PCECV.

## Cure for rabies

The World Health Organization (WHO) (2014) protocol for postexposure rabies is immediate administration of both passive antibody Rabies immunoglobulin (RIG) and active immunisation with 5 injections of the vaccine (purified cell cultured derived: HDCV or PCECV). RIG should be infiltrated into the depth of the wound and around the wound. RIG should be injected at an intramuscular site as well (20 IU/Kg of human RIG or 40 IU/Kg of equine RIG).

Postexposure vaccination consists of three intramuscular doses on days 0, 7 and 21. It should be given in the deltoid area or anterolateral thigh but not gluteal area because it produces low antibody titre. Vaccines are well tolerated with minor local adverse reactions and rare systemic reactions (headache and body aches).

## Modified protocols

Dr. Omesh Bharti, a field epidemiologist in Anti-Rabies Clinic and Research Centre, Deen Dayal Upadhyay Hospital, Shimla, Himachal Pradesh, in collaboration with WHO-accredited rabies research centre and National Institute of Mental Health and Neurosciences, Bangalore, has developed a "Homegrown Protocol" for rabies immunisation. He started it in 2014 by using a vaccine for active immunisation as usual, but he gave RIG only in the wound without any intramuscular administration. This gave successful results in all his 20,000 dog/monkey bite victims. This reduced the cost of treatment from INR 35,000 to INR 350 only per patient. The WHO (2018) has declared the new global standard treatment protocol as cost, dose and time sparing while assuring safety and clinical effectiveness.

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https://doi.org/10.1016/j.cmrp.2019.03.004

**For his path-breaking research**

Dr. Omesh Bharti has been awarded the Padma Shri by the Government of India in January 29 and Professor Tulsi Das Chugh Award for the best published research in the field of infectious diseases by the National Academy of Medical Sciences (India) in October 2018. He is the founder of the "low-cost antirabies treatment".

**Conflicts of interest**

The author has nothing to disclose