

Year : 2014
Volume : 1
Issue Number : 3
Doi Number : 10.5455/JNBS.1408703072

Article history:

Received 22 August 2014
Received in revised form 21 October 2014
Accepted 3 November 2014

RABIES IN INDIA: A RELOOK AT THE NEGLECTED RAMPANT DISEASE

HİNDİSTAN'DA KUDUZ HASTALIĞI: İHMAL EDİLEN YAYGIN HASTALIĞA YENİDEN BİR BAKIŞ

Kalaivani Annadurai¹, Raja Danasekaran¹, Geetha Mani¹

Abstract

Rabies is a tropical zoonotic disease, transmitted to human being by carnivorous animals. Majority of human rabies cases were reported from Asia and African countries. India recorded more deaths from rabies than any other country in the world. There is no effective treatment for rabies; it can only be prevented by vaccination. It needs multiple levels of interventions at human and animal level. World Health Organization's target is to eliminate the disease by 2020 in endemic South-East Asian countries which include India. Key challenges in control of rabies in India are lack of intersectoral coordination, weak surveillance system on rabies, inadequate rabies research and lack of sustainability. To conclude, breaking the rabies cycle in a sustained manner is necessary to eliminate rabies from this part of the world.

Keywords: carnivorous animals, prophylaxis, elimination

Özet

Kuduz, etobur hayvanlardan insanlara geçen tropikal zoonoz bir hastalıktır. İnsanda görülen kuduz vakalarının çoğunluğunun Asya ve Afrika ülkelerinde olduğu rapor edilmiştir. Hindistan'da dünyadaki herhangi bir ülkede olandan çok daha fazla kuduz ölümü olduğu tespit edilmiştir. Kuduz için etkili bir tedavi yoktur; tedavi sadece aşı ile yapılabilir. Tedavi insan ve hayvanlarda farklı seviyelerde müdahaleleri gerektirmektedir. Dünya Sağlık Örgütü'nün amacı Hindistan'ı da içeren endemik Güney Doğu Asya ülkelerinde 2020 yılına kadar bu hastalığı ortadan kaldırmaktır. Hindistan'da kuduz kontrollerindeki kilit sorunlar; sektörler arası koordinasyon eksikliği, kuduz hastalığı için yapılan yetersiz denetim sistemi, yetersiz kuduz araştırması ve sürdürülebilirliğidir. Sonuç olarak, sürekli olarak kuduz döngüsünü engellemek için dünyanın bu bölgesinde kuduzu yok etmek zorunludur.

Anahtar Kelimeler: etobur hayvanlar, hastalıktan korunma, hastalığı yok etme

1. Introduction

Rabies is primarily a disease of warm blooded carnivorous animals like dogs, cats, jackals, monkey, bats and wolves and transmitted to human being by the bites or licks of rabid animals. It is caused by RNA virus belongs to Lyssa virus genus manifests as viral encephalitis in human beings and once symptoms develop, it is always fatal to human beings. There is no effective treatment for rabies; it can only be prevented by vaccination. According to World Health Organization (WHO), the annual cost of rabies worldwide estimated to be about 583.5 million US\$, most of which is attributed by post-exposure prophylaxis (WHO, 2005). Even though a completely preventable disease, it is still a public health problem in India and other developing nations.

2. Clinical manifestation of human rabies

Median incubation period was 54 days for all naturally acquired human rabies (dog acquired - 64.5 days, bat acquired - 51 days). Two different forms of rabies are documented namely furious and paralytic rabies. Clinical features specific to human rabies are headache, sore throat, malaise, fever, meningismus, insomnia, slurred speech, encephalopathy, biting, hyperarousal, hydrophobia, larynx/face spasms, aerophobia, myoedema and priapism. Other manifestations are tremor, convulsive or non convulsive seizures, status epilepticus, sweating, piloerection, hypersalivation, increased lacrimation, ataxia, myoclonus, chorea and dilated pupils. On the bite site, there will be pain, paresthesia, pruritus

¹Department of Community Medicine, Shri Sathya Sai Medical College & Research Institute, Kancheepuram district, Tamil Nadu, India- 603108.

*Address for Correspondence: Department of Community Medicine, Shri Sathya Sai Medical College & Research Institute, Kancheepuram district, Tamil Nadu, India- 603108. Email: kalaimedicos11@gmail.com

and numbness. Cranial nerves manifestations are dysphagia, bilateral or unilateral facial weakness, ptosis, ophthalmoplegia and anisocoria. Late complications include coma, syndrome of inappropriate antidiuretic hormone secretion (SIADH), Diabetes insipidus and several complications on cardiovascular, respiratory and gastrointestinal systems. Hydrophobia, aerophobia and encephalopathy are more common in dog acquired rabies. In bat acquired rabies, abnormal cranial nerve, motor and sensory manifestations such as tremor, myoclonus, and local sensory abnormalities are more common. Death will occur within 7-10 days, after onset of symptoms and usually by respiratory paralysis (Udow SJ et al., 2013).

3. Neurobehavioral symptoms of rabies

Mental changes are anger, fear of death, irritability and depression. Hallucinations, anxiety, confusion, restlessness and high level of excitement are other common symptoms. Even few cases had been presented as acute psychiatric emergencies with symptoms like that of delirium tremens and schizophrenia (De Wet JSJT, 1980). Conversely, pseudorabies is a condition reported in a hypochondriac patient in which the patient with history of dog bite behaved as though he was having rabies (Bidaki R et al, 2013).

4. Burden of the disease

It is a neglected tropical zoonotic disease, with 50,000-55,000 deaths each year worldwide. Around 95% of human rabies occurs in Asia and African countries. It is estimated that there are about three billion people living in the region at risk for rabies in over 100 countries. India recorded more deaths from rabies than any other country in the world with 25,000-30,000 deaths annually (Wunner WH & Briggs DJ, 2010). Human rabies was reported throughout the country except Andaman, Nicobar and Lakshadweep islands. Since rabies deaths occur in a scattered manner, it doesn't pose epidemic threat to claim immediate action (Chatterjee P, 2009).

5. Strategies for prevention of rabies

Due to the complex nature of rabies control, it needs multiple levels of interventions with respect to humans and animals. Prevention of infection at human level by pre-exposure prophylaxis for high risk group and post-exposure prophylaxis for exposed persons. Animal interventions includes registration and licensing of dogs, immunization of dogs, restraint of dogs in public places, control of stray dog population by birth control, destruction of dogs bitten by rabid animals, quarantine of imported dogs for 6 months and better solid waste management (WHO, 2007).

6. WHO's strategy for endemic South-East Asian countries

World Health Organization's regional office for South East Asia, after an expert consultation provided a regional strategic framework in 2011 for eliminating human rabies

transmitted by dogs. The target is to eliminate the disease by 2020 in endemic South-East Asian countries. The initial strategy is to reduce by half the current number of human rabies death by 2016 which covered a period of 5 years from 2012-2016 (WHO, 2012).

7. India's action towards rabies

Government of India as per WHO's recommendation, had replaced nerve tissue vaccine with cell culture vaccine since 2004. Planning commission had identified rabies as priority zoonotic disease in its 11th five year plan. Government of India has introduced pilot project on rabies control programme from 2008 to 2011 with the objectives of prevention of human deaths due to rabies and reduction of transmission of disease in animals. It has set a target to reduce the human rabies deaths by at least 50 per cent by the end of the 11th Plan period which covered Delhi, Ahmedabad, Madurai, Pune, and Bangalore (Planning Commission of India, 2011).

In 12th five year plan, Government of India has planned to extend this comprehensive programme which has both human and animal component. This programme focuses on training health professionals about management of animal bites, providing post exposure prophylaxis, creation of awareness and reduction of animal bites, vaccination and sterilization of dogs (Dhar A, 2012).

Government of India, National Center for Disease Control, New Delhi, WHO collaborating center for Rabies Epidemiology has released Revised National guidelines on Rabies Prophylaxis in 2013 for bringing out uniformity in post exposure prophylaxis. It gave guidelines for indications of anti-rabies vaccine and rabies immunoglobulin. It recommends the use of cell culture vaccine given either intramuscularly or intradermally for pre/post exposure prophylaxis. It also stresses on using rabies immunoglobulin for category II immune compromised patients and for all category III animal bites (Government of India, 2013). Government of Tamil Nadu, Rabies control initiative is a first large scale comprehensive programme on rabies started in the year 2008, with universal coverage targeting both human and animal population (Abbas SS et al., 2014).

In collaboration with local non-governmental organization, the health departments of Chennai, Jaipur and Kalimpong have achieved zero rabies incidence followed by sustained Animal Birth Control-Anti Rabies Program (ABC-AR Program) (Krishna, S.C, 2010). Sikkim is about to be certified free of rabies followed by state-wide campaigning for vaccination of dogs (Chatterjee S & Riaz H, 2013).

8. Epidemiological situation of animal bite

Every year, about 1.7% of Indian population gets bitten by animals of which only 46.9% took anti rabies vaccine (Rahman AS, 2011). Around 97% of human rabies are transmitted by dogs of which 62.9% were stray dogs, followed by cats 2% and others 1% (Jackals, Mongoose) (Government of India, 2013). The vulnerable groups for rabies are males, children below 15 years, poor and

Table 1: Time line of anti-rabies action in India

Year	Action
1907	Neural tissue anti-rabies vaccine was manufactured in Pasteur Institute of India, Coonoor (Lahariya C, 2014).
1911	David Semple (an officer of the Indian Medical Service) developed Semple antirabic vaccine using carbolized dead virus in Central Research Institute in Kasauli (Chakrabarti P, 2010).
1970	Beta-propiolactone (BPL) inactivated rabies vaccine developed in Pasteur Institute of India, Coonoor (Lahariya C, 2014).
1995-1996	Chennai and Jaipur were the first cities to start sustained ABC-AR program (Krishna, S.C, 2010).
2001	The Animal Birth Control (Dogs) rules, 2001 enacted (Government of India, 2010). Developed Vero Cell Derived DNA purified Rabies Vaccine for human use in Pasteur Institute of India, Coonoor (Lahariya C, 2014).
2004	Replaced nerve tissue vaccine with cell culture vaccine for post exposure prophylaxis (Planning Commission of India, 2011).
2007	Identified rabies as a priority zoonotic disease in 11th five year plan (Planning Commission of India, 2011).
2008-2011	Government of India has introduced pilot project on rabies control programme in five cities (Planning Commission of India, 2011).
2007	National Guidelines for Rabies Prophylaxis and Intra-dermal Administration of Cell Culture Rabies Vaccines (Government of India, 2013).
2008	In Tamil Nadu, Rabies control initiative started (Abbas SS et al., 2014).
2009	Animal Welfare Board of India published 'Standard Operating Procedures For Sterilization of Stray Dogs Under the Animal Birth Control Programme'(Government of India, 2009).
2010	Animal Birth Control (Dogs) Amendment rules, 2010 (Government of India, 2010).
2012	Planned to expand the pilot project to whole nation in 12th five year plan (Dhar A, 2012).
2013	Government of India, National Center for Disease Control released Revised National guideline on rabies prophylaxis (Government of India, 2013).

uneducated people, and those who are living in rural area (Chatterjee P, 2009; Rahman AS, 2011; Suraweera W et al., 2012). Among those vaccinated, compliance to full course of vaccine was found to be 40.5% and was not satisfactory. It has been shown that adequate local wound treatment can reduce the chances of developing rabies by up to 80%. Among the animal bite victims, only 39.5% washed their wounds with water and soap (Sudarshan MK, 2004). The use of rabies immunoglobulin was very low at 2.1% (Kole AK et al., 2014). Vaccination of 70% of total dog population in an area for a period of six months is needed to achieve herd immunity. But only few cities are conducting sustained anti rabies vaccination for stray dogs (Chatterjee P, 2009).

9. High mortality of rabies in India

It was attributed by huge stray dog population which accounts for 25 million throughout India that poses great risk to the people. Moreover, there was lack of awareness about rabies and lack of understanding of the need for immediate action against rabies together with poverty, unavailability of anti-rabies vaccine and immunoglobulin (Sudarshan MK, 2004). Ichhpujani et al study reported

that only 30% knew how to clean the wound after any animal bite and majority of the study population were not compliant with the treatment guideline (Ichhpujani RL et al., 2006). Interventions against rabies were mainly concentrated in urban areas leaving behind the vulnerable rural area (Abbas SS et al., 2014).

10. Poor disease surveillance system on rabies

Better estimation of rabies incidence is not available because of lack of systematic rabies disease surveillance system and moreover it is not a notifiable disease in India (Maroof K, 2013). And many cases were not reported and some other cases were missed because of atypical presentation (Rahman AS, 2011). It has been found that there was a gap between rabies research done in India and existing rabies policy interventions. Even though, India contributes to more number of rabies cases globally, Indian research output represents only 4.4% of the global research on rabies (Abbas SS & Kakkar M, 2013). Multicentric studies should be undertaken to reveal the true status of the disease, thereby it will provide a proper input for policymakers to develop strategies against rabies.

11. Key challenges in rabies control

Current challenges are lack of intersectoral coordination between multiple disciplines involved in rabies control like public health department, animal husbandry department, government and non-government agencies; limited information on dog population, poor surveillance data on human and animal rabies, lack of adequate dog bite epidemiology for predicting vaccine requirement, delay in scaling up of successful pilot interventions from local setting to national level, poor diagnostic capacity, limited evidence of effectiveness and efficacy of interventions in different ecological settings, lack of thrust on environmental management which contribute to uncontrolled dog population (Kakkar M et al., 2012).

To conclude, breaking the rabies cycle in a sustained manner is necessary to eliminate rabies from this part of the world. For elimination of rabies by 2020, strong political commitment along with intersectoral coordination between government and non-government health agencies are essential for promoting the use of intervention tools at human and animal level throughout the nation.

References

- Abbas, S.S., Kakkar, M., Rogawski, E.T. (2014). Costs Analysis of a Population Level Rabies Control Programme in Tamil Nadu, India. *PLoS Negl Trop Dis*, 8, e2721.
- Abbas, S.S., Kakkar, M. (2013). Research & policy disconnect: The case of rabies research in India. *Indian J Med Res*, 138, 560-561.
- Bidaki, R., Mirhosseini, S.M.M., Asad, F.A.B. (2013). Rabies or a psychiatric disorder? A rare case report. *Journal of Case Reports in Practice*, 1: 11-3.
- Chakrabarti, P. (2010). "Living versus dead": The Pasteurian paradigm and imperial vaccine research. *Bull Hist Med*, 10, 387-423.
- Chatterjee, P. (2009). India's ongoing war against rabies. *Bull World Health Organ*, 87(12), 885-964. <http://www.who.int/bulletin/volumes/87/12/09-021209/en/>.
- Chatterjee, S., Riaz, H. (2013). Rabies: beware of the dog. *BMJ*, 347, 1-3.
- De Wet, J.S.D.T. (1980). Rabies Presenting as an Acute Psychiatric Emergency. *S Afr med. J*, 58:297.
- Dhar, A. (2012). 12th Plan priority for rabies control. *The Hindu*. New Delhi. September 28, 2012. <http://www.thehindu.com/news/national/12th-plan-priority-for-rabies-control/article3942934.ece>.
- Government of India (2009). Ministry of Environment and Forest. Animal Welfare Board of India. 'Standard Operating Procedures For Sterilization of Stray Dogs Under the Animal Birth Control Programme'. <http://www.awbi.org/awbi-pdf/SOP.pdf>.
- Government of India (2010). Ministry of Environment and Forest. Animal Welfare Board of India. The Animal Birth Control (Dogs) rules, 2001 & Amendment 2010. <http://www.awbi.org/awbi-pdf/notification.pdf>.
- Government of India. (2013). National Center for Disease Control, New Delhi. National guidelines on Rabies Prophylaxis. http://nicd.nic.in/Rabies_guidelines2014.pdf.
- Ichhpujani, R.L., Chhabra, M., Mittal, V., Bhattacharya, D., Singh, J., Lal, S. (2006). Knowledge, attitude and practices about animal bites and rabies in general community-a multi-centric study. *J Commun Dis*, 38, 355-361.
- Kakkar, M., Venkataramanan, V., Krishnan, S., Chauhan, R.S., Abbas, S.S. (2012). Moving from Rabies Research to Rabies Control: Lessons from India. *PLoS Negl Trop Dis*, 6, e1748.
- Kole, A.K., Roy, R., Kole, D.C. (2014). Human rabies in India: a problem needing more attention. *Bull World Health Organ*, 92, 230.
- Krishna, S.C. (2010). 'The success of the ABC-AR programme in India', *FAO*, 20 August 2010. <http://www.fao.org>.
- Lahariya, C. (2014). A brief history of vaccines & vaccination in India. *Indian J Med Res*, 139, 491-511.
- Maroof, K.A. (2013). Burden of rabies in India: the need for a reliable reassessment. *Ind J Comm Health*, 25, 488 – 491.
- Planning Commission of India (2011). Report of the Working Group 5 on Disease Burden for the 12th Five Year Plan. Planning Commission of India. pp.1-256. http://planningcommission.nic.in/aboutus/committee/wrkgrp12/health/WG_3_1communicable.pdf.
- Rahman, A.S. (2011). Towards Sustainable Prevention of Rabies at Source: Case Report India.OIE Global Conference on Rabies Control, 7-9 Sep, 2011. Incheon, Republic of Korea.
- Sudarshan, M.K. (2004). Assessing burden of rabies in India. WHO sponsored national multi-centric rabies survey. *Assoc Prev Control Rabies India J*, 6,44-45.
- Suraweera, W., Morris, S.K., Kumar, R., Warrell, D.A., Warrell, M.J., Jha, P. (2012). Deaths from Symptomatically Identifiable Furious Rabies in India: A Nationally Representative Mortality Survey. *PLOS Neglected Tropical Diseases*, 6, e1847
- Udow, S.J., Marrie, R.A., Jackson, A.C. (2013). Clinical Features of Dog- and Bat-Acquired Rabies in Humans.*CID*, 57, 689-696.
- World Health Organization (2005). WHO recommended standards and strategies for surveillance, prevention and control of communicable disease. Rabies surveillance. <http://www.who.int/rabies/epidemiology/Rabiessurveillance.pdf>.
- World Health Organization (2007). "Rabies vaccines WHO Position Paper". *Weekly Epidemiological Report*, 82, 425-436.
- World Health Organization (2012). Report on the informal consultation to finalize regional strategic framework for elimination of human rabies transmitted by dogs in the South East Asia Region: Bangkok, Thailand. 13-14 June 2011. New Delhi. WHO Regional Office for South East Asia, 2012 (SEA-CD-251).
- Wunner, W.H., Briggs, D.J. (2010). Rabies in the 21st Century. *PLoS Negl Trop Dis*, 4, e591. doi:10.1371/journal.pntd.0000591.