

Assessing Rabies-Free Status of Andaman, Nicobar, and Lakshadweep Islands, India

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Summary

The Indian Islands of Andaman, Nicobar, and Lakshadweep have been historically rabies-free. However, reliable laboratory evidence to substantiate rabies-free status was lacking. In this background, the study was conducted as a component of the World Health Organization-Association for Prevention and Control of Rabies in India, Indian Multi-Centric Rabies Survey; to assess the rabies-free status of the two Islands and to examine the feasibility of initiating laboratory surveillance for rabies in dogs in Andaman, Nicobar, and Cats in Lakshadweep Islands. A team of medical and veterinary investigators visited these Islands in 2017. A review of 10 years records (2007–2017) in medical and veterinary institutes and interviews with different stakeholders were conducted. Based on the review of records, there was no evidence of human/animal rabies in the Islands. Eight dog brain samples from Andaman, Nicobar Islands, and ten cat brain samples from Lakshadweep Islands were tested negative for rabies by fluorescent antibody test at two rabies diagnostic laboratories at Bengaluru.

Key words: Diagnosis, India, rabies-free Islands, surveillance

Rabies, zoonotic viral encephalitis, is endemic in many countries of Africa, Asia, North and South America, and Western Europe. Two epidemiological cycles are established in rabies, namely urban and sylvatic cycle. The urban cycle is maintained in dogs and transmitted to other species through bite of a rabid dog, which remains the most important source of infection in developing countries of Africa, Asia, and Latin America. In the Indian subcontinent, rabies is endemic in Afghanistan, Bangladesh, Bhutan, India, Nepal, Maldives, Myanmar, Pakistan, and Sri Lanka.^[1] Globally, an estimated 59,000 humans die of rabies annually; of these, 45% of the deaths are reported from the Indian subcontinent, with about 20,000 human deaths occurring in India alone.^[2,3] Although, the mainland of India is endemic for rabies, historically, the Islands of Andaman, Nicobar, and Lakshadweep are considered to be free from rabies. However, there is no credible evidence in the form of systematic human and animal surveillance or laboratory testing to substantiate the rabies-free status of these Islands. Moreover, there is a sizeable population of dogs and cats in the Andaman, Nicobar, and Lakshadweep Islands, respectively; that could act as potential vectors in transmission of rabies to other domesticated animals and human population.

This study was undertaken, as a part of the World Health Organization-Association for Prevention and Control of Rabies in India (WHO-APCRI) Indian Multi-Centric Rabies Survey in 2017, to assess the rabies-free status of these two Islands and to examine the feasibility of initiating laboratory surveillance for rabies in dogs in Andaman, Nicobar, and cats in Lakshadweep Islands.

The study was initiated after getting the clearance from the Institutional Ethics Committee, Kempegowda Institute of Medical Sciences, Bengaluru, ref. no. KIMS/IEC/S15-2016 dated: December 05, 2016. A descriptive method mix study, including both quantitative and qualitative component, was conducted by a team consisting of medical and veterinary investigators, who visited the Islands of Andaman, Nicobar, and Lakshadweep in June and November 2017, respectively. Using a standard questionnaire designed for this purpose, the

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Access this article online

Quick Response Code:



Website:
www.ijph.in

DOI:
10.4103/ijph.IJPH_412_19

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How to cite this article: Isloor S, Mani RS, Jayakrishnappa MB. Assessing rabies-free status of Andaman, Nicobar, and Lakshadweep Islands, India. *Indian J Public Health* 2019;63:S48-50.

survey team interviewed the officials of the directorate of health services and directorate of animal husbandry and veterinary services in both the Islands; collected relevant information regarding the animal bites and any reported rabies cases from their records in the past 10 years (2007–2017). The survey team also interacted with officials at seaports and airports to assess import and quarantine practices of the animals brought into the Islands; checked pharmacies for the availability of rabies biologicals; interacted with zoo and wild-life wardens for import and occurrence of rabies among wild animals. The survey team also interacted with government/private medical professionals (9 nos.), veterinary professionals (12 nos.) and general public (32 nos.) in Andaman and Nicobar Islands; in Lakshadweep Islands also, medical (6 nos.), veterinary (17 nos.) professionals, and general public (72 nos.) were enquired about the occurrence of human or animal rabies in the recent past.

LABORATORY SURVEILLANCE FOR ANIMAL RABIES

The survey team motivated veterinary personnel in Andaman, Nicobar, and Lakshadweep Islands to submit carcasses of dogs and cats died due to any diseases or natural death for examination of brain for rabies. Similarly, the general public in both the Islands were encouraged to submit carcasses of dogs and cats through display of posters in the local language and English. Procedures for postmortem brain sample collection and transportation of brain samples to two rabies diagnostic laboratories at Bengaluru were explained to veterinary and paraveterinary staff in both the Islands and standard operating procedures for the same were shared with them.

COLLECTION AND TESTING OF BRAIN SAMPLES

Brain samples of dogs and cats obtained from the Department of Animal Husbandry, Kavaratti, Lakshadweep, and Animal Diseases Diagnostic Laboratory (ADDL), Port Blair, Andaman/Nicobar were shipped in cold chain with appropriate triple-layer packaging to OIE twinned KVAFSU rabies diagnostic laboratory, Veterinary College, Bengaluru and WHO Collaborating Centre for Reference and Research in Rabies, NIMHANS, Bengaluru. The brain samples were tested by the fluorescent antibody test (FAT) for the detection of rabies nucleoprotein antigen using a standard protocol.^[4] Impression smears were made from brain tissues, fixed in cold acetone for 2 h, air-dried and stained with anti-rabies monoclonal antibodies conjugated with FITC (EMD Millipore Corporation, Temecula, CA, USA) for 30 min at 37°C in an incubator in a humid chamber. Known rabies positive and negative brain smears were included as controls. The slides were examined under ultraviolet light using a fluorescence microscope for the presence of typical granular apple green fluorescence.

ANDAMAN AND NICOBAR ISLANDS

Dogs were the major potential vectors of rabies in the Islands. Some inhabitants of the Andamans had dogs as pets,

but a vast majority of dogs were strays. The tribal people of Nicobar use dogs for hunting deer and pigs. As per the animal census of 2012, there were about 27,000 dogs in the Islands. Animal birth control program for stray dogs is carried out by the municipality and animal husbandry department, through an NGO Friendicoes-SECA. There were cats, goats, pigs, and cattle but no sheep, horses, foxes, wolves, jackals, or mongoose. Anti-rabies vaccination (ARV) for the stray dog population was not practiced, but pet owners get their dogs vaccinated; however, there was no licensing of pet dogs. Quarantine of animals imported without vaccination/signs of rabies or any other illness into the Islands was not done. One private pharmacy in Port Blair stocks rabies vaccine and dispenses it following a medical prescription to travelers/individuals exposed to dogs/cats in the island or individuals who are exposed to animal bites in the mainland and seek postexposure prophylaxis. Naval hospital (INHS Dhanvantri), Port Blair also maintains a stock of ARV for use in defense personnel bitten by animals on Andaman and Nicobar Islands. About 381 dog bite cases among travelers were treated at government hospital and private clinics in Port Blair in the past 10 years (2007–2017). However, no clinically suspected case of human rabies was reported in the past 10 years. Eight dog brain samples from Andaman and Nicobar Islands were received and tested negative for rabies by FAT at the WHO collaborating center for reference and research in rabies, NIMHANS, Bengaluru and cross-validated at OIE-KVAFSU Twinned Laboratory, Veterinary College, Hebbal, Bengaluru.

LAKSHADWEEP ISLANDS

It was evident that the Islands were free from dogs based on interactions with the medical and veterinary professionals, administrators, local public, animal owners, and also based on the physical survey by the team in Kavaratti and Agatti Islands. This can be attributed to restrictions for bringing dogs in the Islands at the limited entry points. Cats are the only potential vectors of rabies found in Lakshadweep. However, cats were not included in the livestock census. As per the Directorate of Animal husbandry, there are about 5000 cats, (About 4500 community/stray cats and 500 domesticated cats). As per the available records, there are no pigs, foxes, jackals, mongoose, or other wild animals.

No anti-rabies vaccines or immunoglobulins were available either in the pharmacy shops in the market or government medical and veterinary hospitals. There are no documented cases of rabies in humans or animals in Lakshadweep in the past as per the records available in the medical or veterinary hospitals in both Kavaratti and Agatti Islands. Ten cat brain samples received from seven Islands of Lakshadweep, namely Agatti, Kavaratti, Amini, Chetlat, Kalpeni, Minicoy, and Androth were tested negative for rabies by FAT at OIE-KVAFSU Twinned Laboratory, Veterinary College, Bengaluru and subsequently cross-validated at the WHO collaborating center for reference and research in rabies, NIMHANS, Bengaluru.

Although the Indian Islands of Andaman, Nicobar, and Lakshadweep have been considered to be historically human and animal rabies-free, there was no credible laboratory evidence to substantiate it. A previous survey of these Islands, carried out between July and August 2003, revealed that these Islands continued to remain rabies-free.^[5] However, the study findings alerted public health authorities about the increasing dog population and poor vigil on import/entry of pets in the Andamans, and lack of laboratory surveillance for rabies in both the Islands posing a threat to the rabies-free status.

According to the WHO, a rabies-free area is defined as one in which, an effective import policy is implemented, and in the presence of adequate disease surveillance, no case of indigenously acquired rabies infection has been confirmed in humans or any animal species at any time during the past 2 years.^[6] Therefore, there was an urgent need to establish a routine surveillance system for rabies to substantiate and maintain the rabies-free status of these Islands.

As a part of the WHO-APCRI India Multicentric Survey 2017, laboratory surveillance in these Islands was initiated for the first time and eight dog brain samples and ten cat brain samples were tested at two rabies diagnostic laboratories in Bengaluru. All the samples tested were found to be negative for rabies. This observation supports the earlier findings of rabies-free status of Andaman and Nicobar, and Lakshadweep Islands. Although the number of animal brain samples tested is small, this is the first laboratory-based evidence supporting the earlier rabies-free status of these Islands. The laboratory surveillance for rabies initiated on both these Islands during this study will be continued for a minimum period of 2 years with the support of APCRI, ADDL, Port Blair and ADDL, Department of Animal Husbandry, Kavaratti, Lakshadweep, shall continue to submit the brain samples of dogs/cats for testing to any of the two laboratories at Bengaluru. It is proposed to train veterinarians from these two centers in laboratory diagnostic techniques for rabies and establish facilities for laboratory surveillance within the Islands in future.

Limitations

Laboratory surveillance for animal rabies was restricted only to dogs and cats, from few Islands of Andaman/Nicobar and Lakshadweep. Data on human rabies were based on the absence of “clinically suspected cases” in the past 10 years in these two Islands.

The review of available records at medical and veterinary hospitals; series of interviews with medical and veterinary staffs on both the Islands indicates no evidence of human or animal rabies in either of the Islands, in the past 10 years. This could

be attributed to the geographical isolation from the mainland.^[5] However, there is a need to continue regular surveillance for human and animal rabies; laboratory surveillance in these two Islands and strictly monitor the import/entry of animals through airways and seaways into the Islands.

Acknowledgments

The authors are grateful to Dr. Bernadette Abela Ridder and Dr. Lea Knopf from WHO, Geneva, Switzerland, and Dr. Ritu Singh Chauhan, WHO, India office, New Delhi for extending all support and help to conduct this study. The authors also thank Dr. M. K. Sudarshan, project lead; Dr. D. H. Ashwath Narayana, project coordinator, WHO-APCRI Indian Multicentric Rabies Survey, 2017 for extending their help. The authors gratefully acknowledge the help and support of Dr. Neelufar PP, and Dr. Sabeer B, veterinary assistant surgeons, Department of Animal Husbandry and veterinary services, Government of Lakshadweep and Dr. Sengupta N, Veterinary Officer, Municipal Corporation of Port Blair, Andaman and Nicobar Islands for sending the animal brain samples for testing. The authors thank Dr. Lekshmi J Das and Dr. Mohamad Ghouse, OIE-KVAFSU Twinned Rabies Diagnostic Laboratory, Veterinary College, Hebbal, Bengaluru, and Mr. Mahesh and Ms. Swarupa, Department of Neurovirology, NIMHANS, Bengaluru for testing brain samples.

Financial support and sponsorship

This study was financially supported by WHO Country Office for India, New Delhi.

Conflict of interest

There are no conflicts of interest.

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