Brief Report

Laboratory-confirmed three rabid spotted deer in Colombo suburbs in Sri Lanka: does it alarm the disease transmission to humans?

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Abstract

Rabies is a zoonotic viral disease which is fatal if post-exposure prophylaxis is not administered immediately after an infected bite. In Sri Lanka, around 20-30 human rabies deaths are reported each year, nearly all of which occur from being bitten by rabid dogs, which could occur due to lack of dog vaccination coverage, dog population management and community awareness (1).

Three laboratory-confirmed rabid spotted deer were found in August 2022 in Homagama and Athurugiriya areas in Sri Lanka. Prevention of deer-to-human and deer-to-dog transmission is strengthened by multi-stakeholder collaboration. Controlling and preventing of transmission of the disease among the herd of deer, locating them in the dry zone as well as controlling their breeding remain a challenge. The rabid positive cases indicated that more animals could be affected by the disease, thus, the risk to human health and economic losses remain unknown. Therefore, vigilant attention is needed.

Keywords: *communicable disease control, prophylaxis, rabies, Sri Lankan spotted deer, zoonotic disease*

Introduction

Rabies, an encephalomyelitis caused by infection with the rabies virus or other lyssaviruses, is estimated approximately at 56 000 human deaths each year in Africa and Asia. The expenditure on post-exposure prophylaxis (PEP) is highest in Asia, with estimates up to US$ 1.5 billion annually (2). In Sri Lanka, 23 human rabies deaths occurred in 2021, indicating that rabies is also a threat to humans in the country (3).

Sri Lanka is the first country in South-East Asia where a national strategy for elimination of dog-mediated rabies was developed, with the aim to achieve a global target of zero human rabies deaths from dog-mediated rabies by 2030 (4). Although human rabies is notifiable, rabies surveillance in dogs and wild animals is extremely difficult to undertake in the country, therefore the data is unknown (5). Similar to other Asian countries, rabies is frequently found in dogs, yet cats and wild animals such as jackals, mongoose, polecats, civets and bats may also carry the disease in Sri Lanka (6).

Report

A herd of deer has spread since mid-1980s in the Panagoda Army Camp, following their transportation from Eravur in the Batticaloa District and one family in the same area provided a home to a couple of deer. According to the people, these deer somehow escaped to the nearby villages and up to date around a herd of 400-500 deer are living in Homagama, Panagoda, Athurugiriya and Moratuhena, usually in groups of between 10 and 60 animals.

Around 20 unusual deer deaths were reported from June to September 2022 in Homagama and Athurugiriya suburbs. On 8 August, the Department of Wildlife was informed following a death of deer with drooling of saliva by a resident in Homagama. The brain sample of the deer was laboratory confirmed for rabies by the Medical Research Institute (MRI), Colombo. Similarly, on 16 August from Athurugiriya and 19 August from Homagama, two more deer heads were positive for rabies.

Several meetings were conducted with multi-stakeholder involvement including the Department of Wildlife, Public Health Veterinary Service (PHVS), District Secretariat-Homagama, Education Ministry and Ministry of Health to obtain a collective decision to prevent rabid deer-human contact. Educating the public not to feed the deer and play with them especially children was carried out through Medical Officer of Health (MOH) of Homagama, Kaduwela and the Zonal Directors of Education of Sri Jayewardenepura, Kotte and Homagama. The ring vaccination programmes specially targeting the stray dogs were extended in these two areas since 17 August 2022.

Discussion

Spotted deer (*Axis axis ceylonensis*) is endemic to Sri Lanka, where they are usually found in most parts of the country except in the highest hills. Usually, they are active in the morning and evening, mostly feeding and playing and the afternoon spent in resting (7). Although it is not currently practised in Sri Lanka, the vaccination of deer for rabies is expected to have similar safety and efficacy as it does in other ruminants (8). However, it is less feasible as they are extremely nervous and always on the alert for any sign of imminent danger. Thus, prevention of human-deer contact especially among children is essential, which was carried out in our region. Further, catching of deer and relocating to remote areas is less feasible suddenly, due to several reasons such as the risk of spreading of rabies to a new area, lack of familiarity to the new environment leading to preying of other wild animals and lack of familiar food for those herds of deer. Therefore, relocating need to be implemented gradually. Although, in suburban settings, where deer densities

are often highest, anti- gonadotropin-releasing hormone (GnRH) injections to bucks is less feasible due to the need of repeated doses as a contraceptive method, difficulty in identification of injected bucks once the injection is administered, scarcity of evidence in literature and adverse events following the injection (9). Therefore, frequent health monitoring of spotted deer is carried out through field visits.

The risk of rabies transmission from deer to humans is very low (7). Further, rabies in deer occurred infrequently in other countries such as United States of America, Argentina, China and South Korea (8). We could not find any reported rabid deer cases previously in Sri Lanka. The rabies virus was most likely transmitted to the deer through contact with wildlife, however, deer-to-deer transmission cannot be excluded in Homagama where multiple rabid deer are reported. Other explanation is that these deer were bitten by a rabid stray dog, causing rabies in these deer herds. Further, domestic dog-to-deer transmission can occur once a dog escapes the house with least possibility due to mass vaccination of dogs which was carried out in March 2022 in the affected area with a coverage of 7768 dogs including 736 of stray dogs. Further, around 1500 dogs were vaccinated following the deer deaths around the areas specifically that were inhabited with stray dogs.

Vaccination of domestic and community dogs has been shown to be a successful and cost-effective way of preventing human rabies, which is routinely undertaken in Sri Lanka. It is reported that by vaccinating 70% of dogs in areas where rabies is present, the number of human cases can rapidly drop to almost zero. However, due to unknown figure of dog estimation, this data was unable to extrapolate in our community (10).

Despite the numerous deer deaths mentioned in our case study, only three cases were confirmed for rabies. Although several deer deaths were not tested for rabies, these cases can be taken as evidence to further explore the current situation. Further, no human rabies death has been reported recently in these areas. Following the first stakeholder meeting, we established a knowledge sharing platform among participants to report further cases, increase awareness on prevent human-deer contact and share the intervention that was carried out, which will be helpful in stepping further in reduction of the disease transmission.

Conclusions & Recommendations

Systematic data collection and compilation to provide accurate information on confirmed cases of animal and human rabies at the MOH area level would be helpful in developing control roadmaps. As the spreading of virus to deer is strange, it is of critical importance to perform genetic typing of brain samples to identify the species. Carrying out a survey to estimate the dog density in the district of Colombo is also needed. Further, sterilization of dogs which is usually carried out with the collaboration of PHVS needs to be expedited.

Public Health Implications

- The multi-faceted nature of the disease complicates control and prevention of rabies via deer, and therefore a multi-sectoral One Health Approach could be a better strategy with inclusion of all stakeholders (human, animal, and environmental health sectors) in disease management programmes.

Author Declarations

Competing interests: The authors declare that they have no competing interests.

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Author contributions: CH: Literature search, data acquisition, manuscript preparation; DL: concepts, design, definition of intellectual content, manuscript review; KK: concepts, design, definition of intellectual content, literature search, data acquisition, manuscript preparation, manuscript editing, manuscript review.

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