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Sero-prevalence of virus neutralizing antibodies for rabies in different groups of dogs following vaccination

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Abstract

Background: Mass vaccination of dogs is considered fundamental for national rabies control programmes in Sri Lanka, as dog is the main reservoir and transmitter of the disease.

Methods: Dogs were followed to determine the sero-prevalence of antibodies to the rabies virus. Altogether 510 previously vaccinated and unvaccinated dogs with owners (domestic dogs) and dogs without owners (stray dogs) of the local guard dog breed in different age groups recruited from Kalutara District, Sri Lanka. The dogs were vaccinated with a monovalent inactivated vaccine intramuscularly and serum antibody titres on days 0, 30, 180 and 360 were determined by the Rapid Fluorescent Focus Inhibition Test (RFFIT).

Results: The results indicated, a single dose of anti-rabies vaccination fails to generate a protective level of immunity (0.5 IU/ml) which lasts until 1 year in 40.42% of dogs without owners and 57.14% of previously unvaccinated juvenile (age: 3 months to 1 year) dogs with owners. More than one vaccination would help to maintain antibody titres above the protective level in the majority of dogs. The pattern of antibody titre development in annually vaccinated and irregularly vaccinated (not annual) adult dogs with owners is closely similar irrespective of regularity in vaccination. Previously vaccinated animals have higher (2 IU/ml) antibody titres to begin with and have a higher antibody titre on day 360 too. They show a very good antibody titre by day 180. Unvaccinated animals start with low antibody titre and return to low titres by day 360, but have a satisfactory antibody titre by day 180.

Conclusions: A single dose of anti-rabies vaccination is not sufficient for the maintenance of antibody titres for a period of 1 year in puppies, juvenile dogs with owners and in dogs without owners. Maternal antibodies do not provide adequate protection to puppies of previously vaccinated dams and puppies of previously unvaccinated dams. Immunity development after vaccination seems to be closely similar in both the groups of puppies.

Keywords: Antibody, Anti-rabies vaccine, Dogs, RFFIT, Sero-prevalence, Titre

Background

Rabies is a vaccine preventable, zoonotic disease [1]. Still it remains as a serious public health problem all over the world [2]. It is commonly transmitted to other animals and humans through close contact with saliva from infected animals [3]. It is estimated that 60,000 human rabies-related deaths occur worldwide each year [1, 4, 5].

Sri Lanka has invested a large amount of money to control dog rabies. Human deaths due to rabies were

further decreased from 56 (2.8 per 1,000,000) in 2007 to 19 (0.05 per 1,000,000) in 2014. This was the lowest incidence reported in Sri Lanka. This reduction was mainly because of mass vaccination of dogs against rabies, mass Animal Birth Control (ABC) programmes, Post Exposure Prophylaxis (PEP) for rabid and rabies suspected animal bites and mass awareness programmes [6, 7]. Being an island once rabies is completely eradicated from Sri Lanka it should be easier to prevent re-introduction of rabies from other countries [7, 8].

The mass vaccination of dogs is considered fundamental in rabies control programmes in many countries including Sri Lanka [7, 9]. The total number of animal rabies cases

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