Detection of Rabies Virus Antibodies in Vaccinated and Unvaccinated Stray Dogs in Mumbai City

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ABSTRACT

A total of 50 blood sera samples, including 25 samples each of unvaccinated stray dogs and dogs which received pre-exposure prophylaxis 2-6 month before sampling, were collected from animal welfare centers situated in Mumbai city. The sera samples were subjected to counter immuno electrophoresis (CIEP) test. CIEP titers ranged from 1:4 to 1:64 in 24/25 vaccinated dogs. However, 10/25 unvaccinated dogs showed rabies antibodies titers, of which 5 had higher (1:8) antibodies titers, indicating the prevalence of rabies in the stray dogs.

Keywords: Antibody, blood, CIEP, dog, prophylaxis, rabies, serum.

Rabies continues to be a serious health hazard in developing countries, including India. Dog is the principal transmitter of infection to man and animals, and 96% of human cases in India occur due to dog bite only (Sehgal and Bhatia, 1985). Analysis of data pertaining to the source of the rabies infection in human beings in India shows that practically all the cases are from bites of dogs, cats, wolves, foxes, mongooses and hyenas. It becomes mandatory to scrutinize the unvaccinated stray dog population which may harbour the virus symptomatically. Also, the sero-surveillance of vaccinated dogs for the presence of virus neutralizing antibodies is essential to monitor the efficacy of anti-rabies vaccination.

The specific neutralizing antibodies to rabies virus can be detected by complement fixation test (CFT), serum neutralization (SN) test, counter immuno electrophoresis (CIEP) test and haemagglutination inhibition (HI) test. The CIEP technique is a well established technique for the purpose of detection of antigen/antibodies of rabies (Diaz and Varela, 1977). The present study was undertaken with the objective to scrutinize stray dogs for the presence of rabies virus by detection of virus antibodies in unvaccinated and vaccinated stray dogs.

Twenty five dog sera samples, each from vaccinated and unvaccinated dogs were collected from the Welfare of Stray Dogs Association, Mahalaxmi, Mumbai and the Bai Sakarbai Dinshaw Petit Hospital for Animals, Parel, Mumbai. In case of vaccinated dogs, blood sera samples were collected from those dogs which received pre-exposure prophylaxis treatment 2-6 month before sampling.

The test was carried out on clean, grease free glass slide measuring 75 mm x 25 mm. Noble agar (1 g) was dissolved in 100 ml of barbitone buffer (0.1 M, pH 8.6) and slides were prepared using 2.8 to 3.0 ml molten agar per slide. Four pairs of wells of 2.5 mm diameter, each placed
3.0 mm apart were punched in two parallel rows maintaining minimum 5.0 mm distance between the rows. The cavities were positioned from each other at an angle of 25°.

The slides were placed in the electrophoretic tank after loading the well with sera samples and standard known antigen. The serum cavities were directed towards anode, connected with the help of filter paper wicks. Electrophoresis was carried out at a potential difference of 150 V for 30 min, and for a further period of 3 min at a potential difference of 50 V. Then slides were incubated at room temperature in a humidity chamber in order to prevent drying of the gel. Results were read immediately and after 12 h. The slides were stained with 0.5% amido black solution for future reference. Plates showing precipitation band between the two wells/cavities was considered as a positive test.

The CIEP results revealed that antibody titers of the vaccinated dogs were found in the range of 1:4 to 1:64, except one dog (no. 22) who did not show development of rabies antibodies although the same dog was in an apparently healthy condition. In a survey carried out by Trepsumethanon et al. (1991) using rapid fluorescent focus inhibition test to determine serum neutralizing antibodies to rabies virus in Thai dogs found 42% of the dogs with no detectable rabies antibodies. Similar observations were also recorded by Afshar and Bahmanyar (1978) in their review of non fatal rabies virus infections. Reasons for failures to develop antibodies after vaccination are many, such as, heavy worm load during vaccination (also common in human cases), animals undergoing some sort of stress condition e.g. short intervals between primary and booster vaccinations resulting into vaccination stress, radiation therapy or cortico- steroid treatment within a few days of vaccination, and animals in stage of incubation of rabies or other viral diseases, wherein the immune system does not respond as in normal animals.

Out of 25 unvaccinated dogs, 10 dogs (40%) showed rabies antibody titers of which 5 dogs (no. 3, 4, 5, 7 and 8) showed high antibody titers (1:8), indicating the prevalence of rabies in this group of dogs. The antibody response was indicative of latent rabies virus infection which can either develop into a full blown disease or be suppressed and lead to a latent carrier state. These results are in agreement with Bell (1964) and Fekadu and Baer (1980) who encountered several such cases, where unvaccinated animals had titers.

Thus, in the present study 40% of the unvaccinated dogs showed rabies virus infection and they could be considered as carriers for all practical purposes. The incidence rate observed in the present study is higher as compared to the incidence rate (16.1%) reported by Wosu and Anyanwu (1990) in unvaccinated stray dogs. However, incidence rate observed in the present study was lower than, 44% reported by Iroegebu and Uhuegbu (1992) and 80% by Mebatston et al. (1992).

References

