EPIZOOTIOLOGY OF RABIES: THE AMERICAS

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ABSTRACT

The epizootiology of wildlife rabies in North America, mongoose rabies in the Caribbean, and dog and vampire bat rabies in Latin America is discussed. Particular emphasis is given to the distribution and prevalence of antigenic variants in geographically separate areas and in areas where the disease is enzootic in several host species.

INTRODUCTION

Despite improvements in vaccine quality and availability and advances in diagnostics, epidemiology and surveillance, rabies continues as a threat to human and animal populations. In parts of Central and South America rabies in dogs has increased as rapidly as human populations have grown, and while effective vaccination and animal control programs have eliminated dog rabies in the United States and Canada, the disease there continues to cyclically increase and decrease in a variety of wildlife hosts.

If rabies is to be eventually eradicated or brought under control in these countries, it will be through an understanding of the epizootiology of the disease. This must include knowledge of the relationship which exists between the rabies virus and the host animal (factors such as species differences in susceptibility to infection and tissue tropism, the length of the incubation and morbidity periods, and the clinical syndrome) and of the relationship which exists between that animal and its environment (factors such as population dynamics and interactions between animal species).

Recent advances in genetic engineering have resulted in new and promising approaches to animal vaccination. As field application of these vaccines becomes likely, it is now more important than ever that we re-examine what is known about the epizootiology of rabies and outline those areas in which more information is needed.

RABIES IN CANADA AND THE UNITED STATES

Although 4 decades of successful vaccination and pet animal control programs have reduced canine rabies from more than 8,000 cases per year to a few hundred cases per year, rabies continues in the United States and Canada to be enzootic in wildlife species. From 6-8,000 sylvatic cases are reported each year, and the resulting annual rabies prophylaxis comprises 80-90,000 doses of human vaccine and 20-30 million doses of domestic animal vaccine (1,2).

This picture is unlikely to change without the development and implementation of wildlife rabies control programs on a scale comparable to that which was used against domestic animal rabies. Many of the epidemiologic methods used in assessing disease trends and the efficacy of control measures in domestic animals, however, are inadequate for the complex multi-species involvement that characterizes sylvatic rabies. In addition to an accurate assessment of the geographic distribution of cases, appropriate intervention here will require knowledge of the incidence of rabies in each of several different wildlife host species, and the potential within an outbreak area for both intra- and inter-species transmission of virus. As wildlife rabies increased in the 1960s, efforts were made by several groups to gather this information. One of the most productive has been the nationwide rabies surveillance system. Although a passive surveillance (only those animals that have been observed to have human or domestic animal contact and are submitted for laboratory diagnosis are included), the system has provided much information on the patterns of disease in each wildlife species.

One of the first observations to be made from data collected in this manner was that large numbers of cases are reported in 1 major host species in certain areas while the disease is reported only rarely in this species in other areas. For example, of 634 cases of rabies in