Equine Encephalomyelitis

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Equine Encephalomyelitis
The incidence, epizoolgy and control of equine sleeping sickness.

Hans Grell, '42

DURING the recent Iowa State Veterinary Medical Association meeting, Dr. H. W. Schoening, Chief of the Pathological Division, B.A.I., discussed both the spread of equine encephalomyelitis and the progress made in its control, and attempted to deduce from available information what the immediate future holds with respect to this disease.

Statistics
Recent statistics on equine encephalomyelitis are as follows: In 1935, there were 23,512 cases reported in the United States, in 1936 there were 3,929 cases, in 1937 and 1938 there was an increase of 173,889 and 184,862 cases, respectively, and in 1939 there was a drop to 8,000 reported cases.

Most of the 18,000 cases reported for 1940 appeared in the latter part of September and October whereas in previous years the peak of the disease appeared during the latter part of August and the first week in September.

Incidence
There has been an increase in the incidence of the disease west of the Mississippi this year over last year, whereas east of the Mississippi the incidence has remained the same or has decreased. There is a possibility that we may be again facing, within the next year or two, another epizootic of the disease. In other words, it appears probable that equine encephalomyelitis is not a "sleeping dog", but is again possibly on the move.

Since the work of Kelser, it has been found that at least 10 species of mosquitoes are capable of transmitting the virus of the disease experimentally. Tests thus far reported for one species indicate that the virus of equine encephalomyelitis does not pass from one generation of mosquitoes to the next through the eggs and larvae. It has been found, however, that the virus actually multiplies in the bodies of at least one species of mosquitoes and remains for the life of the insects. Attempts to find virus in mosquitoes and other insects in nature have been negative. The assassin bug, Triatoma sanguisuga, and the Rocky Mountain fever tick, Dermacentor andersonii, have shown the presence of equine encephalomyelitis virus. These, as well as other ticks, are relatively long lived, and it is easy to conceive of their carrying the virus through the winter or even through several years and then transmitting it to susceptible species for further propagation.

The question as to what becomes of the virus between epizootics is of extreme interest, but there is no explanation to this phenomenon yet. It is assumed that it is perpetuated in some species other than equines.

Susceptibility
Man and a large variety of mammals and birds are susceptible to infection with the virus of equine encephalomyelitis. With such a wide variety of species susceptible to the disease and with a large number of mosquitoes and other insects capable of its transmission, the problem

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of the control of the disease in horses, for the present at least, must depend on raising the immunity of the horse population to the disease.

In 1938, brain tissue vaccine was the only vaccination procedure, aside from serum, available. A vaccine against equine encephalomyelitis employing the chick embryo was developed that year. The virus in the chick embryo was destroyed or rendered inactive by 0.4 percent formalin.

More than three million horses were given two doses of the chick-embryo vaccine in 1939, and undoubtedly, the extensive use of the vaccine played a very important part in the reduced incidence of the disease that year.

In spite of the highly gratifying results from the use of this vaccine, certain disadvantages appeared. These had to do with the reactions in certain horses following the administration of the vaccine. While these reactions were first reported in 1939, they were again reported in the spring of 1940 to a considerably larger extent, considering the number of animals treated at the time. No satisfactory explanation has been advanced as to the cause of these reactions. Extensive bacteriological work conducted with various vaccines failed to show that the products were contaminated. It is quite probable that the reactions could be due to any one of the following:

1) Faulty technic in the administration of the vaccine, with introduction of infection from the outside.

2) The deposit of the second injection at or near the site of the first.

3) The sensitivity of certain animals to chick protein or foreign proteins in general.

Work was undertaken in the Bureau looking to a method of vaccination which would eliminate or reduce the possible hazard of reactions. By the use of the intradermic method of vaccination, it was found that an effective immunity could be produced. The immunity produced by two injections of 1 cc. of the vaccine intradermally was as effective as two 10 cc. doses of the same vaccine given subcutaneously.

Any vaccination technic should be considered a highly professional procedure since knowledge is required concerning the disease for which vaccination is practiced, the need of such vaccination, and the method of procedure. It is always advisable and desirable to have sterile instruments in vaccination procedures. The intradermic method of vaccination requires a certain amount of skill and knowledge of anatomy and is, therefore, a procedure which should be left entirely in the hands of the veterinarian.

Two 1cc. injections of the vaccine given at 7-day intervals constitutes the intradermal injection technic. The injection is made into the skin on the middle third of the lateral aspect of the neck. Usual asepsis is observed at the site of injection. The injection is made using sterile 18 or 20-gauge, 1-inch needle, and a sterile syringe. The second injection is given on the opposite side of the neck. No difficulty has been experienced in injecting an amount up to 1 cc. intradermally.

The results of the intradermic method have been quite satisfactory, both from the standpoint of reactions and the immunity produced. The Veterinary Corps of the U. S. Army has treated about 6,000 horses by the intradermic method with entirely satisfactory results.

Research in the improvement of vaccines has continued. Research men have been able to concentrate encephalomyelitis vaccine manifold by a process of lowering the pH, centrifugation, and an immediate readjustment of the pH to 7.0. By this method of concentration it is reported there is an elimination of 90 percent of the total protein originally present.

From all indications it appears quite probable that the intradermic method of vaccination will be the only method used in the coming season. It therefore behooves veterinarians to become familiar with the details of the technic of this method of administration.

The Veterinary Student