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Artikel: Miscellanea : The problem of human and equine encephalomyelitis in Ecuador

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L'auteur a obtenu de beaux résultats en administrant l'*Auréomycine* par voie intra-musculaire. Les solutions de 1 % et de 2,5 % ont été bien tolérées et aucun phénomène toxique n'a été observé.

Les doses thérapeutiques par voie intra-musculaire varient entre 1.5 et 5 mg. d'*Auréomycine* par kilo et jour.

The Problem of Human and Equine Encephalomyelitis in Ecuador.

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Human and equine Encephalomyelitis is a real public health problem in Ecuador, where the Coastal Plain is full of endemic regions, and the disease attacks both humans and horses.

The disease is arthropod-borne and, due to modern transportation, conditions are ripe for epidemic outbreaks in places where the local horse populations have not an acquired immunity because of their location away from an endemic region, thus the danger of human infection is also great, as the disease passes very easily from the sick horses to either healthy horses or healthy human beings.

Causative Agents. In Ecuador the virus involved in the disease is the Venezuelan strain, that has been isolated from sick horses by Dr. *Gonzalo Sotomayor*, Ecuadorian Veterinarian, who has developed the only known vaccine in Ecuador to immunize the horses in the infected areas. This virus was probably introduced into Ecuador during the days of Independence from Spain by Venezuelan horses of the Colombian armies, which served as reservoirs of the virus and arrived during the incubation period or became sick, circulating virus and infecting the local horse population. This is only a hypothesis, as the origin of the introduction of the virus into the horses of the Coastal Plain is still unknown.

Public Health Problem. The possibility that human beings might become infected with the disease makes Human and Equine Encephalomyelitis a public health problem that has to be solved, as the main groups under attack are the youngsters 1 to 10 years old, who suffer from the disease and either die of it or suffer from the sequelae, nerve destruction, that leaves them permanently disabled.

The Venezuelan virus is virulent and highly neurotropic with a very high mortality. It attacks mainly horses and outbreaks occur all the year round.

In the horse, the mule or the ass the disease causes somnolence; apathy, with involuntary backward, sideways and forward movements; inability to avoid obstacles; diminished respiratory movements; muscular tremors in the hips and the back; involuntary masticatory movements of the teeth which tremble noisily; inability to chew and swallow, the hay or grass remaining hanging in the mouth with a total indifference of the animal to all stimulus. The legs are separated as if the animal would avoid losing its balance, but it is possible to cross the front legs one over the other, the animal remaining in this unnatural position that normally is very uncomfortable, showing a typical cerebral dis-

turbance, caused by the disease. If observed during the course of the disease, the animal has two typical phases: 1. *the excitation phase*, when the animal acts stupidly, bumping into everything, hollering and becoming unmanageable; 2. *the paralytic phase* in which, due to nerve destruction by the virulence of the virus, the equine loses its capacity to walk and eat, and when the respiratory centres have been destroyed, death ensues.

In man the clinical picture is as follows: very high fever, 39-40° C., vomiting, convulsions and coma. In all cases a mental confusion and desorientation is observed with leucocytosis and pleiocytosis, somnolence, lethargy that becomes accentuated with the progress of the disease, these appearing immediately at the outset of the fever period and lasting approximately 15 days. The reflexes are variable, the tendinous ones are exaggerated, the abdominal ones ceasing in some cases; a marked rigidity in the neck and vertebral column is present. Leucocytosis is generally between 12,000 and 25,000 with a great augmentation of the polymorphonuclears which sometimes exist in a proportion of 90%. The cephalospinal fluid is turbid, with a great increase of pressure in some cases, 100 to 200 cells per c.c. with a predominance of the polynucleate cells. In many cases the Pándy reaction is + to +++. In cases that were not fatal the patients became normal or had a contracture of the fosso-lumbar column and spastic paralysis of the four limbs, depending on the damage done by the virus to the nervous system. Death was always a result of nerve damage of the respiratory centres and the patient died in convulsions and coma. In some cases pneumonia was observed, produced by the same virus. This complication shows very early in the clinical picture, appearing as if caused by Pneumococci, but later convulsions, coma and other clinical symptoms of the disease appear.

If the human beings are treated, when the first symptoms appear, with high concentrations of antibiotics (Penicillin and Streptomycin), and Sulfa-drugs (Sulfadiazine, Sulfathiazole), the nerve damage of the virus can be checked and patients have a chance of recovery. Aureomycin and Chloramphenicol may prove in the near future to be possible curing drugs, although to date they have not been used in the treatment of the disease in Ecuador.

Geographic Distribution. The disease exists both in human beings and in horses in the coastal provinces of Ecuador. The main endemic regions are in *Esmeraldas Province:* Quininde, Rio Verde, Borbón, La Tola, San Mateo Atacames, Muisne; *Manabi Province:* Cojimies, Pedernales, Coaque, Jama, Canoa, San Isidro, Flavio Alfaro, Eloy Alfaro, Boyaca, Ricaurte, Chone, Canuto, Calceta, Tosagua, Rocafuerte, Junin, Colón, Alhajuela, Honorato Vazquez, Ayacucho, La Unión, Sucre, Jipijapa, Noboa, Santa Ana, Guale, Pedro Pablo Gomez, Paján; *Los Rios Province:* Quevedo, Mocache, Palenque, Catarama, Baba, Vinces Playas de Vinces, Puebloviejo, Guare, Ventanas, Barreiro, Jujan; *Guayas Province:* General Villamil, Posorja, Morro, Puná, Daule, Chanduy, Colonche, Taura Naranjal, Balao, Yaguachi, Milagro, Naranjito, Chongón, Pedro Carbo; *El Oro Province:* Machala, Pasaje, Buenavista, El Guabo, Tendales, Santa Rosa, Pitahaya.

For a complete picture of the distribution of the disease in horses and man it would be necessary to have all sick persons and animals subjected to complete laboratory studies wherever the disease is suspected to be the cause of encephalitis. Up to the present time the epidemiological studies have not been made at all because human and equine encephalomyelitis have generally played a subordinate role in the public health problem of Ecuador, giving place to other diseases such as malaria, tuberculosis, yellow fever, plague, etc. etc. Looking at it only from the veterinary point of view but never as a public health hazard, because it is mainly a rural disease, the human beings suffering from it are treated sometimes for other commoner diseases, or not treated at

all, thus no clear picture of its existence has been obtained so far in Ecuador. The existence of a great number of sick horses who suffer from the disease in given areas is treated with indifference and no campaigns exist against either the equine or the human forms of encephalomyelitis in Ecuador.

Method of Transmission. As we can plainly see, both men and horses (and other equines) suffer from the disease, that is they are the vertebrate hosts and are accidental entries into a disease that belongs to the jungle animals, probably deer, birds and primates, who serve as permanent reservoirs of the disease. The evidence accumulated all over the world on hosts of encephalitides is also valid for Ecuador, where the disease is present in jungle areas and in places near the seashore, where small arms of the sea break into salt water swamps.

The author has studied the following species: *Aëdes taenyorhynchus, Mansonia titillans, Culex quinquefasciatus, and Aëdes serratus,* found in endemic areas, that have proved to be vectors in Ecuador as far as is known, there being a possibility that other mosquito species might become implicated in the transmission of the encephalitides in the endemic regions.

The author has experimentally proved that the incubation period of *Mansonia titillans* is between 8 to 14 days, depending on the virus concentration. In *Culex quinquefasciatus* the incubation period is from 10 to 15 days as experimentally proved. In *Aëdes taenyorhynchus* the incubation period is experimentally between 10 to 13 days. All these mosquitoes were found infective after that period of time by the author under controlled experiments carried out on white mice.

The species *Aëdes serratus* has not been kept alive long enough for transmission experiments, thus its role in encephalitides transmission is very doubtful. Yet as it exists in great numbers and readily bites animals and men in regions where equine encephalomyelitis occurs and where neither of the proved vectors exist in numbers enough to carry on the virus transmission, it is possible, though not yet experimentally proved, that this species is able to transmit the disease. In the epidemiology of the equine and human encephalitides are factors that make this disease one of the most complicated of any of the known arthropod borne diseases. Unhappily not enough evidence has been gathered to date on the transmission of the Venezuelan virus because no importance has been given to the disease in any of the South American countries where it exists. There exist inapparent infections both in horses and human beings that have not been studied sufficiently in our environment and have been classified as diseases other than the encephalitides. In some countries domestic birds have been observed to harbour the virus of encephalitides. Especially chickens and ducks are inapparent reservoirs of the virus, but in Ecuador no research has been carried out on the possibility that these birds might become involved in the epidemiology of the equine and human encephalitides. There are many species of mosquitoes that have in time to be investigated on their actual role as transmitters of the virus such as certain species of Sabethines, Culex and Aëdes, and there are many factors that have to be studied such as the possibility of transmission with experimental inoculations.

Control. Nothing has been done so far to control the disease in Ecuador, nor to initiate epidemiological surveys, as no importance has been given to this disease by the Sanitary Service of Ecuador. There are no statistics as to the extension of the disease, the localities given were personally investigated by the author during 1949-1951 and the disease was found in sick horses, mules and asses with the typical symptoms of the disease; only in the province of Manabí a few children and adults were observed with symptoms of the disease during

a trip made in 1951. Vaccines have been developed by Dr. *Gonzalo Sotomayor* of Guayaquil, Ecuador, for horses, these are now being used for the immunization of equines, but only in a very limited quantity. No vaccines have been developed for the human population in Ecuador, as no funds exist for studying this important disease, because of the cost of the vaccine, the temporary nature of the immunity produced and the apparent low clinical attack rate. No importance has been given to vaccination as a means of control of the disease. The author believes that in known endemic areas where possible vectors exist an intensive control programme against mosquitoes should be initiated and carried out, as this is the only effective means to attack the disease. The destruction of all sick horses and the burning up of the dead bodies would help to destroy active reservoirs of the disease, as at the present time there is no specific therapeutic agent available against this disease.

Quarantine for horses going from one region to another; disinsectization of vehicles and river boats; vaccination of horses and strict veterinary control, would go a long way towards controlling the disease. These preventive measures, added to the active anti-mosquito campaign, would be the only sanitary means of controlling Encephalomyelitis in horses and humans in Ecuador.

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