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Foot-Rot in Cattle

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which will be pelted in the near future are put in one pen, and it is this grouping together which seems to bring on this dreaded disease.

Filtrable Virus

The etiological agent is a filtrable virus which is small enough to pass through a Berkefeld N filter. The virus can be found in the brain, blood, spleen, upper respiratory tract and spinal cord. The reason the virus becomes pathogenic when large groups of foxes are put together is not positively known. Direct contact from quarreling and the cannibalistic tendency of a fox, are thought to be causes as well as eating and drinking from the same containers. The portals of entry are the respiratory tract, digestive tract, and skin wounds.

Adult foxes (over one year old) are twice as resistant as are the younger foxes. When the disease occurs in a large group of mixed-aged foxes, the mortality rate is about 15-20 percent. Experimental inoculation shows about 80 percent mortality in foxes below the age of 6 months and approximately 15-20 percent mortality in adult foxes.

Immunity

A high degree of active immunity is produced by recovery from this disease. Hyperimmune serum seems to have some inhibitory action upon the virus; however, it must be noted that this action is only temporary. The mortality rate has been reduced to one-half when virus attenuated with sodium ricinoleate has been administered.

Intranuclear inclusions in the endothelial cells of the central nervous system, the ependymal cells and the epithelial cells of the upper respiratory tract aid greatly in diagnosis. Also the meningeal infiltration of polymorphonuclear leucocytes and slight hemorrhages in the medulla and spinal cord are significant. The feces usually contain large amounts of mucin which may be streaked with blood. At one time epizootic fox encephalitis was classed with the central nervous system type of distemper, but it has been proved that the two are entirely different.

The prolonged symptoms are seldom seen, because of the acuteness of the disease. In most cases an apparently normal fox will suddenly start staggering, and go into violent convulsions with death occurring in ten to fifteen minutes. When the symptoms occur a little slower, the fox will show partial anorexia, hyperexcitability, and will gradually go into a lethargic state resulting in paralysis, hallucination, coma, and death.

Dogs are quite susceptible to this disease while coyotes have been found to be as susceptible as foxes. The gray fox, mink, rabbit, white rat, squirrel, guinea pig, cat, ferret, and sheep are resistant.

(The author is greatly indebted to Dr. R. G. Green of the Bacteriology and Immunology Department of the University of Minnesota, and his co-workers who have done extensive research on this subject.)

—Harold A. Kjar, fall '43

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4 **Foot-Rot in Cattle.** A six-month old Hereford bull was brought to the Stange Memorial Clinic on February 2, 1943. The history revealed that the animal had started to limp on its left front foot about two weeks previous and that this symptom had progressively increased until the animal refused to place any weight on the leg.

The affected foot showed extensive swelling between and above the digits. At the proximal end of the interdigital space was a small fistula from which discharged a purulent exudate containing synovial fluid. Excoriation of the epithelium around this area had taken place. A diagnosis of foot-rot with a possible joint involvement was made.

Operation Performed

The bull was restrained on the operating table and the claws and lower part of the left front leg were thoroughly scrubbed. The area was shaved and tincture of iodine applied. Two percent procaine was used to infiltrate the tissue surrounding the

fistula. A small blunt pointed probe was then introduced into the fistula, and the tract was found to run posteriorly and medially for about one inch. The fistulous tract was enlarged with a small scalpel and the surrounding necrotic tissue curetted. An opening communicating with the fistula was made on the medial side of the digit and a seton secured between the opening to facilitate drainage. A bipp pack (bismuth subnitrate, 1 part; iodoform, 2 parts; liquid petroleum, 15 parts) was bandaged in place over the wounds. On the following day the bandages were removed. The leg was soaked in hot phenol-formalin solution (phenol 2 oz., formalin 3 oz., water 3 oz.—one ounce of this mixture to each gallon of warm water) for one-half hour and dressed with a bipp pack. The same soaking procedure was repeated daily for the next four days, but with no apparent improvement of the condition. Again the animal was placed on the operating table. Upon examination, it was decided that amputation of the medial claw was necessary since the joints and surrounding tissues of the first and second medial phalanges were badly infected. A tourniquet was placed below the fetlock joint, and the interdigital tissue and the tissue about one inch below the dew claw of the medial digit were thoroughly infiltrated with two percent procaine. An incision was made between the claws from the anterior corner of the interdigital space to an inch below the dew claws. This separated the medial and lateral claw. An obstetrical saw was introduced into the incision as far up as possible and the medial claw amputated at right angles to the long axis of the first phalanx. During the sawing process, the saw was kept from heating by drawing it through cotton soaked in antiseptic solution. This is necesary to prevent the hot saw from damaging the end of the bone with consequent formation of a sequestrum. Another bipp pack was applied, the area tightly bandaged with cotton gauze and muslin, and the tourniquet removed. The dressings were left in place for 48 hours so complete hemostasis would be assured.

After-care consisted of cleansing the wound with warm two percent therapogen and redressing with a bipp pack every two days. Ten days following the operation, granulation tissue had covered the end of the incised bone. The dressings were then discontinued and the wound was dusted with boric acid and urea powder. By this time healing had progressed sufficiently, so the animal was discharged.

Amputation Successful

Removal of the claw in cases of footrot that do not respond to routine wound treatment has been found to be the most satisfactory procedure. This may at first appear to be too drastic but clinical evidence proves otherwise. By this method, both the infected tissue and infected joint are removed. Reports from owners of animals that had amputation of one of the claws show that the animals are not incapacitated by this loss and in a surprisingly short time handle themselves as well as they formerly did. Treatment of cases like the one described without amputation of the infected digit entails a long process. Affected animals go off feed and lose weight rapidly. Milking dairy cows drop quickly in milk production. The longer the infection remains, the more toxic the animal becomes. Extensive bone necrosis may develop, which terminates in death of the animal.

—David Ungs, fall '43

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5 **Hemorrhagic Enteritis in a Cow.** On December 21, 1942, a three-year-old Guernsey cow was presented at the Stange Memorial Clinic. Several days previously the Iowa State College ambulatory clinic had been called by the owner to treat the cow for bloody diarrhea. The history obtained by the ambulatory clinician was that the entire herd was being fed ensilage and shredded corn stover, and that this was the only cow affected.

The cow was depressed and was passing clots of whole blood. The tucked-up flanks indicated abdominal pain. One-half ounce of chloral hydrate was administered per orum as acetonemia was suspected. To