HEMORRHAGIC SEPTICEMIA

STOCKYARDS FEVER, SWINE PLAGUE, FOWL CHOLERA, ETC.

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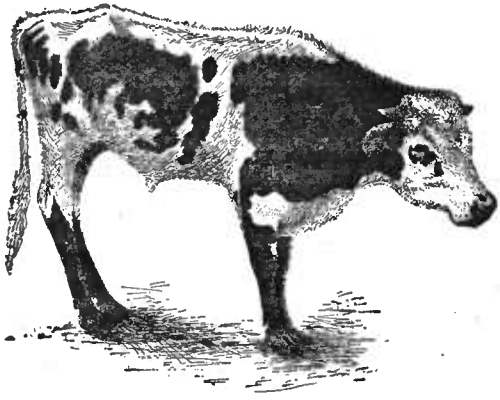

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UNITED STATES DEPARTMENT OF AGRICULTURE

Contribution from the Bureau of Animal Industry

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HEMORRHAGIC SEPTICEMIA is an infectious disease, attended with a very high mortality, which attacks various species of animals, especially cattle, sheep, and swine. The losses are greatest among young animals, especially those that are thin in flesh and poorly nourished. The disease is a septicemia or poisoning of the blood, wherefore it often runs a short course and the animal dies quickly.

In cattle the disease is sometimes termed stockyards fever. In hogs it is known as swine plague, and the acute form usually is fatal a few hours after the appearance of the first symptoms.

In sheep the disease frequently manifests itself in the acute form, with marked depression, high temperature, labored breathing, muscular trembling, and colicky pains. Fowl cholera represents the avian or bird form of hemorrhagic septicemia, pigeons and geese being quite as susceptible as other species of poultry.

No form of treatment has time to become effective for any animals that may be affected. The apparently healthy animals should be separated from the diseased and placed in clean, uninfected quarters, where they should have the best of feed and water. Bacterins (bacterial vaccines), which may be purchased from most American drug stores, have proved to be effective in many instances in checking the spread of an outbreak and in protecting the unaffected portion of the herd or flock.

HEMORRHAGIC SEPTICEMIA.

Stockyards fever, swine plague, fowl cholera, etc.

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CAUSE OF THE DISEASE.

HEMORRHAGIC SEPTICEMIA is caused by an organism (*Bacillus bipolaris septicus*) belonging to the group in which the bacilli of chicken cholera, swine plague, and rabbit septicemia are to be found. This group is known also by the name of Pasteurella. Bacilli which resemble closely the organism of hemorrhagic septicemia are widely distributed in nature. They have been found in the soil, upon various plants, in stagnant water, and upon the moist nasal membranes of normal calves and hogs. In several instances these harmless organisms have been so increased in virulence by passing through animals that they finally proved to be fatal when injected into pigs, and in those instances the tissue changes, which were found at the autopsy of the pig, were similar to those found in swine that had died from swine plague.

Some writers think that after the organisms have become virulent enough to cause an outbreak among animals, and the infection has been overcome, they will return later to their previous harmless stage. The increased virulence which is made evident by an attack of several animals of a single species appears to be effective only in animals of that particular species, and the disease does not readily spread to other species. For example, hogs and sheep that are pastured with a drove of cattle in which several deaths occur from hemorrhagic septicemia usually remain unaffected, although on another farm the sheep or the hogs alone may contract the disease and all the cattle escape. If any exceptions to this rule occur they are extremely rare.

Attempts have been made during an outbreak of hemorrhagic septicemia among cattle to transfer the disease from affected to healthy animals by rubbing saliva from diseased cattle into the

mouths of healthy animals, and by injecting serum from the blood of a diseased yearling beneath the skin of young cattle, but without success. Many attempts to infect hogs by natural means from diseased cattle also have failed. In one instance, however, a colt that fed from the rack with a number of diseased sheep contracted the disease and died.

The spread of the disease seems to depend nearly as much upon the condition and susceptibility of the animal as upon the contagious nature of the disease, as thin, poorly nourished young stock most frequently become infected and die.

SYMPTOMS.

In cattle the disease develops very rapidly, lasting from 1 to 8 days. There is usually a steady elevation of body temperature until from 104° to 107° F. is reached. The animal refuses its feed. Swelling may appear beneath the skin of the head, throat, or dewlap. These enlargements are somewhat soft and pit on pressure. The tongue is often extensively swollen, and the animal drools and slobbers because of the irritation to its tongue and throat. There may be difficulty in breathing, depending on the degree of involvement of the air passages and of the lungs. Occasional coughing may occur. Muscular trembling may be evident. There may be a blood-stained discharge from the nostrils, and strings of mucus may hang from the mouth. Examination of the nostrils often reveals the presence of many small hemorrhages, or blood spots, just beneath their lining membranes. The eyelids become highly inflamed and tears flow.

There is an intestinal form in which the changes are found chiefly in the abdominal cavity, or the intestinal form may develop after the disease has appeared in the lungs. The stomach, intestines, and kidneys and the lymph glands belonging to them become studded with hemorrhages of various sizes, and the intestines become intensely inflamed. The consequence is that diarrhea sets in, and shreds of mucus and bloody droppings are passed. The intestinal form is rare, as most cases show severe involvement of the lungs and the symptoms of croupous pneumonia. The animals may stand with their forelegs wide apart in order to breathe more freely. They lose flesh very rapidly, their abdomens become "tucked up," and the eyes quickly become sunken. A staggering gait, caused by extreme weakness, sometimes is noticed.

A disease has been described under the name of septic pleuropneumonia of calves, which is a form of hemorrhagic septicemia caused by a closely related germ. The symptoms shown by the affected calves are quite characteristic of hemorrhagic septicemia, and the post-mortem findings are also those found in that disease.

In sheep, young animals which have just been weaned are found to be most susceptible, the disease manifesting itself in an acute form. There is marked depression, high temperature, labored respiration, loss of appetite, muscular trembling, and frequently colicky pains. A subacute and a chronic form of the disease are also recognized, the latter affecting principally older sheep. Aside from the changes caused by fever, weakness, etc., there is noted in the subacute form a discharge from the eyes and nose which at first is watery, later being mixed with matter. There may be also pulmonary impairment (pneumonia), or there may be evidence of inflamed intestines. Occasionally the symptoms subside only to return in a more chronic form, which manifests itself principally as a chronic affection of the lungs, with gradual emaciation. Sometimes the joints are involved, swelling of the knee joints being noted rather frequently. Recent reports from Colorado tend to show that hemorrhage septicemia has become rather prevalent among the sheep of that State. It is asserted that bacterins have been used very satisfactorily in several of these outbreaks.

In swine the disease sometimes manifests itself in a very acute form, the animal showing symptoms of general blood poisoning. Red spots may be noted on various parts of the body, especially around the ears and on the neck and rump. When affected with this form of disease the animal usually dies within a few hours after the first symptoms. In acute swine plague the disease usually occurs as a form of pneumonia in which portions of the lungs become degenerated and cheesy. There is labored respiration, dry, spasmodic cough, a slimy discharge from the nose, sometimes a purulent inflammation of the eyelids, bluish-colored membranes, constipation followed by diarrhea, the droppings containing blood. The animal becomes very thin and usually dies in from 1 to 2 weeks. Sometimes the acute form changes into the chronic type, in which case the acute symptoms subside, and the cough and evidence of pulmonary involvement continue for a considerable time. Progressive emaciation occurs and a chronic inflammation of the joints may develop. The animals die in from 3 to 6 weeks from exhaustion. Sometimes, however, the affected parts of the lung may become encapsulated (inclosed in a membrane), and the animals may even be fattened in spite of the condition of the lungs.

ANATOMICAL CHANGES.

Swellings will be found under the skin. If these enlargements are examined they are found to consist of collections of jellylike material tinged with blood. Occasionally they are limited to a single shoulder or flank, when they may be mistaken for blackleg. The lymph glands are enlarged and are injected with blood. The mucous

membranes which line the respiratory tract are similarly affected. False membranes composed of fibrinous exudate (or discharge) may develop in the throat. The spleen remains normal. Hemorrhages are constant in the fatty tissues around the kidneys and within the walls of the intestines.

When the disease is chiefly in the chest the lungs are darkened in color and their fibrous tissues much thickened from the collection of bloody serum in their meshes. The diaphragm, heart sac, and heart walls show numerous bloody points and larger collections of blood.

In the intestinal form hemorrhages into the intestines are present and sloughing of the lining of the intestinal wall is observed, as a result of which the intestinal contents are wrapped in a covering of bloody mucus.

In acute forms the animals may die suddenly and the changes in such cases are not very marked. Microscopic examination of the body fluids demonstrates the presence of germs enough to prove the nature of the trouble.

DIAGNOSIS.

Because of their acute course, high fever, and rapid termination in death, some difficulty may be experienced in distinguishing anthrax (carbuncle), malignant edema (swelling), and blackleg from hemorrhagic septicemia. The differentiation of hog cholera from hemorrhagic septicemia of swine also presents many puzzling points.

There may be swelling of the throat or neck in either anthrax or hemorrhagic septicemia. An examination of the spleen of the affected animal will give a conclusive diagnosis, for the spleen of an animal dead from anthrax nearly always becomes acutely swollen and its pulp becomes softened. In cases of hemorrhagic septicemia small hemorrhages are usually present in the kidney fat. Bacteriological examination will demonstrate quickly the presence of the specific organisms of anthrax or of hemorrhagic septicemia, and a test should be applied in all doubtful cases. The value of a definite diagnosis will be recognized when the lasting nature of an anthrax infection, with its consequent lowering of the value of the affected premises and the more transitory character of an outbreak of hemorrhagic septicemia, are considered.

Blackleg and malignant edema may be detected usually by the formation of gas within the swellings upon the body, and the bubbles thus developed will produce a crackling sound if the fingers are pressed over the affected area. Further, in blackleg the marked change in the affected muscles and the characteristic "rancid-butter" odor noted in cases of blackleg facilitate a differential diagnosis.

Hemorrhagic septicemia of swine, commonly termed swine plague, usually appears as a form of pneumonia. The symptoms readily

point to an attack of pneumonia, but the presence of roundworms in the lungs may cause identical manifestations, making a positive diagnosis somewhat difficult. The long course of pneumonia should be taken as an indication that the pig is not affected with swine plague.

It is very difficult to distinguish swine plague from hog cholera. The two diseases may occur in the same animal. Should the outbreak seem to be but slightly contagious and not inclined to spread from the premises upon which it first appeared, it is probably not hog cholera, but if it spreads rapidly throughout the neighborhood, it is undoubtedly due to hog-cholera infection. The presence of the characteristic bacilli does not alone establish a diagnosis of swine plague, since those organisms are found frequently as secondary invaders in true cases of hog cholera, and again they are often present in the noses and throats of healthy swine.

PREVENTION.

Through the use of bacterins animals and fowls may be protected experimentally from contracting hemorrhagic septicemia. Cattle, sheep, swine, rabbits, and fowls, if treated with heated cultures of hemorrhagic septicemia germs obtained from animals or birds of the same species as that to which they themselves belong, will almost invariably become protected against injections of living cultures of the same germ, even though applied in comparatively large quantities. Tests made by the Bureau of Animal Industry have shown that the use of cultures from animals of another species often affords similar complete immunity. Sheep have been made immune from virulent cultures obtained from other sheep by the use of prepared cultures from cattle. Rabbits have been made resistant to hemorrhagic septicemia cultures, derived from a variety of different species of animals, by treatment with prepared cultures coming from animals of other species. Fowls have been protected from injections of deadly quantities of virulent fowl-cholera organisms by the use of prepared bouillon growths of the same germ, or by the use of strains of the fowl-cholera bacillus possessing but little virulence.

Closely allied germs have at times very important differences in living characteristics which must be taken note of in applying the correct bacterin, to get the best results in producing immunity.

In the October, 1916, issue of the American Sheep Breeder, Dr. W. H. Lytle, Oregon State veterinarian, reports very satisfactory results from vaccination with a weakened culture of the living organism. About 3,000 sheep were treated with the material. After 48 hours subsequent to the vaccination of the flocks only nine sheep in all were lost, although before inoculation several animals died each

day. Bacterins made from the killed organisms of hemorrhagic septicemia have been used also with considerable success in Oregon sheep.

TREATMENT.

In most cases treatment of a fully established case of hemorrhagic septicemia in an animal of any species is quite useless. All apparently well animals should be removed from sick ones by placing them in separate, noninfected quarters. If new cases develop among them in a few days after their removal, the healthy ones remaining should be removed again to another locality. In that way the unaffected animals soon will be out of danger of further contamination, especially if their strength has been supported by an abundance of good feed and water during the separation.

DISINFECTION OF PREMISES.

Premises usually become infected with hemorrhagic septicemia by stock cattle that have recently passed through some of the larger cattle markets. Owing to this method of infection the stables and yards may not be so completely contaminated as they would be if the disease had developed spontaneously. In any event, all stables, sheds, or yards that have contained infected animals should be disinfected. The interior of the stables, especially the mangers and manure trenches, should be washed with a disinfectant, such as liquor cresolis compositus (U. S. P.) or carbolic acid, 6 ounces to a gallon of water in either case. The yards may be disinfected by the application of a solution made of 5 ounces of copper sulphate to a gallon of water. The best way to apply disinfecting solutions is to use a spray pump such as is used in spraying orchard trees. All refuse and material from the stable and barnyard should be removed to a place not accessible to cattle, sheep, or hogs. The manure should be spread on fields and plowed under. A plentiful supply of light and air should be provided for the contaminated stables. Open fields or pasture lands are cleansed rapidly by the action of sunlight.

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