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# Enteric Diseases of Swine

# COLIBACILLOSIS & EDEMA DISEASE

Diseases of the digestive tract (enteric diseases) are among the most common group of infections affecting swine today. Some of these diseases commonly affect only certain age groups; others may affect all swine. The significant economic losses caused by enteric diseases are manifested by unthriftiness, poor weight gain and feed conversion, increased susceptibility to other infectious diseases and severe illness and death of affected animals. Colibacillosis and edema disease, discussed in this bulletin, commonly affect young pigs.

## COLIBACILLOSIS

### Cause

Colibacillosis is caused by several disease producing strains or serotypes of the bacterium *Escherichia coli*. Other causes may be viruses associated with pathogenic *E. coli* organisms. Colibacillosis is the suspected cause of an estimated 75 percent of the cases of baby pig scours and white or milk scours in young piglets. Many harmless strains of *E. coli* are normally found in large numbers in the digestive tract. However, small numbers of pathogenic strains can also be found in the digestive tract of apparently normal animals. These pathogenic strains can fluorish under certain conditions in the intestinal tract of the susceptible host causing either a severe enteritis or a generalized disease depending on the strain involved.

Studies have shown that the damage to the host is due primarily to the harmful effects of potent toxins produced and excreted by the pathogenic *E. coli* organisms.

### Clinical Signs and Pathologic Changes

Susceptible newborn piglets may readily be exposed to pathogenic *E. coli* organisms directly by contact with the sow and other infected animals and indirectly by contact with contaminated feces, feeders, waterers and bedding. The disease may occur during any season of the year and usually spreads slowly through the herd. The organisms are ingested or inhaled, swallowed, then multiply in the small and large intestine.

The first clinical sign of the disease is a creamy-pasty to watery diarrhea which most often appears in 1 to 4-day-old piglets, 3 week-old pigs or in 5 to 6 week-old weanlings. This disease rarely affects older pigs, presumably because of acquired resistance. Diarrhea, often prolonged and severe in younger piglets, will lead to rough hair coat, loss of appetite, listlessness, dehydration, emaciation, coma and death. The mortality rate varies but is often highest in untreated young pigs and decreases with age. The stomach of affected pigs is often partially or completely filled with feed and the small and large intestine appear dilated and inflamed, and contain varying amounts of yellow watery feces mixed with mucus.

### Diagnosis

To diagnose colibacillosis, observe the typical clinical signs, isolate from the intestinal tract and positively identify pathogenic *E. coli* as the predominant intestinal bacteria. You must differentiate colibacillosis from other similar enteric diseases of young pigs including transmissible gastroenteritis (TGE) and clostridial enteritis.

### Treatment and Prevention

Even though a variety of antibiotics have been used, treatment of colibacillosis is complicated. The effectiveness of these compounds varies and is inconsistent. A drug used successfully on one farm may not be effective elsewhere. Further, a drug used successfully at one time in a given herd may be only partially effective or completely ineffective the next time. Effectiveness varies because of variations in

pathogenic strains of the organism, complicating viral infections, poor management and sanitation resulting in massive exposure, the ability of some strains to develop resistance to certain antibiotics and an incorrect diagnosis.

Tetracyclines, tylosin, neomycin, furazolidone, and sulfachloropyridazine are antibiotics effective against various pathogenic strains of *E. coli.* Use sensitivity tests to determine which antibiotics or sulfonamides are most effective. Early treatment is absolutely essential. Treatments include oral administration of a recommended dosage of the most effective antibiotic or sulfonamide; injection of replacement fluids, electrolytes and nutrients; injection of iron dextran to prevent anemia and help increase resistance; and providing a warm, dry and clean environment during convalescence. Oral treatment with cultures of *Lactobacillus acidophilus* bacterial organisms to alter the population of intestinal organisms is also suggested.

To prevent the disease in young pigs, eliminate predisposing stress factors such as unsanitary conditions and chilling caused by excessive dampness and drafts. To further reduce exposure to the infectious organisms, minimizing excessive movement of young pigs from one pen or area to another, isolate and quarantine new additions to the herd and keep visitors, insects and other animals such as cats, dogs and rodents away from the farrowing house and nursery. Provide clean boots and coveralls for persons entering these areas.

Vaccination of pregnant sows against the strains of *E. coli* to which the piglets will most likely be exposed after birth also has been successful. The acquired immunity will be passed in the colostrum to the newborn piglets. Vaccines of this type are commercially available or can be made in a laboratory directly from isolates obtained from the farm.

An alternate and natural method of vaccination is to allow the pregnant sows to consume bedding, feed, water and feces contaminated with the organisms.

## EDEMA DISEASE

### Cause

Effects of toxins produced by various pathogenic strains of E. coli are suspected causes of edema disease (gut edema). Most of these strains of E. coli are different from those associated with colibacillosis. The disease usually occurs soon after weaning and in association with a sudden change in the quality or quantity of feed. Stress and temporary loss of appetite involved with movement from one place to another or mixing different groups of pigs will also predispose animals to the disease. The dietary change is believed to result in a digestive upset, thus allowing an overwhelming growth of *E. coli* organisms. Numerous studies show that the actual lesions of the disease develop as a result of an allergic or shock reaction in the tissues to the bacterial toxins.

### Clinical Signs and Pathologic Changes

The clinical onset is usually sudden and the disease may occur during any season of the year. Affected pigs often die suddenly with no prior clinical signs. Others may have swollen eyelids and face, staggered and stiff gait, knuckled under front legs, muscular tremors and weakness and weak squeal and will lie on their sides and make paddling motions. The body temperature is seldom elevated and diarrhea or constipation are infrequently seen. Less severely affected pigs usually recover in 48 hours.

The disease appears not to be contagious although certain litters or individual pigs within a litter seem to be more susceptible. The largest and fastest growing pigs are often affected first and most severely. From 10 to 35 percent of the pigs may be affected, and the mortality rate ranges from 20 to 100 percent. The most striking pathologic change is the accumulation of excess fluid (edema) in the wall of the stomach; around the spiral colon; within lymph nodes; and beneath the skin of the eyelids, ears, face, jowls and the underside of the abdominal wall. Excess jelly-like and clear to discolored fluid may also be found within the major body cavities.

### Diagnosis

Diagnosis of edema disease is based on the herd history, clinical signs and the gross pathologic changes. Microbiologic examination is not helpful since *E. coli* are seldom isolated from the tissues. Few other common diseases of swine could be confused with gut edema.

### Treatment and Prevention

Attempts at specific treatment of edema disease have been inconsistent and only partially sucessful. Use of a saline cathartic and temporary withholding of feed, either partially or completely, are effective in bringing about recovery. Gradual changes in feed and the addition of oral antibiotics during periods of stress are also helpful in preventing the disease.

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