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Swine Health: Swine Arthritis

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Joe Munroe, Farm Quarterly

SWINE HEALTH

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SWINE ARTHRITIS

James H. Bailey

ECONOMIC IMPORTANCE

Arthritis of swine is of economic importance to the swine producer and the meat packer. Recent figures from USDA meat inspection records have shown an increasing trend in condemnations of parts of carcasses and of whole carcasses due to arthritis. Figures for 1969 show a multimillion dollar loss due to trim and condemnation on the packing floor. This is only a small portion of the actual loss. Most losses due to arthritis are suffered by the producer in terms of slower and less efficient gains. Death losses may occur from the septicemia due to the infectious agent in the blood stream. These losses while great, are difficult to document but substantially add to the cost of swine production on the farm.

TYPES OF ARTHRITIS

There are two types of arthritis. Infectious and non-infectious. Infectious arthritis is by far the most common type. Noninfectious arthritis is usually the result of trauma (bruising), conformation abnormalities, and inadequate bone structure that stresses the joint.

Introduction of infectious organisms into the joint capsule will result in infectious arthritis. The organisms may gain entry by penetration of the capsule due to an injury or they may be carried in through the blood stream (septicemia). The latter being the most common method.

Infectious arthritis from blood origin will usually involve more than one joint. Joints that have the greatest amount of movement seem to be the most susceptible. The shoulder and elbow on the front leg and the hock and stifle on the rear leg generally are the most often involved.

DISEASES CAUSING ARTHRITIS

ERYSIPELAS

Swine erysipelas is worldwide in distribution and has caused serious economic losses in the United States. The organism, *Erysipelothrix insidiosus*, was first isolated in the U. S. in 1885. During the 1920's it became recognized as a serious disease problem.

The clinical signs of erysipelas can be divided into three general headings: acute, subacute and chronic.

Acute Erysipelas

Acute swine erysipelas is characterized by a sudden onset with death of one or more animals. Others will be noticeably sick and some of these will subsequently die. Those visibly sick will have temperatures of 104°F.

and over. Some may appear normal but yet have temperatures of 106°F.

The affected pigs may squeal in pain as they try to move. They will have a stiff, stilted gait or lameness when they walk. When standing they may shift their weight in an effort to ease the pain. The feet are carried well under them giving the back an arched appearance. The arthritis may progress and produce permanent damage of the affected joints. As the animal recovers, the arthritis may either disappear permanently or recur and become chronic.

Subacute Erysipelas

Subacute erysipelas includes symptoms which are less severe than the acute stage. The animals do not appear as sick nor do temperatures go as high or persist as long.

Chronic Erysipelas

Chronic arthritis results in joints that show various degrees of stiffness and enlargement. The amount of locomotion problems is dependent upon the extent of damage and the number of joints involved.

Affected joints usually have a thickening of the joint capsule and the surrounding tissue becomes thickened. Adhesions may form within the joint and this tissue attaches to the membrane lining the joint capsule. The articular (joint) surface may be eroded and the movement of the joint may be restricted because of the adhesions which may become calcified.

Arthritis due to erysipelas has been compared to rheumatoid arthritis in man because of certain similarities. Other researchers have challenged this concept and doubted any similarity.

It has been reported by some workers that erysipelas arthritis may be caused by or aggravated by an allergic reaction. Other trials have failed to conclusively link erysipelas arthritis and allergy. There has been some evidence of lameness following revaccination of erysipelas indicating some sensitivity to the vaccine that was triggered by the second vaccine shot.

Treatment

Erysipelas arthritis is difficult to prevent or treat. Probably the best method to prevent acute erysipelas from localizing in the joints is the immediate treatment of sick swine with erysipelas serum and penicillin. Even with prompt treatment, a number of pigs may develop chronic lameness. The use of corticosteroids may produce some dramatic results with apparent success in

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treating, however, when the steroids are withdrawn, the pigs may relapse.

Vaccination

A number of vaccines are available which effectively reduce the death loss from acute erysipelas. However, it does not seem that vaccination is totally effective in preventing arthritis. In fact, some experimental results indicate that vaccination may actually promote the development of arthritis.

Serum is obtained from horses that have been hyperimmunized through repeated inoculations of the erysipelas organism. Pigs injected with the serum have a passive immunity for a matter of several weeks. This serum along with penicillin is probably the best method of treating acute cases of swine erysipelas.

Vaccination of gilts six weeks prior to farrowing and again two weeks later has been thought to provide immunity to newborn pigs through the antibodies present in the colostrum of the dam. The bacterin or attenuated vaccine is used. Vaccination of the pigs is delayed until the animals are about 8 or 10 weeks of age.

Control of Erysipelas

The soil, once it becomes contaminated, may be a potential source of infection for many years. A source of infection could result from the improper disposal of infected carcasses or the manure and urine of erysipelas infected pigs. Some reports indicate the organism will survive for longer periods of time in heavy, damp jumbo soils.

Preventative measures against erysipelas follow well established principles of disease control. The use of biological products such as bacterins or vaccines along with good management and sanitation may be necessary in areas where erysipelas is common. Newly purchased animals should be isolated for thirty days.

When erysipelas does appear, treatment should be initiated as soon as possible. Dead animals should be properly disposed of to avoid contamination of premises and other swine. Floors and buildings should be thoroughly cleaned and disinfected following an outbreak.

MYCOPLASMAL ARTHRITIS

Various mycoplasma can produce arthritis in swine as well as other animals. Two species have been shown to cause swine arthritis. They are: *M. granularum* and *M. hyorhinis*. Mycoplasma previously have been termed "PPLO."

MYCOPLASMA GRANULARUM

M. granularum has been isolated from the nasal passage and the lungs of swine but apparently it causes no particular problem in those areas. It can cause polyarthritis (arthritis in more than one joint) in three-to five-months old swine. It can also affect mature swine but it rarely affects animals less than three months of age or about 70 pounds.

The incidence in herds infected with *M. granularum* is commonly 5 to 15%, but in severe outbreaks more than 50% of the animals have had clinical arthritis. The dis-

ease may remain in the herd year after year with increasing severity unless the herd is repopulated with uninfected stock. Treatment seems less effective in the chronically infected herds than in those infected for the first time.

Stress may play an important role in precipitating arthritis caused by this organism. Moving swine, changes in weather, administration of biologicals have all been incriminated in outbreaks. It is quite common to see *M. granularum* arthritis in young boars 7-10 days after they have been introduced into a new herd.

Heavy muscling seems to predispose swine to *M. granularum* arthritis, because extremely well muscled swine seem to have a disproportionately greater incidence of the disease.

Clinical Signs

The onset is evidenced by lameness in one or more of the legs. The lameness is variable in severity and may last for several days. Some may walk with a stiff gait and may be reluctant to move and frequently lay down. As the lameness becomes more pronounced the animal is reluctant to use the affected leg. The feet are carried well under the body with the back arched in the case of rear leg involvement. The majority of the animals recover in several days and show no chronic effect of the disease.

The hock, stifle and elbow joints are most commonly involved. The hip, and shoulder and other joints also may be affected. The joints may show some "puffiness" of the joint capsule but they seldom are greatly enlarged.

Gross Lesions

On necropsy in the acute stages, there is distention of the joint capsule with fluid and there is fluid (edema) around the joint and the tendons. Sometimes the tendon sheaths are involved. The lining of the joint capsule may have a velvety appearance due to proliferation of the cells of the capsule. The amount of fluid in the joint may be increased by several times. In the early stages the fluid is quite clear but becomes tinged with blood and may contain flakes of fibrin. In chronic cases the joint capsule will become tan or yellowish in color.

The *M. granularum* organism can be recovered in nearly 50% of the cases early in the infection but as the disease progresses it becomes more difficult to culture it. Specimens for the diagnostic laboratory are best obtained from a live animal early in the course of the disease.

Treatment

Treatment of *M. granularum* arthritis early in the course of the disease with 2 to 4 mg./lb. of injectible tylosin may be effective. Best results will be obtained if treatment is started at the first signs of lameness. Lincomycin hydrochloride has been shown to be effective at the dosage of 5 mg./lb.

Prevention

Prevention of *M. granularum* arthritis is very difficult. In a herd where the infection reappears annually, dispersion and repopulation must be considered. The

disease often appears during periods of stress or the introduction of new swine into a herd. As with any other swine disease, minimizing stressful conditions will help diminish the problem. Care must be exercised to avoid purchasing stock from herds that have had a history of chronic arthritis.

MYCOPLASMA HYORHINIS

M. hyorhinis is a common inhabitant of the swine nasal cavity and a common secondary invader in swine pneumonia. The organisms can, on occasion, gain entry into the blood stream from the nasal passage and produce an infection in the blood termed a septicemia. The resulting condition involves the serous membranes of the body. These are the covering membranes of the heart, lungs, testicles and joints. Inflammation of these membranes is called "polyserositis." Specifically, inflammation of the serous membranes of the joints is called arthritis. Polyserositis and arthritis occur more often in pigs that are under stresses such as malnutrition, severe temperature changes, and also when co-existent with respiratory or scour conditions particularly during nursing and early after weaning. Clinical signs may appear in pigs as young as 10 days of age but usually affect pigs in the 3- to 10-week-old group. Resistance seems to develop at about 10 weeks of age, but occasionally outbreaks of the disease may be seen in young sows or boars. Severe stress in older pigs is required to precipitate the condition.

Clinical Signs

The body temperature is usually elevated to 104-105°F. The affected pigs are usually mildly depressed and have a roughened hair coat. As signs of the polyserositis become evident, the pigs will show stretching movements with the front and hind limbs extended, particularly when first disturbed. There may be some respiratory difficulty and abdominal breathing. This is caused by the inflammation of the serous lining of the abdominal cavity (peritoneum) and the pleural covering of the lungs. Lameness in one or more joints is evident and the pigs are often reluctant to move. The duration and severity of the infection will vary considerably depending on the resistance of the animals and the degree of stress to which they may have been subjected. Some animals die but the mortality is usually less than 10%.

Two or three months following an attack of polyserositis, some of the pigs will only be half the size of unaffected litter mates. The arthritis may persist indefinitely, while in other cases, complete recovery occurs in two or three weeks. Lameness may recur several months after apparent recovery.

Gross Lesions

Fluid in the affected joints is increased and is thickened with some fibrinous material. There may be a great volume of fibrinous material around the heart and adhesions will result. The larger joints of the legs are the most frequently involved. Early joint lesions are similar to those caused by *M. granularum*.

Diagnosis

Several blood tests have been used experimentally, however, none so far has proved to be accurate in detecting the disease.

So far, isolation of the organisms in the diagnostic laboratory is the only sure method of diagnosis. Special techniques are necessary to ensure survival of the organism from the animal to the lab. Samples are most satisfactory from live animals early in the course of the infection.

Treatment

Tetracyclines and sulfathiazol have been used in the treatment of *M. hyorhinis* infections but have been unsatisfactory. There is no known method of eliminating the organism from the nasal passage or the animal's body.

STREPTOCOCCAL ARTHRITIS

The most common arthritis in pigs under three weeks of age is streptococcal arthritis. This is most commonly due to the entrance of the strep organisms by way of the navel. Besides the navel, young pigs may become infected through facial abrasions due to fighting or through abraded knees acquired from rough flooring or stalls that have inadequate bedding material. *Staphylococcus aureus* and *Corynebacterium pyogenes* are involved in the same manner as the strep organisms, however, less frequently.

The arthritis causes much discomfort to the young pig and it may be reluctant to move about or to place any weight on the affected legs. The joints may suddenly swell to twice their normal size. Death loss may result from the septicemic stage.

Diagnosis

The presence of streptococcal organisms can be confirmed by laboratory means, however, with few exceptions, the presence of greatly enlarged joints in pigs less than three weeks of age is highly indicative of strep arthritis.

Treatment

In most cases of strep arthritis, treatment in the early stages with a penicillin-streptomycin combination has proven helpful. Treatment must be instituted early if the maximum response is to be obtained. If treatment is delayed, a chronic arthritis with thick pus and erosion of the articular surface of the joint will result. Chronic cases fail to grow as expected and considerable loss is experienced.

Control

Prevention is the best answer to this type of arthritis. The use of tincture of iodine or other suitable disinfectant on the navel of newborn pigs will help control the entry of strep organisms from the environment. Management practices that will reduce the abrasions of knees on rough cement while pigs are nursing and clipping needle teeth of pigs in large litters where they may fight for the milk supply are necessary.

ARTHRITIS ASSOCIATED WITH TAIL BITING

Tail biting is a vice becoming more common as swine are confined during the growing-finishing phase. Damage to the tip of the tail provides access for organisms to get into the blood stream. Many management factors are involved in the control of tail biting. It has become quite common practice to remove the tail of very young pigs at the first joint from the body. However, this procedure must be done under clean conditions or it may provide an excellent opportunity for entry of contaminating organisms. *Streptococcus* sp., *Staphylococcus* sp. or *Corynebacterium pyogenes* are most often involved in arthritis of this type.

Treatment of arthritis following tail biting is very unsatisfactory and this results in great economic loss each year to the swine industry. Swine growth is retarded and feed conversion is impaired, plus the dock that packers subtract when buying arthritic swine.

Arthritis due to tail biting usually is manifested by large swellings of the shoulder, elbow, hock or stifle joints. It has been reported in the vertebral column which would be a direct extension of the infection from the site of the bite into the spinal column.

NUTRITIONAL PROBLEMS

Nutritional problems have often been connected with feet and leg problems, however, the occurrence of arthritis is seldom directly linked to feeding problems. Bone abnormalities resulting from deficiencies of calcium, phosphorous or vitamin D are common. Improper ratios of Ca:P have also been incriminated. In some

instances cartilage development in the joints has been arrested by serious deficiencies or imbalances. While some of these problems can affect the locomotion and movement of swine, actual arthritis from nutritional causes is rare.

EFFECT OF HOUSING ON ARTHRITIS

Some research reports indicate that slats 1½" wide spaced ¾" apart caused more leg and mobility problems than slats 4" wide spaced the same distance apart. Also, the width and spacing of slats was very important in farrowing stalls and spaces over ½" allowed small pigs to get their legs caught in the crack and resulted in skinned legs and more arthritis problems. The width of space had more to do with leg injuries than the type of material of which the slats were made.

This material was prepared by James H. Bailey, D.V.M., extension veterinarian, South Dakota State University at Brookings. It is based on a research review, "Swine Respiratory Diseases and Arthritis," sponsored by the National Pork Producers Council, the South Dakota State University Cooperative Extension Service and the Federal Extension Service. Additional copies of this fact sheet are available from the National Pork Producers Council, 3101 Ingersoll, Des Moines, Iowa 50312. The research review will be available at cost from the Department of Veterinary Science, South Dakota State University, Brookings, South Dakota 57006.
