



Erysipelas - Past and Present

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Swine erysipelas (SE) is a disease caused by the bacterium *Erysipelothrix rhusiopathiae*. The disease, which was first identified by Robert Koch in 1878, is worldwide in distribution and of economic importance on all continents where pork is produced. It is one of the oldest recognized and best-known swine diseases in the world.

The treatment and prevention of SE has a long history too. Hyperimmune serum treatment and live culture vaccination date back to the 1890s. Penicillin has been used for treatment of SE since 1949. Vaccines were first licensed in 1955 in the U.S. and their wide use continues.

Forms of Swine Erysipelas

SE can appear in several forms and cause several conditions. **Acute SE** can be very dramatic. During acute outbreaks, the producer may report that pigs thought to be healthy were found dead. It is common to observe purplish skin discoloration or diffuse cutaneous hemostasis in the ears, snout, jowls, abdomen, and other areas due to the septicemia and vascular damage. The differential diagnosis must include acute SE, Salmonellosis, *Actinobacillus suis*, and other systemic diseases. Other animals in the herd may appear lethargic, reluctant to move, and have rectal temperatures of 104 -

Key Points

- Swine erysipelas (SE) is caused by *Erysipelothrix rhusiopathiae* and is found in herds throughout the world.
- The disease may manifest itself in acute, subacute, and chronic forms, each with its own signs and problems for producers.
- Erysipelas is an important disease because the organism is ubiquitous in nature, the number of disease outbreaks is increasing, it can lead to possible infection of humans, and the swine industry suffers significant economic losses due to the disease.
- Prevention is best achieved by implementing reliable management practices and a sound vaccination program.

108° F. Morbidity and mortality may continue for days even after treatment has begun. The classic "diamond skin" lesions may start appearing two to three days after infection with *Erysipelothrix rhusiopathiae*. If the animal survives, the diamond shaped lesions may disappear in about a week if uncomplicated. Complications of bacterial infection of the dermis may cause necrosis at the lesion sites. Healing of the necrotic lesions requires many weeks. These healing lesions are those usually observed at slaughter.



Subacute SE has similar clinical signs as acute SE but is less severe and protracted. The less severe form of the disease may be caused by less virulent strains, lower challenge dose, and partial resistance due to maternal antibody protection or vaccination. **Subclinical SE** infection can also occur. With a subclinical infection, the pig may be infected without showing obvious clinical signs or lesions.

Chronic SE may be the sequela to acute, subacute, or subclinical infection. The most recognized sign is a proliferative, nonsuppurative arthritis. Arthritis most commonly occurs in the hock, stifle, elbow, and carpal joints. The arthritic lesions can progress even in absence of the organism causing slower growth rates and chronic arthritis. Fibrin deposition and subsequent connective tissue proliferation can result in ankylosis of the joints. Another less common result of chronic SE is vegetative endocarditis. Vascular inflammation and exudation of fibrin can destroy the valvular endocardium resulting in lesions on the heart valves. The lesions may progress with further fibrin deposition causing loss of valve integrity and function.

Importance of Swine Erysipelas

Even with this lengthy history and understanding of the *Erysipelothrix rhusiopathiae* organism, erysipelas is still not eradicated or eliminated from swine herds. Why is SE still of great interest to the pork industry? First, the *Erysipelothrix rhusiopathiae* organism is ubiquitous in nature. The organism has many hosts in addition to swine. *Erysipelothrix rhusiopathiae* has been found in more than 50 species of mammals, especially rodents, and more than 30 species of birds. It is estimated that up to 50% of healthy swine are carriers of the organism in their tonsils or other lymphoid tissue. Carrier and clinically affected animals can shed the bacteria in any excretion or secretion. The gram-positive bacterium also survives reasonably well in soil, chilled or frozen meat, decaying carcasses, dried blood, and fishmeal. While the bacteria can survive for about a month or less in soil, dirt lots or confined facilities can continually be contaminated by shedding carrier swine or secondary hosts.

Secondly, SE is of current interest because of the apparent increase in disease outbreaks. Clinical erysipelas has been reported more frequently during the last decade. Swine practitioners and regulatory personnel have reported cases from the Midwest to the Southeast. These cases have occurred in herds and geographical areas that had little or no history of SE. Mortality and morbidity were very costly. Acute onset, rapid death, and re-breaks characterized the outbreaks. While the outbreaks were surprising, even more disconcerting was the inability to get the disease under control with treatment and vaccination. Some veterinary practitioners were recommending vaccination for erysipelas every 60 days in some cases to control re-breaks! The apparent lack of duration of immunity from vaccination coupled with the lack of information by manufacturers on duration of immunity added frustration to an already difficult situation. As a result of these outbreaks of acute disease and severe mortality, some herds still vaccinate the breeding herd four times a year and the grow-finish pigs several times after weaning.

A third reason to be concerned about erysipelas is possible infection of humans. In humans, *Erysipelothrix rhusiopathiae* causes a condition called erysipeloid, an infective dermatitis usually limited to the hands and characterized by hyperemia and edema. Occasionally, systemic complications such as endocarditis and acute systemic disease do occur. Erysipeloid is considered an occupational disease of meat, poultry, and fish processors, veterinarians, and others in close contact with species known to harbor the organism.

Finally, SE is a concern to the pork industry because of economic loss. The losses due to acute death, treatments, repeated vaccination, chronic arthritic conditions, poor growth rates, and cull pigs are relatively simple to quantify. However, another area of economic loss is more insidious for the industry and more difficult to quantify. This loss primarily affects the pork producer and occurs at the packinghouse. The losses include trim loss and condemnation of carcasses. It is virtually impossible to add up all the lost income due to trim loss in the

U. S. packing industry. Much of the trim is due to arthritis caused by erysipelas. In addition, there is a condition called “Diamond Skin” by the Food Safety Inspection Service (FSIS) inspectors that is caused by *Erysipelothrix rhusiopathiae*. If the lesions are judged to be localized, the carcass is trimmed and passed for consumption. This also would be a trim loss due to SE infection.

The FSIS compiles data on all carcass condemnations or dispositions at packing-houses. The term “erysipelas” is reserved for the condition with systemic lesions. These carcasses are condemned. In 1995, erysipelas was the eleventh leading cause of condemnation. Other causes for condemnation due to *Erysipelothrix rhusiopathiae* infection would include arthritis and septicemia. These two categories ranked three and six, respectively, for causes of condemnation.

Treatment, Control, and Prevention

Treatment and control of erysipelas in the U.S. remains much the same as it has been since the 1950s. Treatment with penicillin is still the antibiotic of choice. All 131 isolates of *Erysipelothrix rhusiopathiae* from January 1991 to July 1997 at Iowa State University Veterinary Diagnostic Laboratory were susceptible to penicillin. Occasionally, erysipelas antiserum is indicated in severe outbreaks where response to antibiotic therapy is less than acceptable.

Prevention can still be best accomplished by implementing good management practices and a sound vaccination program. According to the 1990 NAHMS survey, 61.4% of pork operations vaccinated for erysipelas. The NAHMS survey in 1995 found 56.2% of pork operations vaccinated for erysipelas. Prevention of erysipelas outbreaks cannot be accomplished without an appropriate vaccination program.

Summary

In summary, SE has been well documented, studied, and present in pork production systems worldwide for over a century. Unfortunately, eradication appears impossible. Prevention by vaccination appears to provide a measure of protection but the

duration of immunity is insufficient in some cases. The swine industry needs to develop more highly effective vaccines with a proven duration of immunity. Sound vaccination programs with improved vaccines may prevent erysipelas from being an economic burden on the pork industry.

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