Pathology of Erysipelas infection in piglets

B.P. Shankar, S.Chandan, H.S.Madhusudan and D.Ranjith

Department of Pathology, Veterinary College,
Karnataka Veterinary, Animal and Fisheries Sciences University, Hebbal, Banglore
Corresponding author email : shankar956@rediffmail.com

Introduction

Erysipelas rhusiopathiae is a small, gram-positive, non-sp.ore forming, unencapsulated, pleomorphic bacillus that is the cause of swine erysipelas. The organism is a facultative anaerobe that has a worldwide distribution and may be found in alkaline soil, decaying organic matter and water. The bacterium is resistant to many chemical and food preservative processes, including salting, pickling and smoking, and may remain viable in the environment for up to several weeks under optimal conditions.

Infection with *E. rhusiopathiae* has been reported in a wide variety of domestic and wild birds, cattle, sheep, horses, fish, moose, and dolphins. *Erysipelas rhusiopathiae* causes polyarthritis in sheep, and is most often seen in lambs in which the organism gains entry through docking or castration wounds. In humans, *E. rhusiopathiae* causes a localized skin lesion termed erysipeloid which may progress to septicemia in rare cases. Erysipeloid is characterized by a self-limiting, painful, red swelling of the fingers, with or without lymphadenopathy. Human infections are usually acquired through occupational exposure in meat or chicken slaughterhouses, or fish plants.

Swine is the most important reservoir host and many pig carry the organism in the oropharynx; the organism can be cultured from the tonsils of clinically healthy pigs. An infected or subclinically diseased pig is often the source of infection to other herd animals. The bacterium is shed into the environment, and susceptible pigs may acquire the infection by ingestion of contaminated soil or water (most common), percutaneously through skin wounds, or possibly via ticks and flies. Septicemia develops within 24 hours of exposure and produces disseminated intravascular coagulation characteristic of acute disease which may be fatal. Animals surviving the acute phase develop lesions of subacute to chronic infection, including cutaneous necrosis, polyarthritis, and endocarditis. Pregnant sows may abort due to infection and bacteria have been isolated from aborted and stillborn fetuses.

Case history

The twenty day old commercial piglets were from a first litter sow. other sows were reported to have had skin lesions that were thought to be erysipelas and were successfully treated with penicillin.

Gross Pathological and histopathological observations

The piglets had red-black discoloration of the skin of the ears, hind legs, and feet. The skin sections had dark blood oozing from a layer under the epidermis. The upper hind leg muscle of one piglet had a well-demarcated, 3 to 4 centimeter, dark red, infarcted area immediately under the skin. The spleens of both animals were moderately enlarged. The lungs of one piglet were diffusely, reddened but not consolidated. The other internal organs were grossly normal.

There was diffuse subacute interstitial pneumonia consistent with septicemia. Many capillaries contained hyaline thrombi and rare, gram-positive bacilli. Neither microscopic lesions, nor gram-positive bacteria were present within sections of kidney, liver, brain, spleen, and intestine. Gram-positive bacteria and fibrin thrombi are numerous in some sections of the skin. The section of muscle from the leg is not the most severely affected area, but myofiber atrophy, individual necrotic fibers surrounded by neutrophils, and fibrin thrombi in the capillaries are present. The more affected muscle section had more extensive necrosuppurative and hemorrhagic myositis. Moderate necrosuppurative myositis with fibrinoid necrosis and fibrin thrombosis of blood vessels were observed. Multifocal hemorrhagic dermatitis with fibrin thrombi and intravascular bacteria were noticed.

Laboratory diagnosis

Erysipelothrix rhusiopathiae was isolated from: both lungs, spleen. infarcted muscle and foot.

Discussion

All pigs are susceptible to infection with

Erysipelas rhusiopathiae, but most cases occur between two months and one year of age. The disease has three forms: acute, subacute, and chronic. Acute infection has septicemia with disseminated intravascular coagulation and hyaline thrombi throughout the body. By four days post infection, the bacteria invade the endothelium, and there is diapedesis of erythrocytes. The purple skin is usually due to congestion and sometimes thrombosis of dermal vessels. Fibrinoid necrosis of vessels may be due to a hypersensitivity (Arthus) reaction. Arteriolar fibrinoid necrosis is thought to be the cause of the "diamond skin" lesions and may not be present in our piglets due to the rapid nature of the infection which may not have allowed enough time for full hypersensitivity vasculitis to develop. The discoloration of the skin can be used as a prognosticator. Pigs with pink to red skin lesions usually recover, while those with dark red-purple lesions usually die. In acute erysipelas in piglets, the dermal and hypodermal hemorrhage also occurred mostly on the ears and limbs.

Muscle degeneration is seen with acute erysipelas, but the locally severe pattern of hemorrhagic infarction seen in one of our pigs is unusual. Less specific lesions can be seen in any organ, with leukothrombi or bacterial emboli. Synovitis may occur in acute or chronic disease. The subacute form is similar but less severe than the acute disease. Chronic infection is characterized by arthritis or bacterial valvular endocarditis, with the bacteria localized at these sites.

References

1. Char, N.L., Rajeswarj, K.R., Singh, K.R., Reddy, V.R., Rao, C.R. and Sreeramulu, P. (1993): An outbreak of urticarial form of swine erysipelas in Andhra Pradesh. *Indian Veterinary Journal*. 70(1): 1-3.
2. Dushuk, R.V., Podlesnykh, L.A., Tikhonov, L.I. and Shapovalova,N.A. (1993): Prevention and treatment of swine erysipelas. *Veterinariya Moskva.* (7): 52-56.
3. Piedy Sreeramulu and Rao, C.R. (1994): Epidemiological observations of an outbreak of swine erysipelas in Andhra Pradesh. *Indian Veterinary Journal*. 71(5): 517.
4. Saini,S.S., Khera, R.S. and Kwatra, M.S. (1994): An outbreak of acute form of swine erysipelas in Punjab. *Indian Journal of Animal Sciences.* 64(8): 816-817.
5. Takahashi, T., Zarkasie, K., Mariana, S., Sumadi, and Ogata, M. (1989): Serological and pathogenic characterization of Erysipelothrix rhusiopathiae isolates from tonsils of slaughter pigs in Indonesia. *Veterinary Microbiology.* 21(2): 165-175.
6. Wood, R.L. and Nord, N.A. (1992): Serotypes of Erysipelothrix rhusiopathiae isolated from field cases of swine erysipelas, 1981-91. Proceedings of the United States Animal Health Association. 96: 143-144.
7. Xuan, C.H., Ren, F.L., Wang, R.J., Zhou, J., Xi, W.L. and Zhang, C.L. (1993): Pathomorphological study of the "blush" around the splenic white pulp in experimental peracute swine erysipelas. *Acta Veterinaria et Zootechnica Sinica.* 24(6): 537-541.

* * * * * * * *

LATEST NEWS - FOOD AND FEED SAFETY

***E. coli* O157:H7 Outbreak**

May 21, 2009 - Valley Meats LLC, a Coal Valley, Ill., establishment is recalling approximately 95,898 pounds of ground beef products that may be contaminated with *E. coli* O157:H7, the U.S. Department of Agriculture's Food Safety and Inspection Service (FSIS) announced. The problem was discovered through an epidemiological investigation of illnesses. Illnesses have been reported in Ohio, Pennsylvania, and Illinois.http://www.fsis.usda.gov/News_&_Events/Recall_022_2009_Release/index.asp

Bacteria eating viruses help fight food pathogens: EFSA study

Bacteriophages, could be an effective way of eliminating specific food pathogens, according to a recent report from the European Food Safety Authority's BIOHAZ Panel. Some bacteriophages, under specific conditions, could be used to eliminate specific pathogens in meat and milk products, concluded the study. The panel, which deals with biological hazards in the field of food safety and food-borne diseases, noted that bacteriophages tend to persist longer than their hosts and behave as inert particles in the environment. But, their long-term antibacterial activity is reduced on dry surfaces and their persistence in food varies with each bacteriophage, and with the conditions of application. Factors include: Dose, and physical and chemical factors associated with the food such as pH and moisture levels. For example, refrigeration temperatures improve the persistence of bacteriophages on the surfaces of meat and dairy products.
http://www.nutraingredients.com/Publications/Food-Beverage-Nutrition/FoodProductionDaily.com/Quality-Safety/Bacteria-eating-viruses-help-fight-food-pathogens-EFSA-study/