SWINE ERYSIPELAS

Genus: Erysipelothrix

This genus contains only one pathogenic member, *Erysipelothrix rhusiopathiae,* the cause of swine erysipelas.

SWINE ERYSIPELAS

Erysipelas is an infectious disease of pigs and appears in an **ACUTE septicaemic form** usually accompanied by **diamond-shaped skin lesions**, and a **CHRONIC** form manifested by a **non-suppurative arthritis and vegetative endocarditis**. It is caused *by Erysipelothrix rhusiopathiae (E. insidiosa)*.

Erysipelas in pigs occurs throughout the world. The disease is important because it causes serious loss due to death or devaluation of pig carcasses due to arthritis. Pigs of all ages are susceptible. Besides pigs, *E. rhusiopathiae* also infects other species, including poultry, cattle, sheep, horse, and dogs.

It causes **erysipeloid** of humans. The term erysipelas, in humans, is used to denote cutaneous infections with beta-haemolytic streptococci.

CAUSE

E. rhusiopathiae is a small, pleomorphic, and rod-shaped, either straight or curved organism. It is Gram-positive, and may have beaded appearance. The organism forms tiny colonies on ordinary agar media. At least 22 serotypes are known to exist. However, **serotypes 1 and 2 are the most** common types isolated from pigs affected with the disease. These are the only serotypes which cause the acute disease. The other types are relatively unimportant.

SPREAD

Soil contamination occurs through the faeces of affected or carrier pigs. In clinically normal carrier animals, tonsils are the predilection site for the organism. Since the organism can pass through the stomach without being destroyed, carrier animals can reinfect the soil continuously. The organism can survive in faeces for several months and many pigs carry the organism in their oropharynx. Once infection is established, a large number of bacteria are excreted and are main source for spread within a herd.

PATHOGENESIS

First, invasion of bloodstream occurs, followed by development of acute septicaemia or bacteraemia with localization of organisms in organs and joints (chronic form). The bacterial antigen tends to localize in joint tissues where local immune complex formation then causes inflammation and arthritis (Type III hypersensitivity-immune complex).So, localization follows usually in the skin, joints, and on heart valves.

SIGNS

In pigs, the disease occurs in a peracute, acute, or chronic form. The Peracute or Acute Form is a febrile disease with a high rate of mortality. Death occurs before any specific signs can be detected. The only outward sign may be **discoloration of the skin**. In severe cases, appearance of **rhomboid-shaped (diamond-shaped) areas of intense erythema in the skin are characteristic**, and therefore the common name "diamond-skin disease" is often applied to this disease. These erythematous lesions may progress to necrosis. Large patches of epidermis slough, as healing occurs.

Chronic Form is characterized by localization of the organism in the heart valves or joints, leading to **vegetative endocarditis or arthritis**. Arthritis in one or more joints is manifested by a

sudden painful hot swelling, particularly of the carpal or tarsal joints. **Vegetative Endocarditis** is a common sequel and may result in sudden death.

LESIONS

In acute septicaemic cases, non-specific lesions such as haemorrhages may occur in serous surfaces etc. Specific lesions of diagnostic importance develop as the disease progresses. The distinguishing lesions are found in the skin, synovial membranes, and endocardium. The cutaneous lesions are most common **on the abdomen**, but may occur elsewhere too. They vary in size, but are almost always of diamond, rhomboid, or rectangular (with four sides and four right angles) shape and are **sharply demarcated** from the normal skin. At first, they are bright red, but later they become purplish, and eventually, dark blue. Necrosis accounts for darkening of the skin. The overlying epidermis dries and eventually peels off. Forcible removal of scabs from an incompletely healed lesion shows a raw, bleeding surface. The lesions result from **bacterially induced arteriolitis and thrombosis**, which can be observed microscopically.

In the subacute form of the disease, microscopic evidence of **synovitis** may be seen, but in the chronic form damage to affected joints can be seen grossly. The joint capsule is visibly enlarged, thickened, and distended with excessive fluid, and the articular surfaces are roughened.

Rugose thickening (i.e., full of wrinkles) of the joint capsule is particularly noticeable at the margins of the articular surfaces. Microscopically, the joint capsule is infiltrated with lymphoid cells, and the synovial lining is prominent and often thrown up into folds.

Lesions in the heart are usually the result of **subacute bacterial endocarditis**. Most prominent are the large, irregular, **coarse masses on the leaves of the mitral (bicuspid) valve**, or less commonly, on the pulmonary valves. These **nodular masses project into the lumen of the left ventricle, and at times, almost occlude it (vegetative endocarditis).** The material adheres rather firmly to the valve leaflets, but it can be broken loose. Microscopically, the thickened valves are covered with fibrinous exudate, necrosis, leukocytes, and colonies of the organisms.

In **SHEEP**, *E. rhusiopathiae* is an important cause of polyarthritis. It is usually seen in lambs. The organism gains entry after docking or castration. Affected lambs are lame. The joints are swollen and contain **fibrin and pus**. The lesions progress to degenerative osteoarthritis. Valvular endocarditis, septicaemia, cutaneous lesions, or pneumonia can also develop in affected sheep.

ZOONOTIC IMPLICATIONS

Because of man's susceptibility, Veterinarians particularly are also likely to be exposed. It causes **erysipeloid (cellulitis) in humans**, particularly in persons who work in slaughterhouses and fish markets. The cutaneous lesions of erysipeloid are usually local but may become fulminant (severe), with widespread exanthematous or bullous lesions on the hands, face, or body.

Rarely, there may be endocarditis and encephalitis in humans who sustain an injury, such as a cut, while handling diseased carcasses.

DIAGNOSIS

- Typical symptoms and lesions are usually sufficient for diagnosis.
- However, recovery and identification of the organism are necessary in acute septicaemic cases.
- PCR for definitive diagnosis.

AVIAN ERYSIPELAS

Erysipelas is an acute, fulminating (sudden and severe) disease caused by *Erysipelothix rhusiopathiae (E. insidiosa).* The disease is of great importance in **TURKEYS**, and of lesser significance in the chicken.

Spread:-

The source of infection may not be known, but often there is a history of pigs or sheep being previously housed on the same land. The organism enters the birds through breaks in the skin, or mucous membranes.

Signs:-

The disease has a rapid onset. Birds in good condition may be found suddenly dead, after little or no prior signs of illness. A few birds may be drowsy, have diarrhoea, or show an **unsteady gait prior to death**. Turkeys often show **cyanosis of the head**. Mortality can range from 1-50% and recovered birds may show **chronic lameness**.

Lesions:-

- There may be **dark, crusty lesions** over any part of the body, especially the **head in turkeys**. Lesions are of generalized bacteraemia and congestion, with **small haemorrhages**, usually in the skin, muscles, pericardial fat, gizzard serosa, mesentery, abdominal fat, liver, and under the pleura.
- Liver, spleen, and kidneys are enlarged, friable and mottled.
- There is marked **Catarrhal Enteritis.**