

## **Classical Swine Fever**

**Hog Cholera, Peste du Porc, Colera Porcina, Virusschweinepest**

### **Importance**

Classical swine fever is a serious and highly contagious viral disease of pigs. Acute or chronic infections occur; both are usually fatal. In herds infected with less virulent isolates, the only symptom may be poor reproductive performance or a failure to thrive. A wide range of clinical signs and a similarity to other diseases can make classical swine fever challenging to diagnose.

### **Etiology**

Classical swine fever results from infection by classical swine fever virus (CSFV), (genus *Pestivirus*, family *Togaviridae*). This virus is also known as hog cholera virus. Only one serotype has been found. The CSF virus is very similar to the Bovine Virus Diarrhea (BVD) virus that affects cattle.

### **Species affected**

Classical swine fever affects domestic and wild pigs.

### **Geographic distribution**

Classical swine fever is found in East and Southeast Asia, the Indian subcontinent, China, East and Central Africa, and most of South and Central America. This disease has been eradicated from the United States, Canada, New Zealand, and Australia. Most of Western Europe is free of classical swine fever; however, foci of infection remain in Germany and some countries of Eastern Europe.

### **Transmission**

Classical swine fever is highly contagious. Virus transmission is mainly oral; CSFV is often spread by feeding uncooked contaminated garbage. Animals can also be infected through the mucus membranes, conjunctiva, and skin abrasions. Aerosol spread is sometimes seen in confined spaces; however, the virus does not travel long distances in the air. Infected carrier sows may give birth to persistently infected pigs. Mechanical spread by fomites and insects occurs.

Infected pigs are the only reservoir of virus. Blood, secretions and excretions, and tissues contain infectious virus. CSFV is moderately fragile in the environment, but can remain infectious for months in refrigerated meat and years in frozen meat. It can survive in contaminated pens and on fomites for as long as two weeks.

### **Incubation period**

Variable incubation periods have been published, ranging from 2 to 14 days.

## **Clinical signs**

The clinical signs of classical swine fever vary with the strain of virus and susceptibility of the pigs. More virulent strains cause acute disease; less virulent strains can result in a high percentage of chronic, mild, or asymptomatic infections.

In acute classical swine fever, common clinical signs include a high fever, dullness, weakness, drowsiness, huddling, anorexia, an unsteady gait, conjunctivitis, and constipation followed by diarrhea. Several days after the first symptoms appear, the abdomen, inner thighs, and ears may develop a purple discoloration. Convulsions may be seen in the terminal stages. Pigs with acute classical swine fever usually die within one to two weeks. Recovery is rare.

The symptoms of chronic disease include intermittent fever, anorexia, periods of constipation or diarrhea, stunted growth, and alopecia. Immunosuppression may lead to concurrent infections. The symptoms of chronic infections can wax and wane for weeks to months and may affect only a few animals in the herd. Chronic infections are almost always fatal.

Reproductive symptoms may also be seen. Virulent strains can cause abortions or the death of piglets soon after birth. Less virulent strains of CSFV may result in stillbirths or mummification. Some piglets are born with a congenital tremor or congenital malformations of the visceral organs and central nervous system. Other piglets are asymptomatic but persistently infected. These animals are persistently viremic and become clinically ill after several months. They may have mild anorexia, depression, stunted growth, dermatitis, diarrhea, conjunctivitis, ataxia, or paresis, and may die. In some breeding herds infected by less virulent strains, poor reproductive performance is the only sign of disease.

## **Post mortem lesions**

The lesions of classical swine fever are highly variable. In acute disease, the most common lesion is hemorrhage. The skin may be discolored purple and the lymph nodes may be swollen and hemorrhagic. Petechial or ecchymotic hemorrhages can often be seen on serosal and mucosal surfaces, particularly the kidney, urinary bladder, epicardium, larynx, trachea, intestines, subcutaneous tissues, and spleen. Straw-colored fluid may be found in the peritoneal and thoracic cavities and the pericardial sac. Necrotic foci are common in the tonsils. Splenic infarcts are occasionally seen. The lungs may be congested and hemorrhagic. In some acute cases, lesions may be absent or inconspicuous.

The lesions of chronic disease are less severe and may be complicated by secondary infections. In addition, necrotic or “button” ulcers may be found in the intestinal mucosa, epiglottis and larynx.

In congenitally infected piglets, common lesions include cerebellar hypoplasia, thymic atrophy, ascites, and deformities of the head and legs.

## **Morbidity and Mortality**

Both morbidity and mortality are high in acute infections. The mortality rate in acute cases can reach 90%. Chronic infections are also fatal in most cases.

Vaccines may be available in some areas. Vaccines can protect animals from clinical disease, but do not eliminate infections.

## **Diagnosis**

### **Clinical**

Classical swine fever should be suspected in pigs with septicemia and a high fever, particularly if uncooked scraps have been fed, unusual biological products have been used, or new animals have been added to the herd. Differentiation from other diseases may be difficult without laboratory testing. In acute outbreaks, the chance of observing the characteristic necropsy lesions is better if four or five pigs are examined.

### **Differential diagnosis**

The differential diagnosis includes African swine fever, erysipelas, eperythrozoonosis, salmonellosis, pasteurellosis, actinobacillosis, *Haemophilus suis* infection, thrombocytopenia purpura, warfarin poisoning, Aujeszky's disease, heavy metal poisoning, and salt poisoning. Pigs congenitally infected with bovine virus diarrhea (BVD) virus may look very similar to pigs with classical swine fever.

### **Laboratory tests**

Classical swine fever can be diagnosed by detecting the virus or its antigens in whole blood or tissue samples. Virus antigens are detected by direct immunofluorescence or enzyme-linked immunosorbent assays (ELISAs). CSFV is differentiated from other pestiviruses by immunofluorescence testing with monoclonal antibodies. The virus can also be isolated in several cell lines including PK-15 cells; it is identified by direct immunofluorescence or peroxidase staining. Reverse transcriptase polymerase chain reaction (RT-PCR) tests are in development.

Serology is used for diagnosis and surveillance. The most commonly used tests are virus neutralization tests, including the fluorescent antibody virus neutralization (FAVN) test, the neutralizing peroxidase-linked assay (NPLA), and ELISAs. Antibodies usually develop during the third week after infection, but cannot be reliably detected until 30 days after infection. They persist for life. Antibodies against ruminant pestiviruses (particularly to BVD virus) are often found in breeding animals; only tests that use monoclonal antibodies can differentiate between these viruses and CSFV.

### **Samples to collect**

**Before collecting or sending any samples from animals with a suspected foreign animal disease, contact the AVIC. These samples should only be sent under secure conditions, by authorized personnel, and to authorized laboratories to prevent the spread of disease.**

Samples should be taken from at least four pigs. In live pigs, whole blood is preferred but tonsil biopsies are sometimes useful. Serum samples should be taken from recovered animals or sows that have been in contact with suspected cases.

At necropsy, the tonsils should be submitted for virus isolation or antigen detection. Other organs to collect include the submandibular and mesenteric lymph nodes, spleen, kidneys, and the distal part of the ileum. Samples for antigen detection and virus isolation should be refrigerated but not frozen; they should be kept cold during shipment to the laboratory. A complete set of tissues, including the whole brain, should be submitted in 10% buffered formalin for histology.

## **Recommended actions if classical swine fever is suspected**

### **Notification of authorities**

Classical swine fever should be reported immediately upon diagnosis or suspicion of the disease. Federal: Area Veterinarians in Charge (AVICS)

[http://www.aphis.usda.gov/vs/area\\_offices.htm](http://www.aphis.usda.gov/vs/area_offices.htm)

State vets: <http://www.aphis.usda.gov/vs/sregs/official.html>

### **Quarantine and Disinfection**

CSFV is moderately fragile in the environment. This virus is sensitive to drying and ultraviolet light and is rapidly inactivated by a pH less than 3. Sodium hypochlorite and phenolic compounds are effective disinfectants. CSFV can survive for long periods in meat, but is destroyed by cooking.

During outbreaks, confirmed cases and contact animals are slaughtered and quarantine is imposed. Vaccination is inappropriate in countries where this disease has been eradicated; however, vaccines are available in other countries and can protect animals from clinical disease. In countries free of classical swine fever, periodic serologic sampling is necessary to prevent reinfection.

### **Public health**

Classical swine fever does not affect humans.

### **For More Information**

World Organization for Animal Health (OIE)

<http://www.oie.int>

OIE Manual of Standards

[http://www.oie.int/eng/normes/mmanual/a\\_summry.htm](http://www.oie.int/eng/normes/mmanual/a_summry.htm)

OIE International Animal Health Code

[http://www.oie.int/eng/normes/mcode/A\\_summry.htm](http://www.oie.int/eng/normes/mcode/A_summry.htm)

USAHA Foreign Animal Diseases book

[http://www.vet.uga.edu/vpp/gray\\_book/FAD/](http://www.vet.uga.edu/vpp/gray_book/FAD/)

Animal Health Australia. The National Animal Health Information System (NAHIS)  
<http://www.aahc.com.au/nahis/disease/dislist.asp>>

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