

# Classical Swine Fever

**Synonym: Hog cholera, Swine fever**

## Definition:

Classical swine fever is a contagious, often fatal, disease of pigs clinically characterized by high body temperature, lethargy, yellowish diarrhea, vomiting, and a purple skin discoloration of the ears, lower abdomen, and legs.

## Etiology and Epidemiology:

- CSF is caused by a small, enveloped RNA virus in the genus Pestivirus of the family Flaviviridae.
- Classical swine fever virus (CSFV) is antigenically related to the other pestiviruses, mainly to bovine viral diarrhea virus (BVDV, see Bovine Viral Diarrhea and Mucosal Disease Complex) of cattle and to border disease virus (BDV, see Border Disease) of sheep.
- These viruses are highly prevalent in bovine and ovine populations and can infect pigs. Although infections of pigs with ruminant pestiviruses in most cases do not lead to clinical disease and are rapidly cleared, infections with both BVDV and BVD induce an antibody response in swine. Therefore, antibody discrimination tests must be applied to differentiate CSF infections from infections caused by ruminant pestiviruses.

## Transmission:

- Mainly by the oral and oronasal routes, via direct or indirect contact.
- Direct contact between animals (secretions, excretions, semen, blood)
- Spread by farm visitors, veterinarians, pig traders
- Indirect contact through premises, implements, vehicles, clothes, instruments and Needle
- Neighbourhood effect' during outbreaks in areas of high pig farm density: airborne
- transmission over short distances (up to 1 km in one study)
- Insufficiently cooked waste food fed to pigs: most common means of entry into free countries
- Transplacental infection: may create inapparent carrier piglets or congenital abnormalities
- Wild boar populations may harbour virus; domestic pigs in the affected area are at a high

Infections of sows during pregnancy with low to moderately virulent strains of CSFV may lead to in utero infections of fetuses. These infections lead to litters born persistently infected with CSFV that are carriers of the virus and source for new infections. Persistently infected carrier pigs usually do not show clinical signs but constantly shed CSFV into the environment. Therefore, it is particularly important to consider CSFV infections while investigating herds presenting with unexplained reproductive failures that include clinical manifestations in piglets such as congenital tremor or congenital abnormalities.

## **Clinical signs:**

### **Acute form (more virulent virus strains and/or younger pigs)**

- Fever (41°C)
- Anorexia, lethargy
- Severe leucopenia
- Multifocal hyperaemia and/or haemorrhagic lesions of the skin
- Conjunctivitis
- Enlarged, swollen lymph nodes
- Cyanosis of the skin especially of extremities (ears, limbs, tail, snout)
- Transient constipation followed by diarrhoea
- Vomiting (occasional)
- Dyspnoea, coughing
- Ataxia, paresis and convulsion
- Pigs huddle together
- Death occurs 5–25 days after onset of illness
- Mortality in young pigs can approach 100%

**Chronic form (less virulent virus strains or partially immune herds)**

- Dullness, capricious appetite, pyrexia, diarrhoea for up to 1 month
- Ruffled appearance of pigs
- Growth retardation
- Apparent recovery with eventual relapse and death within about 3 months.

**Congenital form (outcome depends on virulence of virus strain and stage of gestation)**

- Fetal death, resorption, mummification, stillbirth
- Abortion
- Congenital tremor, weakness
- Runting and poor growth over a period of weeks or months leading to death
- Born clinically normal but persistently viraemic with no antibody response: important intermittent shedders of virus until dying in 6–12 months (late onset form).

**Mild form (usually older animals; outcome depends on virulence of virus strain):**

- Transient pyrexia and inappetence
- Recovery and (lifelong) immunity

**Lesions:**

**Acute form: Lesions are usually complicated by secondary infections**

- Leucopenia and thrombocytopenia
- Enlarged haemorrhagic lymph nodes are common
- Widespread petechiae and ecchymoses, especially in the skin, lymph nodes, epiglottis,

bladder, kidney and rectum

- Severe tonsillitis with necrotic foci sometimes occurs
- Multifocal infarction of the margin of the spleen is characteristic: nearly pathognomonic but occurs infrequently with currently circulating strains
- Lungs may be congested and haemorrhagic
- Encephalomyelitis with perivascular cuffing is common

### **Chronic form: Lesions are usually complicated by secondary infections**

- **'Button' ulcers** in the caecum and large intestine mucosa
- Generalised depletion of lymphoid tissue
- Transverse striations of unmodelled growth cartilage at costochondral junctions in growing pigs
- Haemorrhagic and inflammatory lesions are often absent

### **Congenital form**

- Central dysmyelinogenesis, cerebellar hypoplasia, microencephaly, pulmonary hypoplasia, hydrops and other malformations.

## **Differential diagnosis Varies with form of the disease**

- African swine fever (indistinguishable clinico-pathologically. It is essential to send samples for laboratory confirmation.)
- Septicaemias: erysipelas, eperythrozoonosis, salmonellosis, streptococcosis, pasteurellosis, actinobacillosis, and *Haemophilus parasuis*
- Haemorrhage: porcine dermatitis and nephropathy syndrome, haemolytic disease of the

newborn, coumarin poisoning, thrombocytopenic purpura

- Runting: post weaning multisystemic wasting syndrome, enterotoxigenic, swine dysentery, campylobacteriosis
- Abortions: Aujeszky's disease (pseudorabies virus), encephalomyocarditis virus infection, porcine reproductive and respiratory syndrome, parvovirus
- Nervous signs: viral encephalomyelitis, salt poisoning
- Congenital infection with ruminant pestiviruses: Bovine virus diarrhea, Border disease

## Diagnosis:

CSF is first detected by veterinarians in the field. Because clinical signs manifested by CSFV-infected pigs are also seen with other diseases of swine, laboratory confirmation is always required. Clinically, the differential diagnosis varies according to the course of the disease, and primarily includes African swine fever. Hemorrhagic lesions must also be distinguished from those seen in porcine dermatitis and nephropathy syndrome and postweaning multisystemic wasting syndrome. Hemolytic disease of the newborn, porcine reproductive and respiratory syndrome, Aujeszky disease, parvovirus, thrombocytopenic purpura, anticoagulant poisoning (eg, warfarin), and salt poisoning should also be considered as possible differential diagnoses. Septicemic diseases, including salmonellosis, erysipelas, pasteurellosis, actinobacillosis, *Haemophilus suis* infections, and eperythrozoonosis may resemble CSF. Congenital infections with ruminant pestiviruses can resemble CSF reproductive failures caused by low virulence strains of CSFV. Poor reproductive performance in sows can also be associated with pseudorabies, parvovirus, and other noninfectious causes.

Virologic tests are essential to confirm the diagnosis of CSF. Advice on sample submission should be sought from the laboratory. Suitable tissues to detect the presence of the virus are tonsils, lymph nodes (mandibular, retropharyngeal, gastrohepatic, and mesenteric), spleen, kidney, and ileum. Whole blood collected with EDTA as anticoagulant can be used for virus isolation or virus detection, particularly during the viremic phase of the infection. Clotted blood samples (serum) are taken when serologic tests for detection of CSFV antibodies are pursued. Nasal swabs and/or tonsil scrapings are commonly collected clinical samples used to detect the virus (ie, viral RNA).

## **Prevention And Control:**

No treatment is possible. Affected pigs must be slaughtered and the carcasses buried or incinerated.

### **Sanitary prophylaxis:**

- Effective communication between veterinary authorities, veterinary practitioners and pig farmers
- Effective disease reporting system
- Strict import policy for live pigs, pig semen, and fresh and cured pig meat
- Quarantine of pigs before admission into herd
- Efficient sterilisation (or prohibition) of waste food fed to pigs
- Efficient control of rendering plants
- Structured serological surveillance targeted to breeding sows and boars
- Effective pig identification and recording system
- Effective hygiene measures protecting domestic pigs from contact with wild boar

### **Medical prophylaxis:**

Vaccination with modified live virus strains is effective in preventing losses in countries where classical swine fever is enzootic, but is unlikely, on its own, to eliminate infection entirely. In countries which are free of disease, or where eradication is in progress, vaccination is normally prohibited.