



Classical Swine Fever

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Etiology

Small enveloped RNA virus, the CSF virus (CSFV) belongs to the genus *Pestivirus* of the family *Flaviviridae*. Three major groups are defined according to the phylogenetic classification. In Europe, strains of group 2 currently predominate, especially subgroup 2.3 and in few cases subgroup 2.1, which correspond to an average moderate virulence.

Affected species (wildlife, domestic animals, humans)

Domestic pigs and Eurasian wild boar, both belonging to the species *Sus scrofa*.

Epidemiological characteristics and disease course

CSF is a viral disease transmitted by the oro-nasal route, either by direct and indirect contacts including the ingestion of contaminated meat products. The virus can also be transmitted from pregnant sows to foetuses. Humidity, pH and temperature influence virus survival, which may vary from several months in frozen meat, several weeks in feces, to weeks when kept in a protecting proteic medium (serum, meat) at room temperature (Moennig et al 2000). In natural populations, infection spreads along green corridors; motorways and rivers are partial barriers to virus spread (EFSA 2008, Rossi et al. 2010). The persistence of CSFV in wild boar populations is correlated with the number of individuals and the surface of forested areas or other suitable habitats. Possibly, a higher number of animals leads to a higher probability of chronic infections (Rossi et al. 2005, Kramer-Schadt et al 2009). Persistence can also depend on the virulence of CSF virus (see below).

Clinical signs

Due to a complex interaction between host and virus, the individual outcome of an infection is highly variable (Le Potier et al. 2006). Four forms are described for domestic pigs: acute lethal, chronic lethal, transient or prenatal. The acute lethal form is associated with anorexia, lethargy, conjunctivitis, respiratory signs, constipation or diarrhea, hemorrhages, and death within less than 3-4 weeks. This disease course is often observed in piglets but rarely in adults (with the moderate virulent strains). Neurological signs (like posterior paresis or unusual behavior) are often seen. In the chronic form, pigs may survive 2 to 3 months before dying and may develop non-specific clinical signs such as wasting and enteritis. Transiently infected animals have sub-clinical infection (loss of appetite) and recover within 1 to 3 weeks. Prenatal forms may occur with the trans-placental transmission of CSFV at 50-70 days of gestation, leading to the birth of persistently infected (and immune-tolerant) piglets. But CSFV infection seems harmless in wild boar as little mortality has been reported in the more recent outbreaks.

Gross lesions

SF lesions vary in severity and distribution depending on the virulence of the infectious strain: Petechiae in skin, larynx, urinary bladder and kidney. Swollen and hemorrhagic lymph nodes and tonsils. Infarction of the spleen, ulcers in caecum and colon. Abortion, malformed fetuses/neonates, or stillbirth.

Histological lesions

Generalised depletion of lymphoid tissues (thymus). Hemorrhagic and inflammatory lesions are less common or even absent despite the degeneration of endothelial cells. Necrotic and hemorrhagic lesions in the lymph nodes and the ileum. Leucopenia.

Differential diagnosis

Because CSF presents no pathognomic clinical signs or lesions, laboratory diagnosis is required to differentiate this hemorrhagic syndrome from other diseases such as African swine fever, Porcine Reproductive and Respiratory Syndrome, Porcine Multisystemic Wasting Syndrome, or even coumarin poisoning.

Criteria for diagnosis

Wasting, skin necrosis, or clustered dead carcasses, unusual behavior (neurological signs difficult to observe in the wild).

Recommended diagnostic method(s) and preferred samples (incl. recommended amount and appropriate storage)

Virological investigation: Samples of tonsils, spleen or lymph nodes (mandibular, mesenteric or ileo-caecal). RT-PCR for genome detection can be used for initial detection then virus isolation for confirmation and identification of the isolate. Samples can be kept at 4°C for one week or -70°C before analysis, 1 to 10 gr are sufficient.

Serological investigation: Serum. ELISA is used for CSF antibody detection, then virus neutralization test for differential diagnosis with other pestiviruses as confirmatory test. Serum samples must be kept at 4°C (1 week) or at -20°C; 0,5 ml per animal are sufficient for ELISA but 1 to 2 ml is recommended if neutralisation tests need to be performed to differentiate CSFV from other pestiviruses (Border Disease virus or Bovine Viral Diarrhoea virus).

APHAEA protocol (for harmonization at large scale)

ELISA

Laboratories that can be contacted for diagnostic support

European reference laboratory for classical swine fever, TiHo, Hannover

<http://viro08.tiho-hannover.de/eg/index.html>

Recommended literature

- EFSA. 2008. Scientific report: Control and eradication of classic swine fever in wild boar. Annex to the *EFSA Journal* 932:1-18.
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- Kramer-Schadt S, Fernandez N, Eisinger D, Grimm V, Thulke HH. 2009. Individual variation in infectiousness explains long-term disease persistence in wildlife populations. *OIKOS* 118:199-208.
- Moennig V, Floegel-Niesmann G, Greiser-Wilke I. 2003. Clinical signs and epidemiology of classical swine fever: A review of a new knowledge. *The Veterinary Journal* 165:11-20.
- Rossi S, Pol F, Forot B, Masse-Provin N, Rigaux S, Bronner A, Le Potier MF. 2010. Preventive vaccination contributes to control classical swine fever in wild boar (*Sus scrofa* sp.). *Veterinary Microbiology* 142:99–107.