Porcine Rubulavirus Infection

Iowa State University Center for Food Security and Public Health
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La-Piedad-Michoacan Paramyxovirus Infection, Blue Eye Disease

Importance
Porcine rubulavirus infection or “blue eye” disease is an emerging disease first seen in La Piedad, Michoacan, Mexico and the neighboring states of Jalisco and Guanajuato in 1980. It is characterized by encephalitis and respiratory disease in piglets, reproductive failure in adult pigs, and occasional corneal opacity in all ages.

Etiology
Blue eye disease is caused by the porcine rubulavirus, which is also called the La-Piedad-Michoacan paramyxovirus (LPMV). This virus, which was first isolated in Mexico in the early 1980s, belongs to the genus Rubulavirus and family Paramyxoviridae. Only one serotype is known.

Species Affected
Pigs are the only known host species.

Geographic Distribution
Blue eye disease has been reported only from Mexico; however, closely related paramyxoviruses of pigs have been found in other countries including Australia, Canada, Japan, and Israel.

Transmission
Infections seem to be spread mainly by the respiratory route. A large amount of infectious virus has also been found in the urine. Vertical transmission occurs in utero.

Incubation Period
In experimental studies, symptoms appeared 3 to 5 days after intranasal inoculation of piglets.

Clinical Signs
In 2 to 21 day old suckling pigs, blue eye disease is characterized by encephalitis, pneumonia, and corneal opacity. Typically, the disease begins with the sudden onset of fever, arched back, and prostration or depression. These symptoms are followed by progressive neurologic disease with weakness, ataxia, muscle tremors, abnormal posture, and rigidity mainly in the hind legs. Some piglets are hyperexcitable; they may squeal and make paddling movements when they are handled. Approximately 1-10% of the piglets develop unilateral or bilateral corneal opacity, which usually regresses spontaneously. Other symptoms may include conjunctivitis, apparent blindness, nystagmus, constipation, and diarrhea. Affected piglets often die. The first piglets usually die within 48 hours of the onset of clinical signs; later, deaths are seen after 4 to 6 days of illness.

Weaned pigs more than 30 days old usually have transient, moderate symptoms that may include anorexia, fever, coughing, sneezing, and occasional corneal opacity. Neurologic signs are rare in this age group, but occasional depression, ataxia, circling or swaying of the head may be seen. On some poorly managed farms, a syndrome consisting of severe neurologic signs with a 20% mortality rate has been reported in 15-45 kg fattening pigs. On these farms, as many as 30% of the pigs may also develop corneal opacity.

Non-fatal reproductive failure is seen in older pigs. The symptoms include decreased conception rates, abortions, increased stillbirths and mummified fetuses in sows, and epididymitis, orchitis, and reduced semen quality in boars. Some animals may also have corneal opacity or mild anorexia.

Post Mortem Lesions
The typical lesions in suckling pigs are interstitial pneumonia and non-suppurative encephalomyelitis. Gross lesions may include signs of mild pneumonia (particularly at the ventral tips of the cranial lung lobes), congestion in the brain, and conjunctivitis and chemosis in the eye. The stomach may be mildly distended with milk, and the urinary bladder with urine. The peritoneal cavity sometimes contains a small amount of fluid with fibrin. The histopathologic lesions includes non-suppurative
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Diagnosis

Clinical
Porcine rubulavirus infection should be suspected in an outbreak characterized by neurologic and respiratory disease in young piglets, reproductive failure in adult pigs, and corneal opacity in all ages.

Differential diagnosis
The differential diagnosis includes hemagglutinating encephalomyelitis virus infection and pseudorabies.

Laboratory tests
Serologic tests include hemagglutination inhibition, virus neutralization, indirect immunofluorescence, and enzyme-linked immunosorbent (ELISA) assays. All of the serologic tests detect seroconversion by the 8th day after infection.

The porcine rubulavirus can be isolated in pig kidney cell line (PK-15) cultures or chick embryos. Other pig cell lines and primary cultures, as well as baby hamster kidney cells (BHK 21) and Vero cell lines, are also susceptible. A rapid diagnostic test, which uses immunostaining to detect viral antigens in impression smears, is also available.

Samples to collect
Before collecting or sending any samples from animals with a suspected foreign animal disease, the proper authorities should be contacted. Samples should only be sent under secure conditions and to authorized laboratories to prevent the spread of the disease.

Serum should be collected for serology. In piglets, the porcine rubulavirus can be recovered consistently from the brain and tonsil, and sometimes from the lung, blood, spleen, liver, kidney, retropharyngeal lymph nodes, and nasal turbinates. It has also been found in various tissues of experimentally infected gilts including the lung, tonsils, ovary, placenta, uterus, and lymph nodes. The rapid immunostaining test uses lung, midbrain, or olfactory bulb tissue samples.

Recommended actions if porcine rubulavirus infection is suspected

Notification of authorities
Porcine rubulavirus infection must be reported immediately to state or federal authorities upon diagnosis or suspicion of the disease.

Federal: Area Veterinarians in Charge (AVIC):
www.aphis.usda.gov/animal_health/area_offices/
State Veterinarians:
www.usaha.org/Portals/6/StateAnimalHealthOfficials.pdf

Quarantine and disinfection
The porcine rubulavirus is contagious, and quarantine is necessary. Its disinfectant susceptibility has not been published; however, the related Newcastle disease virus,
which also belongs to the genus *Rubulavirus*, is inactivated by formalin, phenol, or acid pH.

**Public Health**

Human infections have not been reported.

**Internet Resources**

World Organization for Animal Health (OIE)

[http://www.oie.int](http://www.oie.int)

**References**


* Link defunct as of 2012