Swine Influenza Virus

Gordon D. Spronk

Pipestone Veterinary Clinic, 1300 S Highway 75, Box 188, Pipestone, MN USA 56164-0188
Email: gdspronk@pipevet.com

▪ Introduction

Swine Influenza Virus (SIV) is a viral infection in swine that is common throughout the world. It is a common cause of respiratory disease in pigs. Prior to 1998, SIV in pigs in the United States was caused by H1N1 SIV. In late 1998, an Eastern USA swine herd with clinical symptoms of SIV was confirmed with H3N2 SIV isolate. Since that time numerous swine herds across the US have been typed as H3N2 SIV.

▪ Etiology

Swine influenza virus is an orthomyxovirus. This type of virus is divided into three groups; type A, type B or type C. Only type A viruses infect pigs. Type A viruses are further divided into subtypes based on their hemaglutinin (H) and neuraminidases (N). There are 15 hemaglutinins (H) and 9 neuramindases (N) that have been identified in humans, animals and birds. Because it is an RNA virus, antigenic drift can occur as genetic material is exchanged between viruses.

▪ Pathogenesis

SIV generally only replicates in the respiratory tract of the pig. The primary area of infection is the airways of the respiratory tract. Immunity develops rapidly and is detectable in less than one-week post infection.

▪ Epidemiology

There are two common forms of expression of the disease in swine herds: endemic or epidemic. Sow herds with endemic SIV will have sporadic abortions (due to high fever) and low conception rates that are erroneously recorded as “return to heat” events that may actually be first and second trimester abortions. Aborting sows are usually off feed for 1 to 3 days and have a fever of up to 105 F (41 C).

Epidemic SIV is readily apparent in all age groups. The onset of the disease is dramatic. It is not uncommon for herd managers to note that animals were normal the previous day to find very sick animals presented the next morning upon entry into the barn. In sow herds that are naïve to SIV, abortions will be widespread, with up to 5% to 10% abortion rates in the sow herd. One point of differentiation between SIV and PRRS is that the abortion storm of SIV will pass in less than 2 weeks, while PRRS abortion storms typically last longer. A typical SIV abortion storm will sweep through a sow herd and be very dramatic. It will be characterized by high fevers, sows off feed, abortions, coughing and death.

The epidemic version of the disease has a seasonal cadence, peaking in the late fall and winter months in the Midwest USA, due most likely to the colder temperatures and lower ventilation rates. Most commonly, chilling of the pigs is the triggering event of the disease explosion.

Most experts agree that the prevalence of H3N2 and H1N1 in infected swine in the US is similar to Europe, with a slightly higher prevalence of H1N1 (60% vs. 40%).

Risk of transmission of SIV from pigs to humans of either type of SIV is believed to be minimal for the strains of SIV circulating in pigs in the US at this time. Most experts believe that the human population has immunity against the human strains of H3N2, which provides solid immunity against the SIV currently circulating in the US swine population.

▪ Clinical Signs

Pigs infected with H1N1 cannot be differentiated from pigs infected with H3N2 based on clinical signs, as they are similar in both infections. While initially it appeared that H3N2 infections were more severe than H1N1, recently that has subsided and it appears to be impossible to predict which type of SIV infection you are dealing with based on clinical signs.

Pigs with SIV infection show a variety of clinical signs, which include coughing, nasal discharge, sneezing, depression, lethargy, laboured breathing, and fever.

Reproductive performance is impaired in both male and female swine. Boars will have decreased semen quality and output and pregnant females may abort or have delayed return to service. Lactating sows may have reduced milk production.

▪ Diagnosis

Swine influenza virus diagnosis may be made based on clinical signs, gross necropsy lesions or diagnostic tests to detect live virus or antibodies to SIV. Type A viruses share a common protein, meaning that H1N1 and H3N2 may cross-react on some tests.

The best tissue sample for virus isolation is a fresh lung from a pig with acute clinical signs of SIV. It is also possible to isolate SIV from nasal swabs taken from sick pigs with SIV.

Serum samples are also commonly used to detect the presence of virus using IFA, ELISA or PCR.

▪ Treatment/Prevention/Control

Treatment for SIV infection is based on supportive therapy. Commonly used protocols include antibiotic therapy to prevent bacterial infections, and medication to lower body temperature.

Prevention is based on biosecurity and good management practices to reduce the herd to the risk of exposure to SIV. Most procedures would include limiting the herd to exposure to people and vehicle traffic. Proper cleaning and disinfecting of trucks and vehicles that transport any pigs and quarantine of any new animal introductions to the herd is required.

Due to antigenic differences between H1N1 and H3N2, vaccines containing H1N1 SIV are not protective against H3N2 infections. New vaccines will be bivalent, containing both H1N1and H3N2

▪ References:

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