

## *Streptococcus Suis* Disease in Pigs

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### HERD HEALTH

*Streptococcus suis* infection is a significant disease in intensive, indoor swine operations. *Strep suis* is now the most common cause of meningitis in pigs submitted to veterinary diagnostic laboratories. Furthermore, there has been a marked increase in *Strep suis* cases in nursery pigs from herds that have experienced an outbreak of the Porcine Reproductive and Respiratory Syndrome (PRRS). *Strep suis* is a bacterium living in the tonsils of most pigs and capable of causing disease in the brain (meningitis) and other organs (septicemia). While *Strep suis* is most often associated with meningitis, other manifestations caused by *Strep suis* include polyserositis, arthritis, valvular endocarditis, myocarditis, pericarditis and abortion. It is also considered a secondary agent of pneumonia. There are several types of *Strep suis*. In North America, Types 2 and 3, followed by Types 1/2, 7, and 8 are most prevalent, but types may slightly vary depending on location.

### Clinical Signs

Although pigs from birth to adult may be affected, *Strep suis* disease outbreaks occur most frequently in recently weaned pigs. Typically, meningitis is seen in the post-weaning period. It may involve from 1% to 5% of the herd. Disease may appear as sudden deaths, or meningitis may develop as convulsions and subsequent death in pigs in the first three weeks post-weaning (meningitis). Often, pigs are found dead without having shown clinical signs of impending disease. Usually, however, pigs with *Strep suis* meningitis go through a progression of: loss of appetite, reddening of skin, fever, depression, loss of balance, lameness, paralysis, paddling, shaking and convulsing. Blindness and deafness may occur. Septicemia and arthritis in the absence of meningitis are less striking and go sometimes unrecognized. The outbreak may be brought on by stress such as mixing, moving, weighing, vaccinating and weather changes which affect the ventilation and heating of buildings.

Disease is also common in breeding herds. Some of these herds experienced a drop in farrowing rate from 85% to approximately 70% over a three month period. *Strep suis* 2 could be cultured from stillborn fetuses as well as from uteri of infected sows. Pneumonias due to *Strep suis* are most common in 2 to 4 week old pigs, but pneumonias occur in the growing-finishing period as well. *Strep* is not a primary cause of pneumonia, so it is quite often associated with other organisms such as *Pasteurella multocida*, *Actinobacillus* (*Haemophilus*) *pleuropneumoniae*, or swine influenza virus. It has been demonstrated that irritation of the nasal cavities increases clinical signs of *S. suis* disease. In fact, a pre-infection with *Bordetella bronchiseptica*

(and even a pre-treatment with acetic acid) can increase the virulence of a *S. suis* strain. It has been shown that animals infected with *Mycoplasma hyorhinis* are more susceptible to *S. suis* infection. PRRS virus infection predisposes pigs to secondary bacterial diseases. *Strep suis* infection is predominant among these secondary bacterial diseases after PRRS outbreaks. However, some PRRS free herds can be also affected by outbreaks of *S. suis*.

## Epidemiology

*Strep suis* may be introduced into new herds by healthy, carrier pigs which harbor the organism in their tonsils or nasal passages. However, clinical cases are not always due to the introduction of new strains. In fact, virulent strains are sometimes already present in the herd for a long period of time in the absence of clinical signs. Stressing factors and/or concomitant diseases may trigger the disease. The introduction of healthy carrier pigs (breeding gilts and boars, or weaners) into non-infected herds usually results in the subsequent appearance of disease in weaners and/or growing pigs in recipient herds. Carrier gilts may spread virulent *Strep suis* organisms to their piglets when introduced into an uninfected herd. Piglets carry the organisms into the nursery, infecting other pigs. *Strep suis* affects pigs of all ages, but most cases occur between 3 and 12 weeks of age and especially after weaned pigs are mixed. Usually less than 5% of weaners are affected if appropriate antibiotic treatment is applied. English researchers have found that breeding stock can carry *Strep suis* in their tonsils for at least 512 days. There is no test to detect the infective (virulent) or carrier state in breeding stock. Medication does not eliminate the carrier state. The common method of spreading *Strep suis* between herds is through the introduction of carrier pigs; flies, and dead carcasses may also transport the bacterium. Carcasses of dead pigs can be a source of the organism. Properly dispose of infected carcasses by burning, burial or removal from the premises.

## Diagnosis

Make a definitive diagnosis after the *Strep suis* bacterium is isolated and typed from diseased organs. Clinical signs and post-mortem findings are helpful, but not specific. One of the best ways to obtain a definitive diagnosis is to culture tissues (depending on clinical signs: brain, joints, lungs, spleen, etc.) from affected or dead pigs. An antibacterial susceptibility test performed on organisms isolated from an affected, untreated pig identifies the most effective treatment. Serotyping should be done on isolated colonies to establish the importance of a specific serotype in a herd.

## Treatment and Control

Prior to learning the antibacterial susceptibility of the strep organism, affected piglets may be treated individually with injections of penicillin or ampicillin, and given supportive nursing care. Early treatment prevents death and may result in complete recovery. Generally streptococcal organisms are resistant to the tetracyclines. If the pig is down or convulsing, tranquilizers, anti-inflammatory drugs and fluids may be used. The affected pig should be removed from the pen, since it these animals may shed high amounts of bacteria, infecting other animals in the same pen. Water and/or electrolytes may be given orally or rectally. Give fluids at the rate of 12 ml/kg body weight (5 ml/lb). The affected pig should be kept comfortable, warm and propped up on its sternum. Typically, tetracyclines are ineffective for most isolates. Treatments aimed at the rest of the group must be considered. Injection of the whole group with penicillin, ampicillin or another antibiotic to which the strep is susceptible may be of value. This is especially true if others are affected, or history shows the chances for that are good. Alteration of management to minimize stress from overcrowding, poor ventilation and drafts, mixing and moving pigs is a key factor in some control. Strategic antibiotic feed medication, prior to known periods of heightened risk is beneficial but often results in shifting the expression of clinical cases to later in the production cycle. If the economic effects of the disease warrant it, depopulation and restocking with "clean" stock may be the only effective means of control. Since there are no tools to monitor the presence of infective (virulent), the absence of clinical endemic disease in the restocking herd may be the only criterion to be taken into consideration. Practical preventive programs include the use of bacterins (commercial or autogenous) in herds endemically and clinically affected by *Strep suis*. Protection of these bacterins is specific for the type of *Strep suis* present in the vaccine (so, it is important to serotype the strains recovered from diseased pigs). Failures have been observed with commercial bacterins (that usually includes

type 2 only), and may be due to other types of streptococcus. Autogenous bacterins (with the strain isolated in the herd) may also be used. However, both commercial and autogenous bacterins do not have a high rate of success. The cause(s) of failure are not so far known. Solid immunity is developed by live virulent organisms. Less immunity is demonstrated by killed organisms. However, there is no live vaccine available. To avoid introduction of *Strep suis* in uninfected herds, ask the source of new stock whether it is a problem in the herd. Have your veterinarian talk with the veterinarian in charge of that herd. Artificial insemination, embryo transfer or C sections with cross-fostering can be used to bring genetics from infected to non-infected herds.

## Monitoring herds

Monitoring herds for the presence or absence of *Strep suis* presents a difficult problem. Serological tests cross react and they are of no value. Collecting tonsillar cultures and checking for the presence of disease-producing strains of streptococcus is still challenging, since the techniques are difficult to accomplish and generally more suited to research purposes than for practical use as a monitoring method. There is an extreme amount of variation in the virulence of streptococcus between herds. Some may be present but cause no problem, others may cause severe problems. Complete eradication or elimination of infective (virulent strains) from a herd cannot be done by Specific Pathogen Free (SPF) techniques or Medicated Early Weaning (MEW). In fact, piglets are colonized by *Strep suis* during farrowing. Medication of the sow and removal of piglets from the sow during the first week after birth may partially control clinical cases without eradicating the streptococcus. The piglets are then reared in clean quarters apart from animals in the rest of the herd, and they are provided with feed containing appropriate medication. Mass medication, which does not include offspring segregation at an early age, does not eliminate the organism from a herd.

## Zoonotic *Strep suis* (Infection in Humans)

So far, 35 different types of *Strep suis* have been identified. As mentioned above, some types of *Strep suis* also affect Humans (mainly serotypes 2 and 14), producing septicemia, meningitis and septic shock. Meat industry workers are at greatest risk, but farmers, veterinarians, food preparers and anyone else who handles uncooked pork or is in contact with live and mainly, ill pigs may also be exposed. Butchers and others become infected through cuts and abrasions while handling and cutting pig carcasses. Human cases have been reported in almost all countries with an important pork industry, including USA and Canada. The disease may manifest itself as a "flu-like" disease followed by meningitis. Sixty percent of the human cases that recover have permanent hearing loss.

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