Actinobacillus suis septicemia: An emerging disease in high-health herds

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Actinobacillus suis infection in swine has generally been associated with septicemia and death in suckling and recently weaned pigs.[1–3] Several pigs in one or more litters are usually affected.[2,3] The view that *A. suis* septicemia is principally a disease of young pigs is supported by retrospective studies which indicate that 87% of infected pigs are between 2 and 28 days of age.[1]

However, the perception of *A. suis* as a swine pathogen may need to be expanded as swine production systems continue to evolve. The proliferation of high-health herds has apparently been accompanied by an increase in the incidence of *A. suis*-associated disease.[1,4,5] Reports indicate that outbreaks of *A. suis* septicemia are more common in high-health status herds, especially during the "startup" phase of operation.[3] Although suckling and recently weaned pigs continue to be the most commonly afflicted group, syndromes involving grow-finish and adult pigs have been recognized in high-health herds.[1,4–6]

Three syndromes are currently recognized in association with *A. suis* infection in swine:

Suckling and recently weaned pigs

A. suis septicemia in young pigs typically affects pigs between 2 days to 4 weeks of age.[1–3] Multiple animals in one or more litters are generally affected.[2,3] Pigs observed during the terminal phase of the disease pant, are generally febrile, and exhibit terminal cyanosis.[2,3] However, prior clinical signs are seldom observed. Most pigs with *A. suis* septicemia are simply found dead.

The most striking gross lesion in young pigs with *A. suis* septicemia is petechial to ecchymotic hemorrhages in multiple organs, including the lung, kidney, heart, liver, spleen, skin, and intestines.[2] Serous to serofibrinous exudates are generally present in the thoracic and abdominal cavities.[2] Histologic lesions consist of foci of necrosis in multiple organs associated with bacterial thromboemboli. These changes indicate a bacterial septicemia.

Grow-finish pigs

Outbreaks of *A. suis* septicemia in grow-finish pigs typically involve high-health herds.[3,5] Pigs may exhibit a cough and fever. As with young pigs, sudden death is often the most common presenting sign.[3,5,6]

The most remarkable gross lesion is generally a hemorrhagic and necrotizing pneumonia.[3,6] Additional lesions include petechial hemorrhages on the serosal surfaces of abdominal and thoracic viscera and a conspicuous fibrinous peritoneal exudate.

The character of the lung lesions (hemorrhage and necrosis) may be confused with *Actinobacillus pleuropneumoniae* infection (APP). *Actinobacillus pleuropneumoniae* infection typically causes a hemorrhagic and necrotizing pneumonia involving the dorsal portion of the diaphragmatic lung lobes, particularly the region of the hilus.[7] Because the pulmonary changes with *A. suis* infection are the result of a septicemia, the distribution is often random and is unlikely to involve the regions typically affected with APP. The overall spectrum of gross lesions with *A. suis* infection (fibrinous peritonitis, serosal petechia, random hemorrhagic and necrotizing pneumonia) is more suggestive of a septic process than of APP.

Adults

Again, high-health status herds are most commonly involved. Animals may exhibit lethargy, anorexia, fever, and red, rhomboid skin lesions.[3,4] Occasional abortions may be observed. Adults may die as a result of septicemia. Gross lesions in these cases consist of multifocal petechial hemorrhages, serofibrinous exudates in the thoracic and abdominal cavities, and occasionally small foci of hepatic necrosis. *Actinobacillus suis* septicemia in adult pigs, particularly when skin lesions are present, may be confused with erysipelas.[3,4]

Diagnosis

It is important to differentiate *A. suis* septicemia from other diseases that may present with similar gross lesions. *Escherichia coli* septicemia in neonates may resemble the gross changes observed with *A. suis* infection, and even experienced clinicians have confused the lesions of *A. suis* septicemia with APP in grow-finish pigs and erysipelas in adults. Because of these considerations, culture confirmation is essential. The lung is often severely involved and is generally a good source of the organism.[2]

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Diagnostic notes are not peer-reviewed

Because this is a septic condition, culture of liver, spleen, and kidney is also generally rewarding.[2]

A diagnosis of *A. suis* septicemia can generally be confirmed by submitting fresh and fixed lung, liver, kidney, and spleen (and skin if cutaneous lesions are present) to a diagnostic laboratory. The diagnosis is verified by isolating a heavy growth of the organism from multiple tissues and observing histologic lesions consistent with a bacterial septicemia. Microscopic changes in the spleen, liver, and occasionally kidney consist of foci of necrosis associated with intravascular colonies of bacteria. Pulmonary lesions consist of hemorrhage and necrosis, again associated with intravascular colonies of bacteria. Lack of a significant inflammatory exudate helps to differentiate pulmonary lesions from those observed with APP.

Serology is of limited diagnostic value because antibodies to *A. suis* cross-react with those of APP.[3]

Treatment and control

Actinobacillus suis is sensitive to most antibiotics. Though reports state that penicillin and tetracycline are generally effective, experience at this laboratory indicates that the organism may be resistent to a variety of antibiotics and a sensitivity pattern may be of value in determining an appropriate treatment strategy.[1–3] Because outbreaks in young pigs are often acute and unpredictable, treatment may be too late to be beneficial. In older pigs, water or feed medication with oxytetracycline, streptomycin, or amoxicillin has been effective in controlling outbreaks.[1,6] Autogenous bacterins have been used with some apparant success in herds with repeated outbreaks.[2,6]

The emerging significance of *A. suis* as a swine pathogen appears to be associated with a shift towards high-health production systems. Though young pigs continue to be most commonly affected, outbreaks of *A. suis*-associated disease may occur in grow-finish and adult animals in minimal disease herds. Because the gross lesions in older swine with *A. suis* septicemia may resemble other diseases such as APP and erysipelas, laboratory confirmation is essential to establish a definitive diagnosis.

References

1. Sanford SE, Josephson GKA, Rehmtulla AJ, Tilker AME. *Actinobacillus suis* infection in pigs in southwestern Ontario. *Can Vet J.* 1990;31:443–447.

2. Sanford SE. *Actinobacillus suis*. In: Leman AD, Straw B, Glock RD, Mengeling WL, D'Allaire S, Taylor DJ. *Diseases of Swine*. 7th ed. Ames, IA: Iowa State University Press. 1992; 633–636.

3. Sanford SE. *Actinobacillus suis:* An overview of an emerging disease. *Proc Am Assoc Swine Prac.* 1995;26:425–428.

4. Miniats OP, Spinato MT, Sanford SE. *Actinobacillus suis* septicemia in mature swine: Two outbreaks resembling erysipelas. *Can Vet J.* 1989;30:943–947.

5. Odin M, Helie P. *Actinobacillus suis* in swine in southwestern Quebec. *Can Vet J.* 1993;34:634.

6. Christenson C. Clinical significance of *Actinobacillus suis*. *Proc Am Assoc Swine Prac.* 1990;21:267–270.

7. Dungworth DL. *Haemophilus* and *Haemophilus*-like infections. In: Jubb KVF, Kennedy PC, Palmer N. *Pathology of Domestic Animals.* 4th ed. San Diego, CA: Academic Press, Inc. 1993;639–640.