Hemophilus Pleuropneumonia– Pork Industry Handbook
Michigan State University Extension Service
David J. Larson, Iowa State University; James H. Bailey, South Dakota State University; James McKean, Iowa State University; Roy Schultz, Avoca, Iowa
Issued May 1985
2 pages

pork industry handbook

COOPERATIVE EXTENSION SERVICE • MICHIGAN STATE UNIVERSITY

Hemophilus Pleuropneumonia

Authors
David J. Larson, Iowa State University
James H. Bailey, South Dakota State University
James McKean, Iowa State University
Roy Schultz, Avoca, Iowa

Reviewers
Kenneth B. Meyer, Purdue University
Martel Lee Smith, Shelley, Idaho

Hemophilus Pleuropneumonia (HPP) is a severe, often fatal pneumonia of growing-finishing swine caused by the bacteria *Haemophilus pleuropneumoniae (H. parahemolyticus).* This problem was first recognized in the US 20 years ago but had not gained prominence until recent years. The Iowa State University Veterinary Diagnostic Laboratory reported only 2 cases in 1976, but had almost 100 confirmed cases in 1980. Diagnostic laboratories from other swine raising states have also reported significant increases in numbers of HPP diagnoses over this time period.

This disease is worldwide in distribution causing significant economic losses to the swine industries of many countries including Switzerland, Canada, Mexico, Denmark, Brazil, and Germany. Each has experienced a sudden rise in occurrences over the last decade. Serotypes involved differ, but the clinical picture is similar in these countries.

Five distinctive serotypes of *Haemophilus pleuropneumoniae* have been identified in the world. Others may be found or existing groups further fragmented as research continues. Serotypes 1, 3, and 5 have been identified in samples from seven midwestern states. Serotype 5 was most prominent in a number of isolates and in apparent disease potential followed by serotype 1. Serotype 3 appears less capable of causing clinical disease, while serotype 2 has not been confirmed as being present in the US. Only one isolate in the US (from California) has been identified as serotype 4. There may be some cross-reactions between serotypes; but for maximum protection it appears that vaccines must contain the causative serotype. Because of these differences in the clinical picture and the need to produce specific protection for different serotypes, better incidence data on the various serotypes are needed.

Clinical signs

The incubation period can be as short as 8-12 hours. Reports from Denmark indicate that uninfected pigs held overnight at a slaughter plant with infected pigs can develop lesions before slaughter the next morning. Pigs of all ages are susceptible, but most commonly affected are those from 40 lbs. to market weight. Sudden death of apparently healthy pigs is frequently the first sign. This sudden death generally follows a stressful period(i.e. moving, mixing, rapid weather changes). Apparently healthy pigs may develop labored breathing and die within minutes following as small a stress as movement to a new pen within the building. Bleeding from the nose at death may be seen in some pigs but is not a consistent sign. In less severe cases, infected pigs may have abdominal breathing (thumping), high fever (104-107° F), depression, and reluctance to move. Coughing is apparent but is not a major clinical sign in most cases. Pigs with these milder signs may die although many will survive. These survivors may have severely damaged lungs and be poor-doing pigs. Because the organisms are spread through the air by aerosol droplets, the number affected in a group can reach 100% with death loss approaching 20-40% or more if immediate and effective treatment is not instituted.

Diagnosis

A definitive diagnosis may require culture of *Haemophilus pleuropneumoniae* from a typical lesion; however, a tentative diagnosis can be made based on history, age of affected pigs, sudden death, respiratory distress, and typical gross lesions. Lung samples should be cultured immediately after death for *Haemophilus pleuropneumoniae*, but if that is not possible, samples for later culture can be stored temporarily in a 50%

Reprinted 5:85-3M-UP-KMF, Price 10 cents. Single copy free to Michigan residents.
19.461.09 O-15476

glycerol/water solution for submission to a diagnostic laboratory. Culture results are particularly helpful in classifying mixed pneumonia infections. All growing-finishing pigs which die should be necropsied by a veterinarian to develop a disease profile in the herd. This practice can detect potential problems before they become major losses. Based on these findings, successful therapeutic programs can be developed.

Lesions

Lesion development progresses from a hemorrhagic edema-filled lung with small amounts of overlaying fibrin in the acute stage, to lung abscesses and adhesion of the lungs to the chest cavity in the chronic case. The type of lesion observed will depend on length of development time before post mortem. Pasteurella, Mycoplasma and other airborne organisms generally have lesions in the lower anterior part of the lungs. *Haemophilus pleuropneumoniae* infections may occur in the same regions but commonly cause lesions in the upper lobes of the lung near the diaphragm. Circumscribed areas with a layer of fibrin covering the hemorrhagic lesion are typical. This fibrin can form extensive adhesions between the lung and chest wall. Post mortem lesions in pigs surviving *Haemophilus pleuropneumoniae* infections for longer than a few days will not have the red color of acute hemorrhage. Abscesses will form in the lung as the body defenses attempt to wall off the infection. These chronic encapsulated lesions still contain viable *Haemophilus pleuropneumoniae* organisms. Studies have shown that such chronically infected pigs can serve as *Haemophilus pleuropneumoniae* carriers for at least four months. Because of the poor blood supply to these abscesses, limited amounts of antibiotic can reach the bacteria through the blood stream. This makes treatment difficult unless antibiotic blood levels are very high.

The lesions described above are primarily Hemophilus pleuropneumonia lesions. In many pneumonic problems, multiple causes are found. Hemophilus may be active as a triggering agent to other respiratory problems and vice versa. In these cases, the typical lesions described above may be obscured or modified by other pneumonic lesions.

Therapy

In the acute outbreak of HPP, high levels of antibiotics in the blood are the most effective treatment. Dosages must be at the high end of their respective recommended treatment ranges for success. Procaine penicillin and long-acting oxytetracycline (LA-200) injectable are commonly used therapeutic agents in an acute outbreak until a specific antibiotic sensitivity test can be completed. Variation in antibiotic sensitivity patterns of *Hemophilus sp.* organisms makes antibiotic sensitivity testing important in selecting the most effective drug. Treatment of animals exhibiting clinical signs has not been uniformly successful because of the extent of lung damage before clinical signs develop. Therefore, it is recommended that all swine in a common air space be injected for several days to reduce initial losses. Treatment of both healthy and sick swine will usually result in a dramatic reduction of death losses.

Antibiotics that are added to feed or water do not reach the necessary blood levels to effectively stop an acute outbreak. However, drugs in water have been used as preventive measures following the initial injectable treatment. In addition to helping control *Hemophilus sp.*, they aid in controlling other potential respiratory pathogens that may be present in the swine lung. Use of corticosteroids and antihistamines has been suggested to improve treatment of the acute HPP outbreaks. These potent drugs should be used only under direct veterinary supervision since they could have harmful effects if used incorrectly.

Control and prevention

The carrier pig who has recovered from HPP is the major source of infection. The bacteria are fragile and do not live outside the pig for extended periods. They also appear to be specific to swine. Therefore, reservoirs of infection in other species are not thought to be important in the spread of this disease. The entry of infected animals into an uninfected herd poses the greatest danger of spread. Isolation and testing of new additions to the herd may be helpful. A complement fixation (CF) blood test has been developed to identify potential carriers of HPP. If HPP has not been diagnosed on the farm, a program of allowing only HPP-negative animals to enter may yield practical protection.

HPP is spread to uninfected swine by aerosol transmission. Groups of swine held in overcrowded, poorly ventilated buildings are more likely to have problems. Sudden weather changes and drafts can also increase the chances for an HPP outbreak. Once the bacteria are in the herd, environmental quality must be held at optimum levels. Failure to provide a quality environment may precipitate renewed HPP outbreaks in groups of pigs which have apparently recovered following treatment. It also greatly increases the probability that new additions to the environmental space will develop a clinical outbreak of HPP. Therefore, efforts to reduce overcrowding and to maintain good ventilation are very important. Reducing pig density, increasing ventilation rates or taking pigs out of a confinement building may help lower the number of death losses.

Autogenous HPP vaccines and a federally licensed vaccine containing four serotypes are available in the US. Vaccines for HPP have been used with variable success—from excellent to nil. *Haemophilus pleuropneumoniae* is apparently not a powerful antibody stimulant and available vaccines do not completely block infection or the development of carrier pigs. Timing of vaccination, selection of proper vaccine strain, concentration of bacteria per dose, and effective adjuvant to stimulate immune response are all very important for success. Several reports from Denmark indicate that vaccinating prior to *Haemophilus pleuropneumoniae* exposure can reduce both clinical signs and lesion development. However, vaccination after exposure may help precipitate a clinical disease problem. This has created a dilemma for farrow-finish operators where sows pass the bacteria to their suckling litters before vaccination can be accomplished.

The overall value of HPP vaccines to the swine industry remains to be seen. Vaccines will be a tool to reduce death losses and lesion development in some herds. Additional research work is needed to understand this disease—how it acts in the pigs, the best methods of producing and administering vaccines and methods of environment manipulation to prevent economic losses.

The increased occurrence, the severity of clinical signs and the losses experienced with Hemophilus pleuropneumonia make it an important and emerging problem. The need for new knowledge to attack this disease is great. Veterinarians are constantly looking for successful methods of handling this problem. They are in the best position to obtain a diagnosis and formulate a successful strategy based on an individual producer's needs and should be contacted when developing a preventative and treatment program for HPP.