EFFICACY OF A LONG-ACTING OXYTETRACYCLINE INJECTABLE AGAINST ARTIFICIAL AND NATURAL RESPIRATORY INFECTIONS IN PIGS

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The development of a long-acting oxytetracycline injectable formulation [Terramycin/LA[a] (TM/LA)] several years ago, led to extensive evaluations of this injectable for the prevention and treatment of respiratory disease in pigs. Under commercial pig production conditions, TM/LA was reported[1] to be highly effective as a treatment of pig respiratory disease, resulting in markedly reduced mortality and improved average daily body weight gains. The results of five U.S. therapeutic studies[2] involving naturally occurring swine pneumonia confirmed these earlier findings[1]. Using an induced Pasteurella multocida pneumonia model in pigs, Bentley and Farrington[3] found that a single intramuscular dose of TM/LA at 20 mg/kg body weight was highly effective as a treatment of induced pasteurella pneumonia.

This paper summarizes the results of twelve laboratory-induced respiratory disease pig experiments. Seven of these studies evaluated the prophylactic efficacy of TM/LA and the therapeutic efficacy of TM/LA was assessed in five experiments. The results of 37 clinical field trials (16 controlled, 21 non-controlled), in which TM/LA therapeutic efficacy against clinical outbreaks of respiratory disease in pigs maintained under commercial production conditions was determined, are also summarized in this paper.

Procedures

A. Induced Respiratory Disease Experiments - Pigs used in these experiments had not received any antibacterial agents for at least 14 days prior to the start of each experiment. Each pig was infected by endotracheal inoculation of a suspension of Pasteurella multocida [Serotypes A or B (MSU 7)][3].

1. Therapy - TM/LA treatments were administered after clinical disease (depression, dyspnea, febrile) was apparent about four hours post-infection. Clinical observations, such as degree of depression, body temperature, coughing, dyspnea, feed consumption and weight gain, were recorded daily starting three days before infecting and were continued until necropsy at seven days post-infection.

2. Prophylaxis - To determine TM/LA prophylactic efficacy, TM/LA injections were given the same day as the infecting inoculum and at various daily intervals up to 6 days prior to the infection time. Daily clinical observations recorded were the same as those described above for the therapy experiments, and were continued until necropsy at 7 to 10 days post-infection.

   At necropsy, lung samples, healthy and diseased, were obtained for bacteriological recovery of Pasteurella multocida in all studies.

B. Clinical Field Experiments - Sixteen controlled therapeutic clinical trials were conducted in 10 different countries with pigs raised under commercial production conditions. Six studies had positive control groups which received medications other than TM/LA and the remaining 10 trials included non-medicated control groups.

   Twenty-one clinical trials involving over 1800 pigs contained no control groups. These clinical evaluations were carried out in 10 different countries, 6 of which were different from those in which the controlled studies were conducted.

   In all field experiments, respiratory disease was diagnosed prior to treatment. Diagnosis was based on the typical clinical signs of respiratory disease such as coughing, sneezing, labored breathing, elevated body temperature and depression.

Results

A. Induced Respiratory Disease Experiments

1. Therapy - Therapeutic administration of TM/LA to pigs showing symptoms of induced Pasteurella pneumonia resulted in marked improvements over the nonmedicated control pigs in all criteria measured. TM/LA therapy reduced depression index, lung lesion scores and mortality compared to the control animals. The recovery of P. multocida from the lungs of TM/LA treated pigs was 5.0% compared to 59.4% for the control pigs. Average daily gain and feed consumption of TM/LA treated pigs were markedly superior to those of the nonmedicated pigs.

2. Prophylaxis - Administration of TM/LA from 0 to 6 days prior to endotracheal inoculation of P. multocida suspension to pigs prevented the onset of severe respiratory disease compared to the nonmedicated control pigs. Depression index, lung lesion score and mortality were all lower in TM/LA medicated pigs than in the control animals. Recovery of P. multocida from the lungs of TM/LA pigs was 39.2% compared to 96.4% for the nonmedicated animals. Prophylactic use of TM/LA also resulted in higher body weight gains and feed consumption than observed for the control animals.

B. Clinical Field Experiments - The results of 16 controlled field trials show that TM/LA was highly effective as a therapeutic agent against pig respiratory disease. Mortality of TM/LA treated pigs was 78.6% lower than the control pigs. Average daily gain and feed consumption of TM/LA pigs were, 56.3% and 31.6% respectively, higher than those of the nontreated pigs.

   A single treatment with TM/LA in 21 noncontrolled clinical trials proved to be very effective therapeutically against respiratory disease outbreaks. Pig mortality was less than 1.0% and 89.6% of the treated pigs fully recovered. Approximately 6.0% of the pigs did not recover and 2.5% required additional treatment. Cooperating investigators in 6 trials judged the response to TM/LA therapy to be good/very good in 95.3% of the treated cases.

Conclusions - Controlled investigations have shown that a single treatment with Terramycin/LA Injectable Solution was prophylactically and therapeutically effective against induced Pasteurella pneumonia in pigs. In a series of controlled and noncontrolled field clinical trials Terramycin/LA also proved to be very effective as a treatment for naturally occurring respiratory disease in growing pigs.

Selected References

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