Treatment of Experimental Pulmonary Pasteurellosis in Swine with Liquamycin/LA-200 and Liquamycin-50

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Pneumonia associated with Pasteurella multocida infection is an important cause of economic loss in swine production through its role in rhinitis and pneumonia (Farrington 1981). The naturally-occurring disease is complicated by other factors and strains of P. multocida recovered from these outbreaks will not induce the disease experimentally. Lack of a suitable experimental model has made study of pulmonary pasteurellosis in swine difficult. Bentley and Farrington (1980) recently reported a method for induction of pneumonia using the MSU7 strain of P. multocida, a type B strain originally isolated from a bison. In the study reported here two preparations of oxytetracycline were evaluated for treatment of pulmonary pasteurellosis in swine using the MSU7 strain in the experimental model reported by Bentley and Farrington.

Methods: Crossbred pigs were reared in isolation at Iowa State University. When approximately 6-7 weeks of age, clinical evaluation of all pigs and post mortem evaluation of randomly selected pigs revealed no evidence of respiratory disease. Pigs were randomly assigned to four groups of 10 each and housed in individual Smidley swine houses with slotted floor porches. A complete swine grower ration with no added antibacterial agents was given in self feeders.

Inoculum consisted of the MSU7 strain of P. multocida (Bentley and Farrington 1980) prepared for inoculation as described by the authors. Preliminary evaluation of the susceptibility of the pigs indicated the optimal dosage was '48 units'. This '48 unit' dose was given endotracheally. At 4 hr PI, temperatures of all pigs were taken to determine if a febrile reaction had developed and treatment was initiated. Pigs in groups 1 and 2 received placebo IM injections while pigs in groups 3 and 4 received 3 s.i.d. IM doses of 3 mg/lb of Liquamycin-50 and 1 IM dose of 9 mg/lb of Liquamycin/LA-200 respectively. Clinical appearance and feed consumption were determined daily. All pigs were necropsied 7 days post inoculation.

Results: Following inoculation with P. multocida, pigs in group 2 (nonmedicated) developed marked febrile responses and exhibited moderate to severe coughing, depression and dyspnea. Signs continued to be prominent at 24 hr, 72 hr and 7 days PI except for the febrile response which had returned to normal 7 days PI.

Pigs medicated with Liquamycin-50 (group 3) and Liquamycin/LA-200 (group 4) had significantly lower temperatures than pigs in group 2 at 24 hr PI and normal temperatures at 72 hr and 7 days PI. Depression scores and percent of pigs showing dyspnea in groups 3 and 4 were significantly lower than group 2 and did not differ from pigs in the uninoculated control group 1.

Average daily gain and average daily feed consumption were highest in control group 1 (Table 1). At necropsy, pigs in groups 1 and 3 had no gross lesions of pneumonia while 90% of pigs in group 2 and 40% of pigs in group 4 had pneumonia (Table 2). P. multocida was recovered from lungs of 9 of 9 pigs in group 2 but only 1 in group 4. The organism was not isolated from any site in pigs from groups 1 and 3. Two of the 10 pigs in group 2 died of acute pneumonia prior to necropsy at 7 days PI.

Table 1. Gain and Feed Consumption.

Group	Ave. Daily Gain (Kg)	Ave. Daily Feed Consumed (Kg)
1	1.103[a]	2.670
2	0.698[b]	1.646
3	0.788[b]	1.942
4	0.765[b]	2.143

[a,b]Means with different superscripts differ ($p<0.05$).

Table 2. Mortality and Lesions of Pneumonia at Necropsy.

Group	Mortality	No. Pigs with Pneumonia	Pleuritis and Pneumonia Severity Score
1	0/10	0/10	0.0
2	2/10	9/10	3.4
3	0/10	0/10	0.0
4	0/10	4/10	0.8

[a]Severity score based on a scale of 0 = normal to 4 = most severe.

Conclusions: Medication with Liquamycin-50 or Liquamycin/LA-200 resulted in a substantial reduction in clinical signs and severity of lesions resulting from infection with P. multocida. The dramatic therapeutic effect was effective also in preventing infection of the respiratory tract, improving feed consumption and gain and in preventing death loss. Under conditions used in this study, both compounds appear promising for use in treatment of naturally-occurring disease caused by P. multocida.

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