Efficacy of Tilmicosin Phosphate (Pulmotil Premix®) in Feed for the Treatment of a Clinical Outbreak of Actinobacillus Pleuropneumoniae Infection in Growing-Finishing Pigs

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ABSTRACT

The objectives of the study were to evaluate the field efficacy of Tilmicosin (Pulmotil premix®, Elanco Animal Health) administered in feed at 400 ppm, for the treatment of a clinical outbreak of an Actinobacillus pleuropneumoniae infection, and to compare the results with those of an injection therapy with long acting oxytetracycline (Terramycine LA®, Pfizer Animal Health) at 20mg/kg bodyweight. One hundred and forty seven pigs (n=147) housed in 12 pens were selected out of a pig unit with acute clinical respiratory disease. The pens were ranked according to the severity of clinical symptoms and blocked into pairs of 2. The tilmicosin group (T) received a medicated feed during the first 15 days of the trial period (medication period) and a non-medicated feed during the next 11 days. The control group (C) received no in-feed medication but whenever a pig of this C group showed some respiratory symptoms during the medication period it was injected intramuscularly with a long acting oxytetracycline (20 mg/kg). During the entire study period, ADG and FCR were significantly better for the T group than for the C group (P<0.01). The T group showed statistically better results over the C group for several measured clinical and performance parameters. Partially this can be attributed to the fact that all the pigs of the T group received medicated feed for 15 days whereas only the diseased pigs (39.5%) of the C group were injected with oxytetracycline.

1. INTRODUCTION

Actinobacillus pleuropneumoniae (A. pleuropneumoniae) is the etiologic agent of contagious pleuropneumonia, a disease that causes major economic losses in the pig industry (7). The morbidity can be as high as 100%, but usually varies from 30 to 50%, with a case fatality rate as high as 50%. Improvement of the ventilation system, the housing conditions and the management practices turn out to be very effective in reducing the risk for clinical outbreaks of porcine pleuropneumonia and in reducing the economic consequences of the disease (2, 3). Although these measures are very beneficial, some pig herds operating under intensive production conditions continue to encounter clinical outbreaks of pleuropneumonia in growing-finishing pigs. In these cases, additional interventions such as vaccination or the use of antimicrobials may be warranted. Tilmicosin is a semi-synthetic macrolide antibiotic with excellent in vitro activity for gram-positive bacteria and mycoplasma, but also for certain gram-negative bacteria such as Pasteurella multocida and A. pleuropneumoniae (1). The efficacy of this antibiotic against A. pleuropneumoniae has also been demonstrated in vivo, mainly in experimental studies or for the control or prevention of clinical outbreaks in commercial pig farms (4).

The objectives of the present study were to evaluate the field efficacy of Tilmicosin (Pulmotil premix®, Elanco Animal Health) administered in feed at 400ppm, for the treatment of a clinical outbreak of respiratory disease due to A. pleuropneumoniae infection, and to compare the results with these of an injection therapy with long acting oxytetracycline (Terramycine LA®, Pfizer Animal Health) at 20 mg/kg bodyweight.

2. MATERIALS AND METHODS

The trial was conducted in a commercial fattening pig herd with a history of clinical respiratory disease. In total, 347 pigs housed into 28 pens were present in the pig unit. Females and barrows were penned separately and fed ad libitum with a commercial feedmix. Prior to the start of the trial, all pigs in the unit were observed daily for the presence of clinical respiratory symptoms. These were evaluated based on a demeanour, a respiratory effort and a gauntness score. The trial was initiated when 10% of the pigs showed clinical respiratory symptoms, i.e. 2 weeks after the pigs were transferred to the fattening unit. Twelve pens (147 pigs) with the highest number of
diseased pigs were selected. Those pens were ranked according to the severity of clinical symptoms and blocked into pairs of 2. Within each block, the pens were randomly allocated to either treatment group or control group. The trial period of 26 days was divided into a 15 days medication period and an 11 days post-medication period. The tilmicosin (T) group (n=71) received a medicated feed containing 400ppm tilmicosin during the first 15 days, this corresponds to 16mg/kg bodyweight (6) and a blank feed during the next 11 days. The control (C) group (n=76) received a blank feed during the entire trial. Whenever a pig of the C group showed some respiratory symptoms in combination with a temperature ≥39.8 °C during the medication period, it was injected intramuscularly with long acting oxytetracycline (20 mg/kg bodyweight). A second injection was applied if the animal still complied with the injection criteria 48 hours after the first injection. Whenever pigs suffered respiratory symptoms 48 hours after the second injection, they were weighed and removed from the study for additional treatment. Because of ethical reasons, severely diseased pigs of the T group with a rectal temperature ≥39.8 °C during the medication period were also injected intramuscularly with the same dosage of long acting oxytetracycline (20 mg/kg bodyweight).

Both groups were compared by means of clinical and performance parameters. The proportion of sick pigs, of recovered pigs and the median time to recovery (in days) were compared during the medication period (D1-D15). The proportion of new respiratory disease cases, of removed pigs, the average daily gain (ADG) and the feed conversion ratio (FCR) were calculated for the entire study period (D1-D26).

The proportion of sick pigs, of new respiratory disease cases, of removed pigs and the proportion of recovered pigs were analyzed using logistic regression models. Fisher's exact tests were applied when the number of pigs in one of the response categories was too small. The median time to recovery, ADG and FCR were compared using analysis of variance. The statistical analyses were performed using SAS 6.12.

3. RESULTS

Based on clinical, pathological and bacteriological examinations, it appeared that the respiratory outbreak was due to an infection with *A. pleuropneumoniae* biotype 1 serotype 2. This serovar and almost all secondary bacteria found by bacteriological culture of the lung tissue of pigs necropsied, were sensitive to both antibiotics used. At the start of the medication period, the proportion of pigs with clinical respiratory symptoms was identical (21%) in both groups. From then onwards the number of sick pigs decreased in both groups, but the decrease was more pronounced in the T group as shown in figure 1.

![Fig 1. The proportion of sick pigs in the T and C group during the medication period (D1-D15)](image-url)
Table 1: Results of the clinical parameters in both groups during the medication (D1 – D15) and post-medication (D16 – D26) period

<table>
<thead>
<tr>
<th>Period</th>
<th>Parameter</th>
<th>T group</th>
<th>C group</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1-D15</td>
<td># of new disease cases (%)</td>
<td>2</td>
<td>23</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td></td>
<td># of removed pigs (%)</td>
<td>4</td>
<td>14</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td># of recovered pigs (%)</td>
<td>88</td>
<td>63</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>median time to recovery (days)</td>
<td>2</td>
<td>1</td>
<td>0.42</td>
</tr>
<tr>
<td>D16-D26</td>
<td># of new disease cases (%)</td>
<td>0</td>
<td>5</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td># of removed pigs* (%)</td>
<td>3</td>
<td>11</td>
<td>0.09</td>
</tr>
</tbody>
</table>

*: this parameter includes pigs that died, pigs that did not respond properly to the treatment, pigs with severe loss of body condition and pigs with other disease conditions

The results of the different clinical parameters in the T and C group during the medication period (D0-D15) and during the post-medication period (D16-D26) are presented in table 1.

During the medication period (D1-D15), the proportion of new disease cases was significantly lower in the T (2%) than in the C group (23%) (P<0.01). The percentages of pigs removed from the study during the medication and post medication period were not statistically different between the two groups. The percentage of pigs that recovered during the medication period and the median time to recovery were only numerically better in the T group than in the C group.

The results of the two performance parameters are displayed in table 2. During the entire study period (D1-D26), ADG was 555g in the T group and 393g in the C group (P<0.01) and FCR was 2.23 in the T group compared to 2.82 in the C group (P<0.01).

Table 2: Results of the performance parameters in both groups during the entire study period (D1-D26)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>T group</th>
<th>C group</th>
<th>Difference (T-C)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADG (g/day)</td>
<td>555</td>
<td>393</td>
<td>+162</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>FCR</td>
<td>2.23</td>
<td>2.82</td>
<td>-0.59</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

4. DISCUSSION AND CONCLUSION

The present study investigated the efficacy of tilmicosin phosphate administered in the feed at 400ppm for the treatment of a natural outbreak of pleuropneumonia in growing-finishing pigs. Different clinical and performance parameters were used to compare the efficacy to an injection therapy with long acting oxytetracycline at 20 mg/kg bodyweight. Previous studies showed that the use of tilmicosin in feed at the concentration of 200ppm and 400ppm was effective to prevent disease in an experimental *A. pleuropneumoniae* model (5). In the present study tilmicosin medicated feed at 400ppm was used therapeutically for 15 consecutive days.

The tilmicosin group showed statistically significant benefits over the control group for the two measured performance parameters ADG and FCR. There was a tendency in favor of the T group for all measured clinical parameters. The difference between both groups was most pronounced (P<0.01) with regard to the number of new disease cases, which is related to the infection pressure of *A. pleuropneumoniae* in those pig units (6).

In a sense, it was not expected that the difference in result between the two treatment groups would be that pronounced in this case of an acute pleuropneumonia outbreak because it is generally accepted that the time required for achieving therapeutic levels in the body is longer when an antimicrobial is administered per os than via injection.

Part of the better results for the T group may be attributed to the fact that all these pigs received medicated feed for 15 days whereas only the diseased (39.5%) pigs of the C group were injected with oxytetracycline. In addition, severely diseased pigs in the T group also benefited by an injection therapy. However, this number of pigs was low (5.5%) and the criteria to be eligible for injection were much higher for pigs in the T group than for pigs in the C group, as only severely diseased pigs were injected in the T group whereas pigs with only mild respiratory symptoms in the C group were injected.

The trial period lasted only for 26 days and therefore no conclusions can be drawn for the entire fattening period. However the better performance of pigs in the T group may result in a shorter fattening period.
5. ACKNOWLEDGEMENT

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6. REFERENCES