

DEVELOPMENT AND VALIDATION OF A PASTEURELLA MULTOCIDA CHALLENGE MODEL IN PIGS

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Introduction

Pasteurella multocida is an important veterinary and opportunistic human pathogen with a diverse and complex structure, host range and virulence. It causes pneumonic and systemic disease in livestock, cholera in poultry, atrophic rhinitis in pigs and infections in humans from dog and cat bites. The clinical features of pneumonic disease include sudden dullness, pyrexia (above 40.5°C), anorexia and laboured breathing often accompanied by adventitious respiratory sounds that may be heard on auscultation of the anterior pulmonary region. Piglets that recover remain dull and anorexic for a period after recovery, causing significant economic losses due to retarded growth rates. Development of a *P. multocida* challenge model would provide a platform to allow further research into methods of preventing or treating pneumonic disease in pigs.

Materials and Methods

A total of 30 piglets of 3.5 weeks of age were sourced from a commercial high health status pig farm. On arrival, the animals were weighed then allocated to three groups of eight and one of four (plus 2 spares) and placed in individual pens with each group housed in a separate pen / airspace. On Day 0 (4.5 weeks of age), the animals were weighed then the three groups of 8 were challenged with *P. multocida* at 2×10^9 cfu total in 10ml (Group 1), or 1×10^9 cfu/ml in 5ml (Groups 2 and 3). Each group was challenged with a different isolate by the intranasal challenge route. The group of four (Group 4) was administered 5ml of sterile growth medium by the same route.

Clinical observations were performed twice daily from Day -1 to Day 6. On Day 7 a final clinical observation was conducted and the animals were weighed, euthanased and the lungs were removed from each for gross pathological examination and scoring for lesion development. Lung tissue samples were also collected for bacteriology.

Results

Of the three *P. multocida* isolates tested, only isolate 1 produced clear clinical symptoms post challenge with increased rectal temperatures and abnormal respiration. In the other groups only sporadic abnormalities were observed which in many cases could be related to handling stress. In Figure 1, the group mean total clinical scores are shown.

The clinical results were backed up by group mean body weight gain (Figure 2) and group mean % lung damage (Figure 3) where Group 1 had reduced weight gain compared to controls and much higher % lung damage than the other groups.

Conclusion

Of the three isolates tested, only isolate 1 is considered suitable for use in challenge model studies as it produces a mild to moderate level of clinical disease, reduced body weight gain and good levels of lung pathology. The other two isolates produce only subclinical disease and lower lung damage making them unsuitable for use in a challenge model.

References

1. Joa X. de Oliveira Filho *et al* : *Pesq. Vet. Bras* 35 (8) 716-724 – *Pasteurella multocida* type A as the primary agent of pneumonia and septicaemia in pigs.

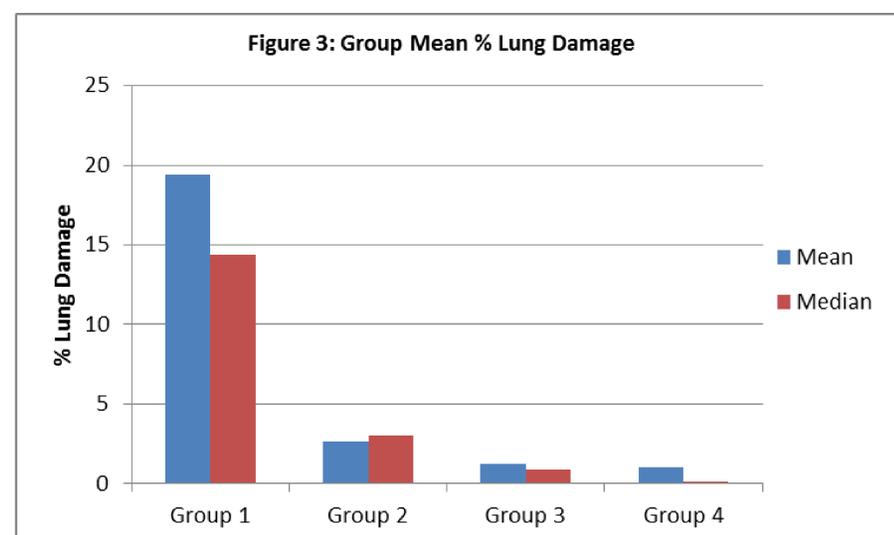
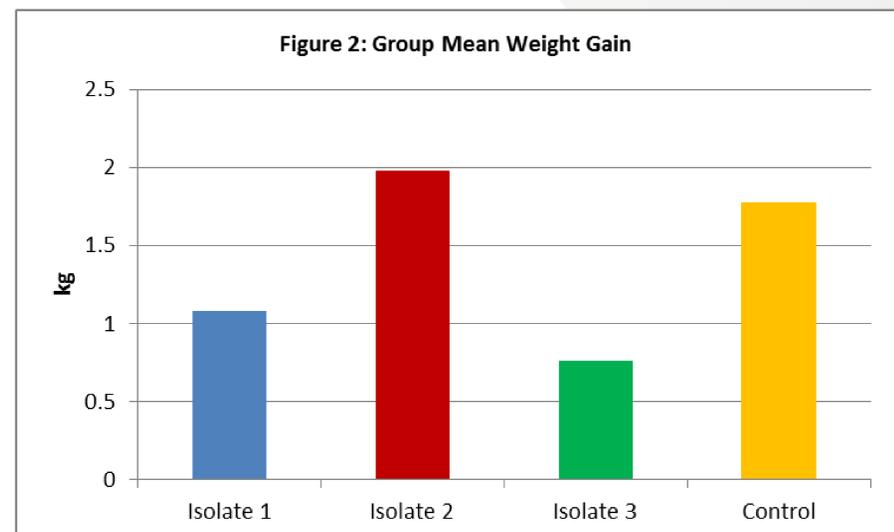
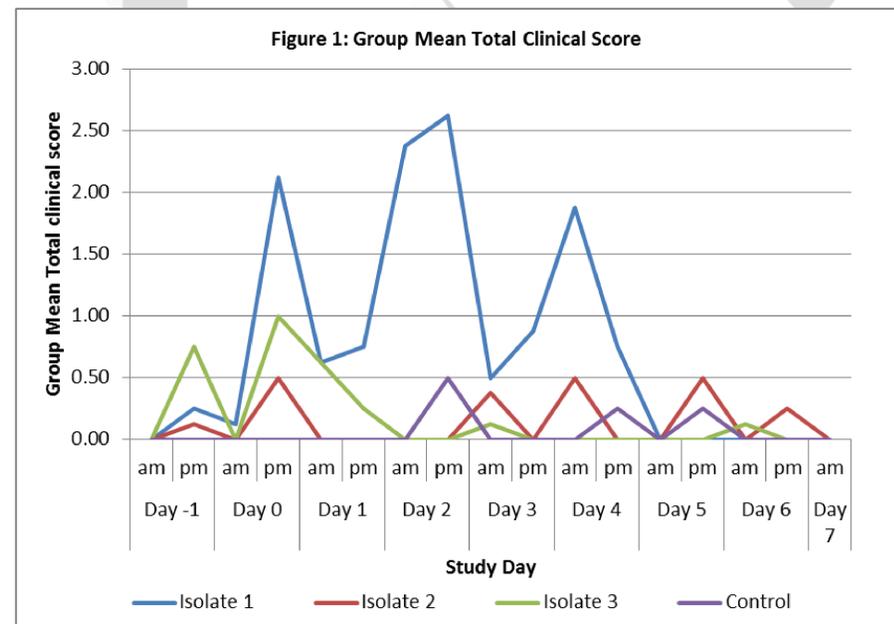


Figure 4: Examples of an infected lung (Left) and control lung (right)

