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TECHNICAL REVIEW

Mathematical Model to Determine the Recovery Probability of Pig with Hemorrhagic Disentery

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INTRODUCTION

Digestive disorders are the main cause of major economic losses in swine production (Rodríguez, 2004). The main agents involved are *Escherichia coli, Salmonella, Clostridium, Brachyspira hyodysenteriae*, coronaviruses, adenoviruses and aflatoxin-producing mycogenes (Zumalagorregui, 2004).

Swine hemorrhagic dysentery caused by *B. hyodysenteriae* is a disease that attacks pigs of all ages, but its negative effects are more frequent on growing animals (pre-fattening) (Reyes, 2008).

Morbidity may get up to 90 %, and mortality may be over 60 % on farms where immediate and effective measures are not applied thoroughly since the very first time (Rodríguez and Perez, 2009). Therefore, it is necessary to use some kind of diagnostic tools for swine hemorrhagic dysentery.

The aim of this paper is to elaborate elements to set up a mathematical model to predict the recovery probability in pigs with hemorrhagic dysentery.

DEVELOPMENT

The research took place at the integrated commercial swine center in the province of Ciego de Avila. It started from the first positive result in swine hemorrhagic dysentery diagnosed at the Provincial Veterinarian Diagnostic Laboratory. All sick and susceptible animals were segregated in groups of 25-30, ages 54-83 days, 13-24 kg body weight. Oral metronidazole was administered in the treatment in doses of 50 mg/kg body weight (Talavera, 2006). Oral Tylosin and injectable Pyanosid were also applied according to Bayer (2008).

The signs and parameters of health and recovery of sick animals were evaluated in the variables: duration of blood present in feces (days); body condition; health state recovery; occurrence time of new symptoms, relapse or evolution.

For statistical analysis SPSS 15.0 (2006) was used. The Kruskal-Wallis (non-parametric) test was used to compare the treatments according to the variables included.

The binary logistic regression test was used to analyze data behavior to set up variable relation and their importance for recovery and disease appearance (Hsieh, 1089). It also offers a regression mathematical equation with predictive value over an infected area, applicable to other integrated swine centers.

The variables included in the analysis were: the duration of blood presence in feces (days); occurrence time of new symptoms (days); and recovery type (excellent: 3; partial: 2; poor: 1).

Excellent. No dehydration signs are observed, feces are sticky to compact, in dark gray coloring. There is predisposition to compete during meals and pigs are on the alert for feed.

Partial. Moderate dehydration signs, or up to 6 % (Bujacich and Sappia, 2008). Sticky diarrhea is observed with no blood. The pigs appear reluctant when approaching the feed tray, but there is no or little ingestion. Sunken flanks are visible in the animal, assuming postures with laterally spread limbs, or leaning hind legs.

Poor. Severe dehydration of 7-8 % (Bujacich y Sappía, 2008); visible polypnea, mydriatic eyes; dry snout; sticky to liquid diarrhea with fibrin; no blood; perianal area blemished with feces, lack of appetite, sunken flanks and impossibility to remain standing.

The resulting equation is:

$$Y = \frac{1}{1 + e^{-(-3,703) - (2,463)*(fR) - (-0,638)*(dT) - (0,020)*(iR)}}$$

Where:
Y: likelihood for patient recovery
fR : type of recovery
dT: duration of blood presence in feces
iR : symptom occurring time

CONCLUSIONS

When metronidazole is used as therapy and the mathematical model described is applied, it is possible to predict the recovery of pigs suffering from hemorrhagic dysentery with a certainty level of 92.5 %.

REFERENCIAS

BAYER PHARM. (2008). Bela-Pharm. GmbH & Co. KG. Lohner Strabe 19. Vechta. Alemania.

BUJACICH, J. y SAPPÍA, D. (2008). *Terapia hidroelectrolítica y ácido/base. Guía de estudios de Cirugía General*. Extraído el 24 de febrero de 2012, desde http://www.w3.org/TR/xhtml1/DTD.

HSIEH, F. Y. (1989). Sample Size Tables for Logistic Regression. *StatMed* (Supl. 8), 795-802.

REYES, O. R. (2008). Enfermedades entéricas contagiosas del cerdo en Cuba. Encuentro de Porcicultura. *Revista ACPA*, (Supl. 3).

RODRÍGUEZ, M. F. y PÉREZ, R. M. (2009). *Desarrollo de un programa de prevención y control de la disentería hemorrágica porcina en las granjas especializadas del MINAZ en Ciego de Ávila*. Tesis de maestría. Universidad Agraria de La Habana, Cuba.

RODRÍGUEZ, C. (2004). *Informe del plan técnico-económico de la Empresa Porcina Camagüey*. Instituto de Medicina Veterinaria, Camagüey, Cuba.

SPSS (2006). *SPSS 15.0* (v. 15.0.1.). LEADTOOLS.

TALAVERA, A. (2006). *Control de enfermedades infecciosas*. Tesis doctoral, Univ. Agraria, Ciudad de La Habana, Cuba.

ZUMALAGORREGUI, J. (2004). Causas del síndrome diarréico. Extraído el 25 de mayo de 2006, desde http://www.tuotromedico.com.

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