

DETERMINATION OF DIAGNOSTIC PARAMETERS OF COMPLEMENT FIXATION TEST (CFT) FOR SEROLOGICAL DIAGNOSIS OF MYCOPLASMA MYCOIDES SUSUBSP. MYCOIDES (SMALL COLONY) INFECTION DURING AN OUTBREAK IN BOTSWANA

Majok A.A.¹, Masupu K.V.¹, Amanfu W.¹

Diagnostic parameters (sensitivity, specificity and predictive values of positive and negative tests) of Complement Fixation Test (CFT) for serological diagnosis of Mycoplasma mycoides subsp. mycoides (small colony) infection, using naturally occurring cases in cattle in Botswana have been determined.

INTRODUCTION

Complement Fixation Test (CFT) (Campbell and Turner, 1953) was adopted as the serological diagnostic method of choice for eradication of contagious bovine pleuropneumonia (CBPP) in Botswana. However, its sensitivity, specificity and predictive values for positive and negative tests under field conditions were not known. The purpose of this study was to determine these parameters, using naturally occurring CBPP cases in Botswana.

MATERIALS AND METHODS

82 apparently healthy cattle from the infected area were slaughtered and post-mortem carried out. Blood was also collected for testing with the CFT.

RESULTS AND DISCUSSION

61 cattle were positive on post-mortem (pm) while 21 were negative. 57 cattle of the 61 pm positive were positive on CFT while only 2 of the pm negative cattle tested positive. Using pm results as the standard CBPP status, sensitivity (se), specificity (sp) and predictive values (pv+ and pv-) were calculated as shown below.

CBPP status on post-mortem			
	positive	negative	total
CFT results			
positive	57	2	59
negative	4	19	23
total	61	21	82

sensitivity (se) = $P(T^+/D^+) = a/(a+c) = 57/61 = 0.93$; specificity (sp) = $P(T^-/D^-) = d/(b+d) = 19/21 = 0.90$
 predictive value of positive test = $P(D^+/T^+) = a/(a+b) = 57/59 = 0.97$; and predictive value of negative test = $P(D^-/T^-) = d/(c+d) = 19/23 = 0.83$. Prevalence of CBPP as diagnosed by post-mortem = $P(D^+) = (a+c)/N = 61/82 = 0.74$; and probability of being not infected with CBPP = $P(D^-) = (b+d)/N = 21/82 = 0.26$

Using the mathematical formula based on Baye's theorem (conditional probability), the predictive values of CFT were computed as follows:

$$P(D^+/T^+) = \frac{se \times P(D^+)}{se \times P(D^+) + (1-sp) \times P(D^-)} = \frac{0.93 \times 0.74}{0.93 \times 0.74 + (1-0.90) \times 0.26} = 0.96$$

$$P(D^-/T^-) = \frac{sp \times P(D^-)}{sp \times P(D^-) + (1-se) \times P(D^+)} = \frac{0.90 \times 0.26}{0.90 \times 0.26 + (1-0.93) \times 0.74} = 0.82$$

Results obtained using mathematical formula after Baye's do not differ from those computed using contingency table. In theory therefore any of the two methods could be used to compute these values. However, since the true prevalence $P(D^+)$ of a disease is not usually known use of Baye's theorem may be of little practical value. This study has established, for the first time, the diagnostic properties of the CFT for serological diagnosis of *Mycoplasma mycoides subsp. mycoides* (small colony) infection under field conditions in Botswana.

REFERENCES

Campbell A.D. and Turner A.W. 1953. Studies on Contagious Pleuropneumonia of Cattle, IV - An improved Complement Fixation Test. Australian Veterinary Journal, 29, 154 - 163.

¹ Department of Animal Health and Production, Ministry of Agriculture, Private Bag 0032, Gaborone, Botswana