

PREVALENCE OF CASEOUS LYMPHADENITIS IN GOATS IN PENINSULAR MALAYSIA

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SUMMARY: In a cross-sectional study of 3484 goats from intensive farms and smallholdings throughout Peninsular Malaysia, 242 of the animals examined had evidence of caseous lymphadenitis (CLA) as disclosed by the gel diffusion test. High prevalence of infection was indicated in the semi-intensive farms whilst infection was evidenced in smallholdings from only two localities. The gel diffusion test used in this study to detect antitoxin to *Corynebacterium pseudotuberculosis* exotoxin in the test serum samples was seen as a simple method of screening animals for CLA.

Key words: caseous lymphadenitis, goat, Malaysia

INTRODUCTION

Caseous lymphadenitis (CLA) is an insidious, subclinical disease which often goes undetected in the infected animal. The infection is usually realised when matured abscesses in superficial lymph nodes burst to the surface or is encountered during meat inspection at slaughter. The causal organism, *Corynebacterium pseudotuberculosis* (also known as *C. ovis*), was first isolated in Malaysia at the Veterinary Research Institute, Ipoh in 1970 in a goat and in 1971 in a sheep although in the early sixties the condition was detected in imported sheep during meat inspection at the Johore Bahru abattoir (Joseph, personal communication). Studies by Sheikh-Omar and Chulan (1980) and Tham and Sheikh-Omar (1981) have shown the economic importance of this disease in goats and sheep in Selangor. This chronic contagious disease has not been studied in detail in Malaysia and information on its epidemiology is hardly available. The present paper reports the prevalence of the disease in goats in Peninsular Malaysia and extrapolates the epidemiology of the infection amongst these small ruminants.

MATERIALS AND METHODS

1. Test Sera

A total of 3484 sera were obtained from goats of various age, sex and breed in Peninsular Malaysia. These sera were sampled from nine semi-intensive government farms and innumerable smallholdings over a period of almost two years (February, 1984 to December, 1985). Fifty-five of the goat sera were obtained from the Universiti Pertanian Malaysia (UPM) Goat Unit. All test sera except those from UPM were submission through the Regional Veterinary Diagnostic Laboratory, Petaling Jaya.

2. Serological Test

A modified version of the gel diffusion test (double immunodiffusion assay) developed by Burrell (1980) was used in this study to screen the sera for CLA. The basis of the test is the interaction of *C. pseudotuberculosis* exotoxin with antitoxin produced in the serum of infected animals to produce detectable precipitin line in semi-solid ion agar.

a) *C. pseudotuberculosis* exotoxin

The exotoxin was obtained from the supernatant of 250 ml cultures of *C. pseudotuberculosis* by centrifugation and filtration.

b) β -*Staphylococcus aureus* lysin

β -*Staphylococcus aureus* lysin was obtained from the supernatant of 48-hour cultures of *Staphylococcus aureus*. This lysin was required to titrate the *C. pseudotuberculosis* exotoxin on the basis that the exotoxin inhibit lysin activity. The highest dilution of lysin which caused complete lysis of bovine erythrocytes (RBC) was accepted as the minimum haemolytic dose (MHD). Two MHD were used to titrate the exotoxin.

c) Toxin Titration

Two-fold dilution (0.5 ml) of *C. pseudotuberculosis* exotoxin was titrated against 0.5 ml of two MHD lysin and 0.5 ml of three percent bovine RBC. The titre was the highest dilution showing complete haemolysis. The titre of the toxin must be at least 1/512 before the toxin could be considered for the gel precipitation test.

d) The Gel Diffusion Test

Each test serum sample (0.1 ml) was placed in the six wells cut into the ion agar. These six wells encircled a central well which was filled with an equal volume of exotoxin. The gel was then incubated in a moist environment for two to three days and observed for precipitin lines. Precipitin lines were evidenced when any of the test serum sample contained antitoxin as a result of infection with *C. pseudotuberculosis*. Immune sera were produced in young adult white laboratory rabbits by inoculation of a suspension of *C. pseudotuberculosis* cells and Freund's complete adjuvant (Batey, 1974). Pre- and post-inoculation serum samples were used as negative and positive control serum respectively.

RESULTS

Almost 7 percent (242/3484) of the serum samples examined had evidence of caseous lymphadenitis as disclosed by the gel diffusion test. The large or semi-intensive farms demonstrated higher (9.4%) prevalence of infection (Table 1) as compared to the smallholdings (1%) (Table 2). The prevalence of infection ranged from eight to 16 percent amongst the large farms having positive reactors whilst smallholdings in only two areas, one in Sabak Bernam and the other in Rawang, had positive reactors.

DISCUSSION

The overall prevalence of infection of seven percent in the animals examined is comparable to those reported overseas (Hein and Cargill, 1981). The prevalence of infection amongst positive farms in this study ranged from eight to 15.8 percent. Most of the semi-intensive farms were found to be positive whilst smallholdings in only two areas were shown to have positive reactors.

TABLE 1
Prevalence of positive reactors to caseous lymphadenitis amongst goats
in semi-intensive farms

Farms	No. Samples	No. Positive	Percentage Positive
Pusat Ternakan Haiwan, Gajah Mati	392	62	15.8
Pusat Pembiaikan Kambing, Kampung Pah, Jelebu	425	37	8.7
Pusat Ternakan Haiwan, Pantai, Seremban	55	8	14.6
Pusat Ternakan Haiwan, Batu Arang	1,077	86	8.0
Ladang Ternakan, Ijok	19	0	0
Universiti Malaya (IPT), Kuala Lumpur	17	0	0
Pusat Latihan Ternakan, Sungai Siput	1	0	0
Universiti Pertanian Malaysia, Serdang	55	8	14.6
TOTAL	2,464	232	9.4

Most of the large farms examined (Table 1) were found to have high (> 7%) prevalence. One of the factors for the high prevalence in the semi-intensive farms is perhaps the high stocking rate. The presence of large numbers of positive reactors was, perhaps, the result of congregation of large numbers of animals in a defined area. The highest prevalence was seen in the Pusat Ternakan Haiwan (PTH), Gajah Mati followed by the Universiti Pertanian Malaysia Goat Units, PTH Pantai and PTH Jelebu (Table 1). A small number of serum samples from Institut Haiwan, Kluang and the Pusat Latihan Ternakan, Sungai Siput was examined for CLA and all of the sera were negative to the test. However, both farms have records of CLA (Bahaman, unpublished data). The large farms tend to have imported goats of improved breeds and these animals were suspected to be more susceptible to CLA.

Representative samples from smallholdings in various states in West Malaysia were examined and all except those from Selangor were negative to the test. Less than 1 percent (10/1020) of the animals examined from smallholdings had evidence of CLA.

The infection seemed to proliferate on introduction of an infected animal to a farm, particularly, the semi-intensive farm where there were large number of susceptible animals in a given area. The organism is known to survive for long periods of time in the soil (Augustine and Renshaw, 1982). Infection of abrasions and wounds with pus containing the organisms or with contaminated soil would lead to infection of the animal. In one farm, Pusat Ternakan Haiwan Pantai, most of the goats had leech bites on their legs

TABLE 2
Prevalence of positive reactors to caseous lymphadenitis amongst goats
in smallholder farms

Smallholdings (District)	No. Samples	No. Positive	Percentage Positive
Seremban	222	0	0
Kelang	90	0	0
Hulu Selangor	20	0	0
Semenyih	26	0	0
Sabak Bernam	60	8	13.3
Ulu Langat	25	0	0
Kajang	25	0	0
Kuala Selangor	92	0	0
Gombak	25	0	0
Ulu Kelang	5	0	0
Rawang	10	2	20.0
Jitra	30	0	0
Yan	31	0	0
Sik	30	0	0
Baling	30	0	0
Kota Setar & Pendang	30	0	0
Kuala Muda	31	0	0
Pulau Pinang (Bukit Tengah)	98	0	0
Perlis	63	0	0
Ipoh (VRI)	38	0	0
Kota Bahru	39	0	0
TOTAL	1020	10	0.98

and these bites could possibly be the portal of entry. Overall, all positive reactors seen in this study were from three to seven years of age.

The incidence of the disease in local goats has long been realised but only recently has it been studied. The disease could possibly have been in the country all this while but being insidious and subclinical, it attracted little attention as more important animal diseases like brucellosis and tuberculosis were given priorities.

It is difficult to determine from this study whether the infection is endemic or not in this country. Evidence indicated it to be widely distributed amongst the large farms but to be rather sporadic in the smallholdings.

UPM has two goat units situated in different localities, one on the main campus and the other at Puchong which is about 15 km away. *The unit on the main campus had only*

local goats and had a prevalence of infection of five percent. The other unit at Puchong had cross-bred animals (Anglo Nubian/Jamnapari/Local) and a much higher prevalence (31.6%). The test indicated six of the 19 animals in Puchong Farm had evidence of CLA, including one with clinical signs.

The economic importance of CLA has been well documented in Australia and the United States. Losses were due to condemnation of sheep and goats in abattoirs because of emaciation and disseminated abscesses, decrease in reproductive efficiency and loss in hide value (Brown and Olander, 1987).

Control of the spread of CLA is of utmost importance. Once CLA becomes endemic in a farm or a locality, it is very difficult to eradicate it because antibiotics are unable to penetrate the thick capsule of the abscesses. Furthermore, the organism can survive in the soil and fomites for long periods and there are no vaccines available. It is difficult also to distinguish between infected and non-infected animals during the long incubation period of the disease as there are no visible lesions. This gel diffusion test is, therefore, a useful procedure for screening animals before introducing them into a clean farm or for monitoring the infection in an area. Robertson (1980) found it to be more sensitive than the anti-hemolysin inhibition (AHI) test. It was able to detect 78 per cent of the sheep with CLA lesions in a study in Australia whilst the AHI was able to detect *C. pseudotuberculosis* antitoxin in only 62 per cent of the sheep with CLA. This gel diffusion test, however, is not a definitive test for CLA.

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RINGKASAN

PREVALENS LIMFADENITIS KASEUS PADA KAMBING DI SEMENANJUNG MALAYSIA.

Dalam satu kajian keatas 3,484 kambing dari ladang-ladang intensif dan peternak-peternak kecil di Semenanjung Malaysia terdapat 242 ekor daripada kambing-kambing tersebut mempunyai bukti-bukti penyakit limfadenitis kaseus seperti yang ditunjukkan oleh ujian peresapan gel. Prevalens jangkitan yang tinggi ternyata di ladang-ladang intensif. Jangkitan di kalangan kambing-kambing peternak kecil pula terdapat hanya di dua daerah. Ujian peresapan gel yang diguna dalam pengajian ini untuk mengesan antitoksin kepada *Corynebacterium pseudotuberculosis* didapati adalah kaedah yang mudah untuk memeriksa ternakan berpenyakit limfadenitis kaseus.