UNIVERSITI PUTRA MALAYSIA

STUDIES ON HAEMORRHAGIC SEPTICAEMIA IN CATTLE AND BUFFALOES IN PENINSULAR MALAYSIA

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By

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TO MY PARENTS, MY WIFE RAZMA, AND CHILDREN

AZMADY, SHAZLY, SHANIZA, AND HISHAM, WITHOUT

WHOSE LOVE AND CONTINUED SUPPORT, THIS THESIS

WOULD NOT HAVE BEEN POSSIBLE.

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LIST OF ABBREVIATIONS

Bl.	-	blood
°C	-	degree Centigrade
cfu	-	colony forming unit
D1	-	primary dry
D2	-	second dry
EDTA	-	Ethylenediaminetetra-acetic acid
ELISA	-	Enzyme-linked immunosorbent assay
FAO	-	Food Agriculture Organisation
APHCA	-	Aminal Production and Health Commission for Asia and Pacific
HS	-	Haemorrhagic septicaemia
H_2S	-	Hydrogen sulphide
IHA	-	Indirect haemagglutination test
l.n.	-	lymph node
MRVP	-	Methyl Red Voges-Prauskauer
n/p	-	nasopharynx
NCCLS	-	National Committee for Clinical Laboratory Standards
p	-	pharynx
PMP	-	passive mouse protection
SIM	-	Sulphide-Indole-Motility
TBA	-	Tryptose Blood Agar
TSI	-	Triple sugar iron
VRI	-	Veterinary Research Institute
W1	-	first wet
W2	-	second wet
YPC	-	yeast extract protease peptone-cystone

Abstract of the thesis presented to the Senate of Universiti Pertanian Malaysia in fulfilment of the requirements for the degree of Doctor of Philosophy

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By

ABDUL AZIZ BIN SAHAREE

March, 1992

Supervisor : Professor Dr. M. R. Jainudeen
Faculty : Veterinary Medicine and Animal Science

Haemorrhagic septicaemia is an acute septicaemic disease caused by *Pasteurella multocida* types 6:B and 6:E. It affects mainly cattle and buffaloes and is characterised by a rapid course, loud stertorous breathing, oedematous swelling and petechial haemorrhages in the throat and brisket region. The disease is responsible for acute deaths causing severe economic losses to the farmers. Haemorrhagic septicaemia has long been present in the country and many attempts have been made to understand and control the disease. Currently, despite prophylactic vaccination, outbreaks of the disease continued to be reported. A review of the literature on HS indicates that there are gaps in our understanding of the disease in Malaysia.

A retrospective study using questionnaires sent to all District Veterinary Officers showed that the disease is endemic in the East Coast states of Peninsular Malaysia (Kelantan, Terengganu and Pahang). The disease was observed to occur at any time of the year, contrary to the long-held belief that HS occurs during the monsoon season. Although the incidence can be higher during rainy seasons, the time series studies showed that rain per se did not influence the frequency of the disease.

Six major outbreaks were investigated in the states of Perak, Melaka, Negri Sembilan, Johor, Terengganu and Kelantan. Field and experimental observations suggest that buffaloes are more susceptible than cattle to the disease. It was seen

that young and adult animals were equally susceptible to the disease especially in the non-endemic areas. The low IHA titres among adults in both endemic and nonendemic areas was because of the low vaccination coverage in the animal population.

Carrier animals were present in the endemic areas. They are usually immune and become a source for further outbreaks elsewhere. The detection of carriers are difficult and presently, carriers can only be detected by culturing the lymph nodes recovered from slaughtered animals. Treatment of carriers were also ineffective due to their location in the crypts of the lymph nodes which are inaccessible to antibiotics.

The modes of transmission of the disease were through aerosol or ingestion of feed and water contaminated with infected saliva and discharges. Rivers and streams are also implicated when carcasses were washed down from one village upstream to another, further down the river. Illicit slaughter may have also played a role in disease transmission in certain areas.

Haemorrhagic septicaemia was experimentally produced through intranasal and subcutaneous inoculations of Pasteurella multocida type B. Infected animals showed clinical signs typical of the natural disease. Those that did not develope clinical signs produced antibodies against the disease and could probably become carriers.

Despite the availablity of an effective vaccine, outbreaks still occurred among cattle and buffaloes in Malaysia. This was due to inadequate control measures and low vaccine coverage in the animal population. The free range type of animal management, maked it difficult to implement good control practices.

Based on results from this study, it is recommended that a standard method of control be formulated and vaccination be made mandatory until the area is declared free of the disease. The present animal management practices should be improved to facillitate the adoption of good control measures. Extension and education services on diseases should be provided to farmers and incentives given for early reporting of

disease outbreaks. Research is required to produce a more specific and protective vaccine against haemorrhagic septicaemia.

Abstrak tesis yang dikemukakan kepada Senat Universiti Pertanian Malaysia bagi memenuhi keperluan Ijazah Doktor Falsafah

KAJIAN TERHADAP SEPTISEMIA HEMORAJ PADA LEMBU DAN KERBAU DI SEMENANJUNG MALAYSIA

oleh

ABDUL AZIZ BIN SAHAREE

Mac, 1992

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Septisemia hemoraj adalah satu penyakit septisemia akut disebabkan oleh *Pasteurella multocida* tip 6:B dan 6:E. Penyakit ini memberi kesan terutama sekali kepada lembu dan kerbau, dan ianya dicirikan oleh perjalanan penyakit cepat, pernafasan garau bising, bengkak beredema dan hemoraj petekia pada leher dan kawasan brisket.

Penyakit ini bertanggungjawab terhadap kematian akut yang menyebabkan kerugian yang banyak kepada penternak. Septisemia hemoraj telah lama wujud di negara ini dan berbagai usaha telah dilakukan untuk memahami dan mengawal penyakit ini. Pada masa kini, sungguhpun ada vaksin profilaksis telah diberi, wabak penyakit masih terus dilaporkan berlaku. Ulasan tulisan mengenai septisemia hemoraj menunjukkan beberapa jurang di dalam kefahaman penyakit ini di Malaysia.

Satu kajian retrospektif menerusi borang soal selidik yang telah dihantarkan kepada semua Pegawai Veterinar Daerah, menunjukkan penyakit ini endemik di negeri Pantai Timur Semenajung Malaysia iaitu, Kelantan, Terengganu dan Pahang. Penyakit ini dicerapkan berlaku pada bila-bila masa dalam satu-satu tahun itu, bertentangan dengan kepercayaan lama yang septisemia hemoraj berlaku pada musim tengkujuh. Sungguhpun insidensnya boleh menjadi lebih tinggi pada musim

hujan, kajian siri masa menunjukkan bahawa hujan secara bersendirian tidak mempengaruh kekerapan penyakit ini.

Enam wabak utama telah diselidik di Perak, Melaka, Negeri Sembilan, Johor, Terengganu dan Kelantan. Cerapan luar dan ujikaji menyarankan yang kerbau lebih rentan terhadap penyakit ini berbanding dengan lembu. Juga didapati ialah, haiwan muda dan dewasa adalah sama rentan kepada penyakit ini, terutama sekali dalam kawasan bukan endemik. Titer yang rendah di kalangan ternakan dewasa di kedua-dua kawasan endemik dan bukan endemic adalah disebabkan oleh tahap liputan pemvaksinan yang rendah di kalangan populasi ternakan.

Ternakan pembawa wujud di kawasan endemik. Pembawa ini biasanya imun dan menjadi sumber pencetusan wabak di tempat lain. Pengesanan pembawa ini sukar dilakukan, dan pada masa sekarang pembawa hanya dapat dikesan dengan mengkultur nodus limfa ternakan yang disembelih. Rawatan pembawa ini juga tidak berkesan disebabkan lokasi bakteria di dalam kript nodus limfa yang tidak boleh dicapai oleh antibiotik.

Cara pemindahan penyakit ini adalah melalui aerosol atau menerusi pengingesan makanan dan air yang tercemar air liur dan lelehan terjangkit. Sungai dan aliran air juga terbabit apabila karkas hanyut dari kawasan hulu ke kampong-kampong hiliran. Penyembelihan haram juga berperanan dalam pemindahan penyakit ini di kawasan tertentu.

Septisemia hemoraj dihasilkan secara ujikaji menerusi penginokulatan intranasal dan subcutis *Pasteurella multocida* tip B. Ternakan yang terjangkit menunjukkan petanda yang tipikal untuk penyakit semula jadi. Ternakan yang tidak terjangkit menghasilkan antibodi terhadap penyakit ini dan mungkin boleh menjadi pembawa.

Sungguhpun terdapat vaksin yang mujarab, wabak masih lagi berlaku di kalangan lembu dan kerbau di Malaysia. Ini disebabkan oleh kekurangan langkah

pengawalan dan liputan vaksin yang rendah di kalangan populasi ternakan. Pengurusan secara lepas bebas menyukarkan perlaksanaan pengawalan yang baik.

Berasaskan hasil kajian ini, adalah disyorkan satu kaedah pengawalan standard dirumuskan dan pemvaksinan bagi penyakit ini diwajibkan sehingga sesuatu kawasan itu diistiharkan bebas daripada penyakit ini. Pengurusan ternakan yang sedia ada perlu diperbaiki untuk membolehkan kaedah pengawalan yang baik diamalkan. Perkhidmatan pengembangan dan pendidikan tentang penyakit ternakan perlu disediakan untuk penternak dan insentif juga diberi kepada penternak yang awal melaporkan wabak penyakit. Penyelidikan perlu dijalankan untuk menghasilkan vaksin yang lebih khusus dan melindung daripada septisemia hemoraj.

CHAPTER 1

INTRODUCTION

Haemorrhagic septicaemia (HS) is an acute septicaemic disease caused by *Pasteurella multocida* type 6:B or 6:E. It affects mainly cattle and buffaloes and is characterised by a rapid course, high fever, loud and stertorous breathing due to oedematous swelling, petechial haemorrhages in the throat and brisket region, profuse salivation, severe depression, and death within 24 hours. The disease has been described mainly in the African and Asian Continents including Malaysia.

Southeast Asian countries lose at least 100,000 heads of cattle and buffaloes annually due to the disease. The disease continues to be the major cause of mortality of cattle and buffaloes in Malaysia. Losses in West Malaysia were estimated at about M$ 1.5 million in 1966 (Thomas, 1972) with an average annual loss estimated at M$ 200,000 for 1967-1976 (Joseph, 1979).

HS has long been present in Malaysia and is well-known to farmers. Since its first description in 1902 by Carrongean, many attempts have been made to understand and control the disease. Before the advent of active immunization, antisera were used in Malaysia to obtain rapid protection in herds where outbreaks had occurred in conjunction with a bacterial broth vaccine (Cheah, 1960). The antisera were later proven to be ineffective and were discontinued. Since 1969, an oil-adjuvant vaccine which provides protection for about 12 months is routinely used for cattle and buffaloes throughout West and East Malaysia. Currently, despite prophylactic vaccination programmes and other managemental control strategies such as legislation, restriction of animal movement and slaughter; outbreaks of the disease continued to be reported, albeit, at reduced frequency and magnitude (Joseph, 1979).