MALIGNANT CATARRHAL FEVER (MCF) IN BALI CATTLE (*BOS JAVANICUS*) IN A COMMERCIAL FARM IN MALAYSIA

SUHAILA, N.S.[1]; AZIZAH, D.[1]; ZAMILA Z.[1]; AZILA Z.[1]; SHUHAINI A.[1]; ESDY A.A.R.[2] AND YUSNIZA M.Y.[2]

[1] Institut Penyelidikan Veterinar (VRI), 59 Jalan Sultan Azlan Shah, 31400 Ipoh, Perak

[2] Jabatan Perkhidmatan Veterinar Negeri Perak, Jalan Sultan Azlan Shah (U), 31400 Ipoh, Perak

Corresponding author: suhaila@jphvri.gov.my

ABSTRACT. Malignant Catarrhal Fever (MCF) is a highly fatal disease of cattle and other ruminants with worldwide distribution. There are two forms of the disease: the first is caused by Alcephine herpesvirus-1 (AHV-1) and is derived from wildebeest wherelse the second form of the disease is associated with sheep and is caused by Ovine herpesvirus-2 (OHV-2). All cases were collected from the same farm where cattle (including Bali Cattle) and sheep were raised together. The infected animals showed clinical signs of severe depression, anorexia, fever, hypersalivation, eyes discharge and corneal opacity. Histopathologically, there was generalized vasculitis with perivascular cuffing lesion detected in all post-mortem cases. It is possible from the history, clinical signs and histological finding, that MCF in Bali Cattle, in this case, was associated with sheep. The aim of this study is to describe the clinical signs and pathological findings of 12 MCF affected animals.

Keywords: Malignant catarrhal fever, Bali Cattle, sheep, corneal opacity, vasculitis

INTRODUCTION

Malignant Catarrhal Fever (MCF) is a highly fatal viral disease of cattle, buffaloes, deer and other ruminants of certain ruminant species which occur worldwide. MCF is usually sporadic and it is an acute disease with high mortality but low morbidity (Hoffmann *et al.*, 1989). It is characterized by clinical signs of corneal opacity, fever, depression, nasal and ocular discharge, generalized lymphadenopathy, occasionally by cystitis and central nervous involvement (Hoffmann *et al.*, 1984). It is caused by two types of gamma herpesvirus; alcephine herpesvirus 1 (AHV – 1) which causes wildebeest – associated MCF (WA – MCF) and ovine herpesvirus 2 (OHV – 2) which cause sheep – associated MCF (SA – MCF) (Taenkam *et al.*, 2006). It is known that sheep are asymptomatic carriers of OHV – 2, shedding the virus and passing it to other ruminants (Wiyono *et al.*, 1994). Wildebeast and sheep are natural carriers of the two viruses, respectively.

The aim of this study was to describe the clinical signs and pathological findings of MCF–affected animals in the 12 Bali Cattle.

MATERIALS AND METHODS

Management of Bali Cattle

A total of 90 cattle raised under a semi intensive management system were involved in this study. They were fed with PKC, grass and dried corn as well as other supplements such as mineral block and molasses. Drinking water was given *ad libitum*. Out of 90 animals, 50 (of mixed ages and sexes) were Bali Cattle and the rest were Brahman, Kedah-Kelantan and Friesian Sahiwal. Vaccination and deworming status for this herd was up to date. The farm accommodates various kinds of animals including sheep, goat and deer. The sheep and goats (approximately 1000 animals) were raised separately with slatted floor housing and the distances between sheep and Bali Cattle housing were approximately 100 metres. A complaint was received from the owner that 5 out of 50 Bali Cattle died suddenly within a 2-week interval.

Upon visiting the farm, physical examination and samples were collected to ascertain the cause of death.

Clinical history

A group of normal Bali Cattle were examined routinely. The animals that showed clinical signs were isolated and underwent detailed clinical examination. All affected animals (n:12) were examined for clinical signs and blood samples were collected for further laboratory analysis. Twelve Bali Cattle showing clinical signs were treated with oxytetracycline 200 mg/ml intramuscularly at dose rates of 50 mg/10 kg bodyweight per day for 4-5 days continuously.

Post-mortem study

Post-mortem was performed on 4 animals that died during the occurrence of clinical disease. Various organs were submitted for routine laboratory diagnosis. Representative tissue samples were collected at post-mortem, fixed in 10% buffered formalin, embedded in paraffin and the sections were cut at 5 µm thickness before staining with hematoxylin and eosin (H&E) to examine histologically for lesions characteristic of MCF.

RESULTS

Clinical observations

Twelve Bali Cattle (n:12) showed clinical signs of the disease and four animals died during the period of observation. The major clinical signs observed were fever, discharge from eyes and nose, depression, corneal opacity and anorexia (Table 1). Fever (>40.0^{o}C) and ocular and nasal discharge was seen uniformly in all animals. The discharge usually remained serous and progressed to a mucopurulent discharge in a few days. Rectal temperature often increased until death unless the Bali Cattle recovered from illness. The temperature usually returned to normal if the animals

TABLE 1. Major clinical signs observed in 12 Bali Cattle

No.	ID	Clinical signs					
		Age	Fever (>40.0 °C)	Depression	Anorexia	Discharge (eyes/nasal)	Corneal opacity
1.	PK4 1946	Adult	√	√		√	√
2.	PK4 1957	Adult	√	√		√	
3.	PK4 1971	Adult	√		√	√	
4.	PK4 1949 *	Adult	√	√		√	√
5.	PK4 1969 *	Adult	√		√	√	√
6.	PK4 1947	Adult	√	√		√	
7.	PK4 1977	Adult	√			√	
8.	PK4 1978 *	Adult	√	√	√	√	√
9.	PK4 1953	Adult	√			√	
10.	PK4 1960	Adult	√	√		√	
11.	PK4 1962 *	Adult	√		√	√	√
12.	PK4 1964	Adult	√	√		√	

*died during clinical observation

responded to the treatment given. Nervous signs such as in-coordination and seizures were also observed prior to death in some animals.

Pathological finding

A bilateral corneal opacity associated with conjunctivitis was observed in animals that eventually died. Erosions and ulcerations of oral mucosa were seen in most animals. The erosions and ulcerations extended along the digestive tract especially gums, esophagus, small intestine and large intestine as well as in spleen. Larger ulcers were found in the gums and esophagus. A frothy fluid in the tracheal lumen was observed. Lymph nodes were grossly swollen. Haemorrhages and severe congestion were observed in lung, heart, kidney and liver.

Histopathological examination revealed the presence of perivascular cuffing in all tissues especially in kidneys. There were also presence of mononuclear cells, mainly lymphocytes in the blood vessels (mainly artery) indicating vasculitis and arteritis, and also infiltration of the mononuclear cells in the tissues. Most capillaries in the lamina propia were slightly congested.

DISCUSSION

In this case, diagnosis of MCF could be based on the pathognomonic lesion of generalized vasculitis and presence of perivascular cuffing in all tissues. A vasculitis with adventitial mononuclear cell infiltration and medial fibrinoid necrosis is considered to be the pathognomonic lesion

for MCF in cattle (Jubb and Kennedy, 1970). Various predilection organs including the kidney, heart, lung, lymph nodes, brain, carotid rete, eye, intestine and vessels of the reproductive organs should be examined for the presence of vasculitis (Barker *et al.,* 1993). In MCF – affected animals, the kidney was the main organ affected (Barker *et al.,* 1993). Generalized vasculitis is the major histological finding of MCF in cattle and other ruminants (Teankam *et al.,* 2006). In this study, vasculitis was found in various organs especially in kidney and brain. This finding supports the observations made in previous reports of the disease in cattle.

Bali Cattle (*Bos javanicus*) and water buffalo (*Bubalus bubalis*) is highly susceptible to SA – MCF and incidence in this species is thought to be high (Wiyono *et al.,* 1994). Field evidence and experimental transmissions suggest that Bali Cattle, Asian swamp buffalo and deer are more susceptible to SA – MCF than *Bos taurus* and *Bos indicus* breeds (Daniel *et al.,* 1988). The close distance between sheep and Bali Cattle housing indicates that close contact between these animal could contribute to the occurrence of MCF. However, other cattle breed raised in the same farm was not affected by MCF. This finding suggests that Bali Cattle are more susceptible compared to other breeds of cattle. The disease will occur where susceptible animals grazed or housed together with sheep (Hoffmann *et al*., 1989). Outbreak of SA-MCF have been associated with lambing season (Hoffmann *et al.,* 1989).

MCF has been recognized as an acute and fatal disease but recovery of affected animal has been reported (O`Toole *et al.,* 1997). In this study, some affected animals survived with supportive treatment and proper management.

In this study, MCF was likely to occur in adult Bali Cattle (more than 1 year old) and this age–related occurrence had also been reported (Vanselow, 1980).

In conclusion, strong suspicion of MCF should be made if the animals of a clinically susceptible species is presented with a history of close contact with sheep, goat or wildebeest. This finding could possibly help the field veterinarians in Malaysia to consider the disease as a possible differential diagnosis when confronted with fatal disease in cattle, buffaloes and other exotic ruminants, especially when these animals have been in contact with sheep.

REFERENCES

1. Barker I.K., Van Dreumer A.A. and Palmer N. (1993) Malignant Catarrhal Fever In: *Pathology of Domestic Animal. 4th edition*. K.V.F. Jubb, P.C. Kennedy and N. Palmer (eds.). New York: Academic Press: 163-173
2. Daniel P.W., Sundarisman Wiyono A., and Purnomo R. (1988) Malignant Catarrhal Fever In: *Asian Livestock,* edited by Daniel *et al*., *ACIAR*. Canberra.
3. Hoffmann D., Soeripto S., Sobironingsih S., Campbell R.S.F. and Clarke B.C. (1984) The clinico-pathology of a Malignant Catarrhal Fever syndrome in the Indonesian swamp buffalo (*Bubalus bubalis*). *Aust. Vet J.* Vol **61 (4)**: 108-112
4. Hoffmann D. and Young M.P. (1989). Malignant Catarrhal Fever. Aust. Vet J. Vol **66 (12)**: 405-406
5. Jubb K.V.F. and Kennedy P.C. (1970) In: *Pathology of Domestic Animals*, Vol 2, 2nd edition. Academic Press, New York. pp 27
6. O`Toole D., Li H., Miller D., Williams W.R. and Crawford T.B. (1997) Chronic and recovered cases of sheep –

associated malignant catarrhal fever (MCF) in cattle. *Vet Rec.* **140 (20)**: 519-524
7. Taenkam K., Tantilertcharoen R., Boonserm T., Suadsong S. and Banlunara W. (2006) Malignant Catarrhal Fever in Swamp Buffaloes (*Bubalus bubalis*): A retrospective pathological study of outbreaks in Thailand. *Thai. Vet Med J.* **36 (1)**: 19-30
8. Vanselow B.A. (1980) An Epizootic of bovine malignant catarrh in Malaysia, *Vet Rec.* **107 (1)**: 15-18
9. Wiyono A., Baxter S.I.F., Saepulloh M., Damayanti R., Daniel P. and Reid H.W. (1994) PCR detection of ovine herpesvirus – 2 DNA in Indonesian ruminants – normal sheep and clinical cases of Malignant Catarrhal Fever. *Vet Microbiol.* **42 (1)**: 45-52

ACKNOWLEDGMENTS. We thank Dr. Ramlan Mohamed and staff of Pathology Unit, Veterinary Research Institute (VRI) for their support and help. We also thank to Dato` Dr. Azhar Idris from Department of Veterinary Services (DVS) and veterinary pathologists from University Putra Malaysia (UPM) for their valuable diagnostic assistance.