Onderstepoort J. vet. Res., 57, 201–204 (1990)

RESEARCH COMMUNICATION

EPIZOOTOLOGY OF WILDEBEEST-DERIVED MALIGNANT CATARRHAL FEVER: POSSIBLE TRANSMISSION AMONG COWS AND THEIR CALVES IN THE NORTH-WESTERN TRANSVAAL

B. J. H. BARNARD, Veterinary Research Institute, Onderstepoort 0110

ABSTRACT

BARNARD, B. J. H., 1990. Epizootology of widebeest-derived malignant catarrhal fever: possible transmission among cows and their calves in the north-western Transvaal. *Onderstepoort Journal of Veterinary Research*, 57, 201–204 (1990).

The investigation involved 52 cases of wildebeest-derived malignant catarrhal fever in 1986 and 1989 in a herd of cattle kept in camps adjacent to a game farm harbouring a herd of approximately 330 blue wildebeest (*Connochaetes taurinus*). In the outbreaks, 34 cows and 18 calves died as result of the disease. The exceptionally high incidence of the disease in both cows and their calves, the low incidence in calves of unaffected cows, the relatively short period between the death of cows and their calves as well as the occurrence of the disease in 2 calves born after their mothers had been moved away from wildebeest, are indicative of transmission among cows and calves. The death of at least 6 calves within 6 weeks of birth is ascribed to intra-uterine infection while some calves that survived longer may have acquired the infection from other cattle or from wildebeest.

INTRODUCTION

Calves of blue wildebeest (*Connochaetes taurinus)*, the carrier of Alcelaphine herpes virus 1, which causes wildebeest-derived malignant catarrhal fever (WD MCF), may become infected *in utero* or may acquire the infection by horizontal spread from other calves shortly after birth (Plowright, Ferris & Scott, 1960).

Although histopathological changes characteristic of WD MCF have been described in cattle and buffalo foetuses from cows that have died of the sheep-associated disease (Pop, Jivanesco & Popovici, 1982), contact transmission of the disease among cattle under natural conditions does not occur or is very rare (Daubney & Hudson, 1936; De Kock & Neitz, 1950; Plowright, 1981).

An exceptionally high incidence of WD MCF among cows and their calves in a particular herd in an outbreak in 1986 (Barnard, Van de Pypekamp & Griessel, 1989) and again in 1989, prompted the present investigation.

History

The outbreak occurred on the farm 'Blinkwater' 40 km north of Thabazimbi in the north-western Transvaal (Barnard *et al.*, 1989). The farm 'Blinkwater' which adjoins a game farm harbouring about 330 blue wildebeest is divided into several camps. Eight camps are separated from the game farm by a game-proof fence. Other camps adjacent to these 8 camps are separated from wildebeest by at least 1 000 m of densely vegetated bushveld.

In the spring and early summer of 1986, severe losses as a result of WD MCF were experienced among cattle in the 8 camps next to the game farm and transmission was believed to have taken place in the period from May–October (Barnard *et al.*, 1989). Consequently, the owner was advised to avoid utilizing these camps for grazing during these months of the year. However, in 1989 cases of WD MCF, again involving cows and their calves, were again seen. Seven cases occurred in autumn while the cattle were in the camps next to the game farm and 7 cases occurred in August–September, 3 months after the cattle had been moved to the camps 1 km away from the wildebeest.

Received 27 April 1990—Editor

MATERIAL AND METHODS

Data

Data obtained from the owner, a breeder of pedigree Bonsmara Cattle, were used to compile Table 1.

Exposure to wildebeest

Exact information on the exposure of individual cattle to wildebeest was not available. However, as the cattle were kept in groups of 100 animals each in a rotational grazing system it was assumed that most of them were similarly exposed. This assumption was strengthened by the occurrence of WD MCF cases in several of those groups. In 1986, the cattle, including cows and heifers, were kept in the camps next to the wildebeest from January–December and in 1989, they were exposed from January to the 15th of May (Week 20), when they were moved to the camps at least 1 000 m distant from the Wildebeest. Three calves, N123, N29 & N21 (Table 1), were not exposed to wildebeest as they were born 2–6 weeks after their mothers had been moved to the distant camps.

Management of sick cattle

Cows showing signs suggestive of WD MCF together with their calves were transferred for better observation to a small enclosure near the homestead and at least 2,5 km away from wildebeest. When typical signs of the disease became visible usually within 1–3 days, the affected animals were destroyed and their calves hand-reared. At times, up to 8 cows with clinical signs of WD MCF, their calves as well as the orphan calves were cared for in the enclosure.

Weekly occurrence of WD MCF

The weekly occurrence of WD MCF cases is depicted in Fig. 1.

Occurrence of WD MCF in different groups of cattle

The occurrence of WD MCF in dry cows and heifers, cows with calves, as well as in calves of affected and unaffected cows is shown in Table 2.

Survival period after parturition

The survival period of cows (parturition to death) is shown in Fig. 3, and the difference between the survival periods of cows and their calves is depicted in Fig. 2.

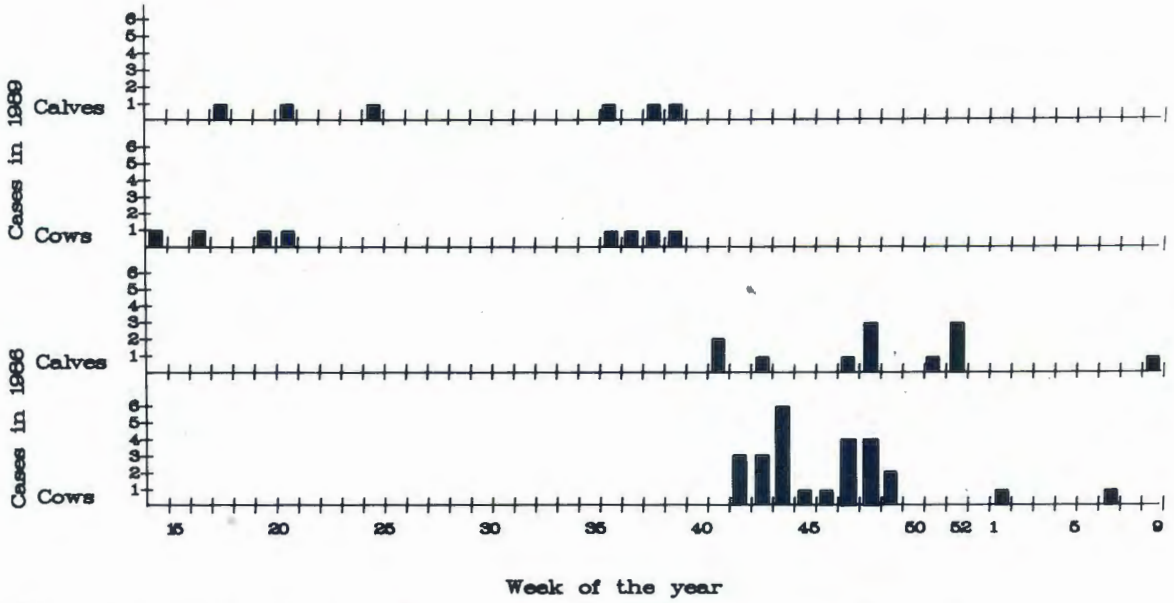

FIG. 1 The weekly occurrence of WD MCF in a herd of cattle in 1986 and 1989 in the north-western Transvaal

TABLE 1 Cases of WD MCF in 1986 and 1989 on the farm 'Blinkwater' in the north-western Transvaal

Cases	Cow No.	Calf No.	Week of parturition	Week of death	
				Cows	Calves
Pregnant cows	C51	—	—	42/1986	—
	Y5	—	—	2/1987	—
Cows with unaffected calves	B38	J105	18/1986	43/1986	—
	S82	J132	40/1986	44/1986	—
	X 8	J143	42/1986	44/1986	—
	X12	J137	40/1986	44/1986	—
	X16	J 8	20/1986	44/1986	—
	Y22	J 27	38/1986	44/1986	—
	C30	J 26	38/1986	44/1986	—
	T62	J104	17/1986	48/1986	—
	U41	J 51	46/1986	48/1986	—
	C54	J 28	39/1986	48/1986	—
	X13	J 43	42/1986	49/1986	—
	C 8	J 14	22/1986	49/1986	—
	W10	J 57	40/1986	1/1987	—
	B20	L121	26/1988	15/1989	—
	H19	L135	38/1988	20/1989	—
	D 9	N123*	25/1989	37/1989	—
Cows not affected	Y33	J 10	21/1986	—	47/1986
	H13	L132	37/1988	—	25/1989
Cows and calves affected	T64	J146	42/1986	42/1986	43/1986
	X 6	J136	40/1986	42/1986	48/1986
	W20	J147	43/1986	43/1986	51/1986
	W13	J134	40/1986	43/1986	52/1986
	C20	J 44	43/1986	45/1986	48/1986
	C53	J149	44/1986	46/1986	9/1987
	X48	J116	21/1986	47/1986	41/1986
	Y12	J163	47/1986	47/1986	52/1986
	B 1	J 50	46/1986	47/1986	52/1986
	C48	J166	47/1986	47/1986	48/1986
	Y49	J112	20/1986	48/1986	41/1986
	E33	N 5	16/1989	17/1989	18/1989
	H11	L145	40/1988	21/1989	21/1989
	D 3	N 29*	26/1989	36/1989	36/1989
	C39	N 3	16/1989	38/1989	38/1989
	B13	N 21*	22/1989	39/1989	39/1989

* These calves were born after their mothers had been moved in Week 20 to the camps 1 000 m away from wildebeest.

RESULTS

Weekly occurrence of WD MCF

In 1986, all the deaths occurred in spring and early summer (Fig. 1), and the 1st cases were encountered in Week 41 when 2 calves died. The outbreak lasted till the 9th week of 1987 with the death of Calf J149, whose mother had died 15 weeks previously. In this outbreak, 26 cows and 12 calves succumbed to the disease.

A cow was the first to die in 1989. Seven cases were seen in autumn and 7 occurred approximately 18 weeks later in late winter. In both periods, 4 cows

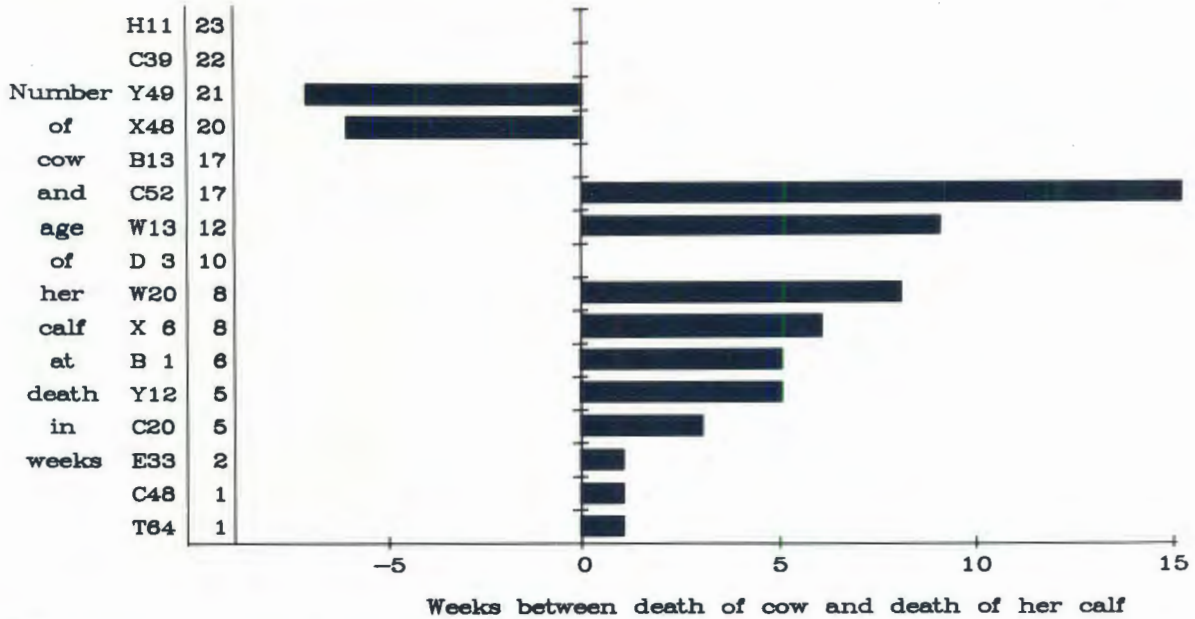

FIG. 2 The survival time from parturition to death of cows with affected and unaffected calves

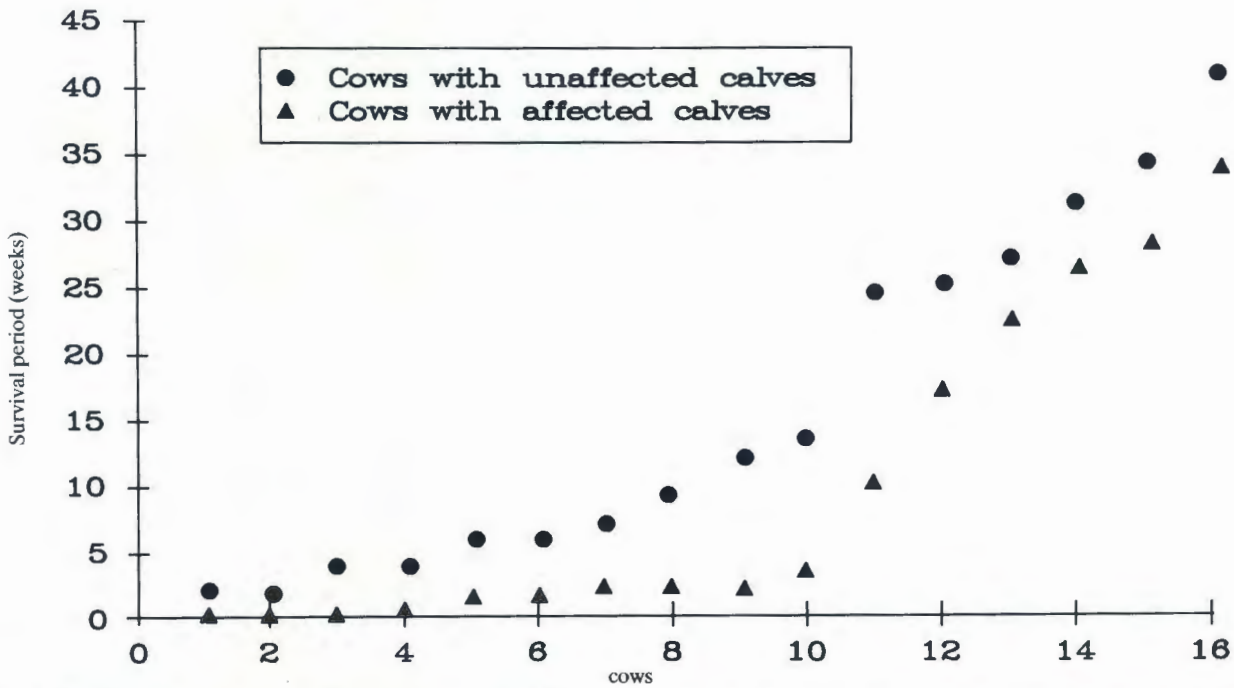

FIG. 3 The difference in the time from parturition to death as a result of WC MCF between cows and their calves in a herd of cattle in the north-western Transvaal

and 3 calves died of WD MCF. Two of the 3 unexposed calves (Table 1) were among those that succumbed to the disease.

Occurrence of WD MCF in different groups

The incidence of WD MCF in cows with calves in 1986 and 1989 (Table 2) was 20 % and 12 % respectively, whereas the incidence in dry cows and heifers was less than 1,5 %.

In calves of cows succumbing to the disease in 1986 and 1989 (Table 2), the incidence was 45,8 % and 62,5 %, respectively. This is notably higher than the incidence of approximately 1,5 % in calves of unaffected cows, where only 2 calves out of 161 died.

Survival period after parturition

The period from parturition to death of those cows whose calves survived (Fig. 3) varied from 2–41 weeks, with an average of 15,4 weeks. The average survival period of cows with affected calves, 9,1 weeks varied from 0–33 weeks. Ten of the 16 cows with affected calves (62 %) died within 3 weeks after parturition, whereas only 2 cows with unaffected calves died in the same period.

TABLE 2 The occurrence of WD MCF in different groups of cattle in 1986 and 1989 in a herd in the north-western Transvaal

Group of cattle	Number in group	Number of WD MCF cases	Incidence of WD MCF (percentage)
Cases in 1986			
Dry cows and heifers	>130	2	1,5
Cows with calves	119	24	20,0
Calves of healthy cows	94	1	1,0
Claves of cows that died of WD MCF	24	11	45,8
Total	367	38	10,4
Cases in 1989			
Dry cows and heifers	>130	0	0,0
Cows with calves born before Week 40	66	8	12,1
Cales of healthy cows	67	1	1,5
Calves of cows that died of WD MCF	8	5	62,5
Total	271	14	5,1

Age of calves at death and the period between the death of cows and calves

Six of 16 calves (37 %) died when they were 0–6 weeks old (Fig. 2). The other calves died when they were 8–33 weeks of age. Seven of the 16 calves died within 1 week of their mother's death, and the age of these calves varied from 1 week–23 weeks. Two calves, J116 & J112, 20 and 21 weeks of age, respectively (Table 1), died while their mothers were still alive. These cows died 6 and 7 weeks later.

DISCUSSION

The most significant fact that emerged from this investigation was the high incidence of WD MCF in cows shortly after parturition and the death of their calves in the first weeks of life. The validity of these observations is strengthened by the fact that they were made during 3 different seasons in 2 separate years (Fig. 1).

The incidence of WD MCF in cows with suckling calves, 20 % in 1986 and 12 % in 1989 (Table 2), is significantly higher than the incidence of less than 1,5 % in dry cows and heifers and in calves of unaffected cows. The occurrence of the disease in a high percentage of calves of infected cows (45,8 % in 1986 and 62,5 % in 1989) but almost none in calves of unaffected cows is a strong indication of cow to calf transmission.

The death of 6 of these calves (37 %) within 5 weeks of their mothers, and when they were less than 6 weeks old (Fig. 2), is most likely the result of intra-uterine infection, and, taking into account the long incubation period of WD MCF, 6 weeks to 4 months under natural conditions (Barnard *et al.*, 1989), intra-uterine transmission could then also have taken place in some of the calves that died when they were 8–33 weeks old.

A strong indication of horizontal transmission of the disease among cattle is the death of 2 calves (N21 & N29, Table 1) born 2 and 6 weeks after their mothers had been moved away from wildebeest. They died in the same week as their mothers 10 and 17 weeks after birth.

The susceptibility of young calves to natural infection, unlikely to be of intra-uterine origin, is demonstrated by the death of 2 calves J10 and L132 (Table 1) from unaffected mothers. These 2 calves were 26 and 40 weeks old at death and could only have contracted the disease in the camps next to the game farm, as they were moved to the enclosure for sick animals only after clinical signs were noticed. This implies that some of the older calves (Fig. 2) might have acquired the infection from wildebeest. This is considered to be unlikely, however, because of the low incidence of the disease in calves of WD MCF free cows.

The high incidence of WD MCF in calves on 'Blinkwater' but not in calves in other herds exposed in a similar way could not be explained previously (Barnard *et al.*, 1989). On further investigation it was learned that herds with a low incidence of the disease in calves were exposed to wildebeest 1–2 weeks after calving, whereas the cattle on 'Blinkwater' were kept in camps next to the wildebeest during pregnancy and for some time thereafter. This fact and the strong indications for intra-uterine transmission obtained in the present investigation clarify the discrepancy in the incidence of the disease in cattle of the same breeding status on different farms and are an indication, as was previously suggested (Barnard *et al.*, 1989), that young cattle and dry cows are not as prone to infections as pregnant cows and cows with young calves.

REFERENCES

BARNARD, B. J. H., VAN DE PYPEKAMP, H. E. & GRIESSEL, MONICA, D., 1989. Epizootology of wildebeest-derived malignant catarrhal fever in an outbreak in the north-western Transvaal: Indications of an intermediate host. *Onderstepoort Journal of Veterinary Research*, 56, 135–139.

DAUBNEY, R. & HUDSON, J. R., 1936. Transmission experiments with bovine malignant catarrhal. *Journal of Comparative Pathology*, 49, 63–80.

DE KOCK, G. & NEITZ W. O., 1950. Sheep as reservoir host of snotsiekte (or malignant catarrhal fever of cattle) in South Africa. *South African Journal of Science*, 46, 176–180.

PLOWRIGHT, W., FERRIS, R. D. & SCOTT, G. R., 1960. Blue wildebeest and the aetiological agent of bovine malignant catarrhal fever. *Nature*, London, 188, 1167–1169.

PLOWRIGHT, W., 1981. Herpesviruses of wild ungulates including malignant catarrhal fever virus. pp 126 *In:* DAVIS, J. W., KARSTAD, L. & TRAINER D. O. (eds) 2nd edn. Infection diseases of wild mammals, Iowa State University Press.

POP, M., JIVANESCO, I. & POPOVICI, I., 1982. Malignant catarrhal fever in bovine fetuses: post mortem findings. *Buletinul Institutului Agronomic Cluj-Napoca, Zootehnie si Medicina Veterinara*, 36, 89–93.

Printed by the Government Printer, Private Bag X85, Pretoria, 0001