

FREQUENCY OF CLINICAL LISTERIOSIS IN DAIRY CATTLE IN ENGLAND

Erdogan H.M.¹, Cetinkaya B.², Green L.E.², Cripps P.J.¹, Morgan K.L.¹

*La listériose est une maladie infectieuse animale et humaine causée par *Listeria monocytogenes*. Sa prévalence et son incidence ont été étudiées dans les élevages bovins laitiers de l'Angleterre par le biais d'un questionnaire postal auprès d'un échantillon tiré au hasard de 1500 élevages entre Août 1995 et Janvier 1996. Le questionnaire était mis au point pour collecter des données sur les cas cliniques de listériose notés "à tout moment", ou entre Juin 1994 et Juillet 1995 dans trois groupes d'âge de bovins, c'est-à-dire les vaches en lactation, les génisses de remplacement, et les veaux laitiers, et aussi des données prédictives de production telles que la taille du troupeau, les bâtiments, l'alimentation, la préparation des aliments et les pratiques d'élevage en général. Le taux de réponse était de 64,1% et 59,6% des questionnaires étaient exploitables pour les analyses. Deux estimations de la fréquence de la listériose ont été faites : la prévalence de troupeaux et celle dans les troupeaux. La prévalence des cas notés "à tout moment" était de 19% chez tous les bovins laitiers. La prévalence dans les différents groupes d'âge était de 15,8% chez les vaches en lactation, 7,7% chez les génisses de remplacement, et 2,2% chez les veaux laitiers. Comparativement, la prévalence entre 1994 et juillet 1995 était de 12,3% chez tous les bovins laitiers, 9,3% chez les vaches en lactation, 5,0% chez les génisses de remplacement, et 1,4% chez les veaux laitiers. Les taux d'incidence chez les vaches en lactation étaient de 39,7/1000 vache-années dans les troupeaux infectés et de 4,2/1000 vache-années dans tous les troupeaux. Pour les génisses et les veaux, ces taux étaient de 86,6 et 7,4, et de 73,7 et 1,5 respectivement dans les troupeaux infectés et dans tous les troupeaux. Les signes cliniques les plus fréquemment reportés par les éleveurs ont été l'avortement (57,8%), les signes nerveux (56,8%), l'atteinte oculaire (49,4%) et la diarrhée (24,1%). La plupart des cas ont été enregistrés en hiver (44,2%) et au printemps (38,4%), entre Décembre et Mai, avec un maximum de cas en Janvier (19,3%).*

INTRODUCTION

Listeriosis is a world-wide zoonotic disease caused by members of the genus *Listeria*, predominantly *Listeria monocytogenes*. Listeriosis is a well recognised food-borne disease and reports suggest that the frequency of clinical listeriosis is increasing in both man and animals (Gitter, 1988, Farber and Peterkin, 1991). In this report we describe the prevalence and incidence of listeriosis in dairy cattle farms in England obtained by postal questionnaire.

MATERIALS AND METHODS

An eight page, self administered questionnaire was designed, pre-tested and then sent to a random sample of 1500 dairy cattle farms. The questionnaire included questions on prevalence, incidence, herd size, replacement rate, number of calves born and farm management in the period between July 1994 and June 1995.

DATA MANAGEMENT AND ANALYSIS

Two estimations of the frequency of listeriosis were made, the farm prevalence and the incidence rate. The farm prevalence was estimated from farms reporting cases of Listeriosis "ever" and farms reporting cases of Listeriosis between July 1994 and June 1995 for three groups of dairy cattle; milking cows, replacement heifers and dairy calves. The within herd incidence rate was calculated separately for infected herds and for all herds. Herd sizes were also calculated for affected and non-affected herds. Respondents who did not know if they had had any cases of Listeriosis or did not give details about the cases in any of these groups were removed from further analysis. Three alternatives were given for the diagnosis of the disease, veterinary surgeon, veterinary investigation centre (V.I.C.) or self diagnosis. In order to validate the diagnosis of the disease by farmers they were asked about the clinical signs of Listeriosis. The criterion validity of "self diagnoses" (Abramson, 1988) was made by examining the frequency of farmers reporting the correct clinical signs. Information about the month of illness, clinical signs, was also collected for cases seen between July 1994 and June 1995. All replies were numerically coded, entered into a database and analysed using Epi-info version 6 (Dean et al 1994). The differences between proportions obtained for each group and median values were compared by Yates corrected chi squared test and Kruskal-Wallis test respectively. A probability of less than 0.05 was accepted as statistically significant.

¹ Department of Veterinary Clinical Science and Animal Husbandry, University of Liverpool, Leahurst, Neston, L64 7TE South Wirral, UK

² Department of Clinical Veterinary Science, University of Bristol, Langford, BS18 7DU, Bristol, UK

RESULTS

64.1% (961/1500) of the questionnaires were returned by the farmers and 59.6% of these provided usable data. The median herd size of affected herds was greater than unaffected herds; the values were 85 and 65 respectively ($p < 0.001$). The figures of farm prevalence are shown in the table 1. Overall, 19% of the respondents reported having "ever" had listeriosis on their farms. When stratified by age, the farm prevalence was 15.8% for milking cows, 7.7% for replacement heifers and 2.2% for dairy calves, the difference between the groups was significant ($p < 0.001$). Diagnosis was made by a veterinarian or V.I.C on 88.9% of the farms. When the estimates were reanalysed using only these data, the farm prevalence was not significantly different (Table I). Similarly the farm prevalence for cases seen between July 1994 and June 1995 was 12.3% overall, 9.3% in milking cows, 5% in replacement heifers and 1.4% in dairy calves. There was statistically significant difference between the groups ($p < 0.001$) and between these figures and those calculated for the cases "ever" (Table I). The within herd incidence rate in affected and all herds was calculated for each age group. It was 4.2/1000 cow-years (239/56824) in all herds and 39.7/1000 cow-years (239/6017) in affected herds for milking cows, 7.4/1000 heifer-years (142/19174) overall and 86.6/1000 heifer-years (142/1639) in affected herds for replacement heifers and 1.5/1000 calf-years (42/28697) in all herds and 73.7/1000 calf-years (42/570) in affected herds for dairy calves. The incidence of listeriosis was higher in replacement heifers ($p < 0.001$). Farmers were asked to state the clinical signs of listeriosis as validation. The results are shown in the table II. Although the sensitivity of farmers picking up one correct sign was low it was 96.1% for reporting one or more correct signs, abortion, silage eye and nervous sign. A similar request was made to determine the clinical signs of cases reported between July 1994 and June 1995. Silage eye (84.5%) was most commonly reported, followed by nervous sign (11.3%) and abortion (2.3%) (table III). Farmers were asked to state the month in which cases occurred; **44.2% reported cases** in winter, 38.4% in spring, 11.1% in summer, and 6.6.3% in autumn. The monthly distribution of cases is also shown in figure 1.

Table I : The farm prevalence of Listeriosis in dairy cattle in England

	cases "ever"		cases between July 1994 and June 1995	
	proportion (CL)	proportion ^a (CL)	proportion (CL)	proportion ^a (CL)
Overall	19% (16.3-22.0)	16.9% (14.3-19.8)	12.3% (10.0-14.8)	10.3% (8.4-13.0)
Milking cows	15.8% (13.3-18.6)	13.5% (11.2-16.2)	9.3% (7.4-11.7)	7.5% (5.9-9.9)
Replacement heifers	7.8% (6.1-10.0)	5.9% (4.4-7.9)	5% (3.6-6.8)	3.5% (2.5-5.3)
Dairy calves	2.2% (1.3-3.5)	1.2% (0.6-2.3)	1.4% (0.7-2.6)	0.5% (0.2-1.4)

^a= based on the diagnosis made by a veterinarian or V.I.C.

CL= 95% confidence interval

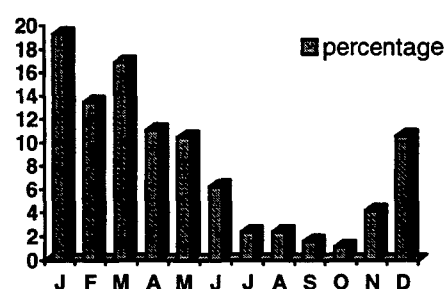


Figure 1 : Monthly distribution of listeric cases

Table II : Farmers reporting clinical symptoms in cases where diagnosis was made by a veterinarian or V. I. C.

Clinical signs	Frequency n=128 (%)
Silage eye (SE)	86 (67.2)
Nervous (N)	63 (49.2)
Abortion (A)	28 (21.9)
Sudden death (SD)	12 (9.3)
SE, A, N	123/128 (96.1)
SE, A, N, SD	124/128 (96.9)
Diarrhoea	8 (6.3)
Mastitis	4 (3.1)
Lameness	4 (3.1)
Pneumonia	2 (1.6)

Table III : The frequency of clinical symptoms for the cases reported between July 1994 and June 1995

Clinical signs	Frequency n=403 (%)
Silage eye	369 (84.5)
Nervous	49 (11.3)
Abortion	10 (2.3)
Mastitis	4 (0.9)
Sudden death	2 (0.5)
Diarrhoea	1 (0.2)

DISCUSSION

This is the first national survey of the frequency of clinical listeriosis in dairy cattle in England. A postal questionnaire was used to determine it. We have used this technique in previous studies of ovine myiasis (French et al, 1992) and Johne's disease (Cetinkaya et al, 1997). Listeriosis differs from these diseases in not presenting with one type of clinical sign; neurological signs, iritis, abortion and septicaemia all occur following listeria infection. However listeria does have a distinctive name and occurs sporadically (Radostits et al, 1994) for this reason we considered the farmers recall would be good enough to conduct such a survey. In order to validate the results we asked for the method of diagnosis. The majority of the cases were diagnosed by a veterinarian or V.I.C. and the estimates of prevalence using these data was within confidence limits of the overall estimates. We attempted to determine whether farmers knew what the clinical signs of listeriosis were by providing a list which included a mixture of clinical signs some of which were associated with listeriosis. When we examined sensitivity of reporting the correct clinical sign it was low for individual sign but high when at least one correct clinical sign was examined. This may indicate that farmers are poor at self diagnosis or that they report the particular clinical sign seen in their herd. The fact that there was no significant difference between veterinarian or V.I.C. diagnosis and that overall suggests that farmers misdiagnosis did not bias the results. However, the failure of farmers to recognise listeriosis and to call a veterinarian may have resulted in underestimate of the true prevalence. However given the seriousness of the clinical signs, we considered this unlikely. Comparison of incidence and prevalence data revealed interesting differences. At farm level the disease was reported most commonly in adult cows. However within herds the greatest incidence was in heifers and calves rather than cows. This suggests that younger animals are at greater risk, either because of susceptibility or exposure to different risk factors. We collected details of about 20 predictor variables in this study and are currently analysing the farm based risk factors associated with disease.

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