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SEROPREVALENCE OF LEPTOSPIRAL ANTIBODIES IN DAIRY CATTLE HERDS AND THEIR EMPLOYEES IN MASHHAD SUBURB IN IRAN

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La leptospirose est une importante zoonose qui entraîne des pertes de reproduction dans la production bovine dans le monde. La présente enquête analyse la séro-prévalence d'anticorps antileptospires dans des troupeaux laitiers et leurs employés.
De septembre 1994 à mars 1996, un total de 551 échantillons de sérums ont été prélevés de manière aléatoire de 18 troupeaux laitiers et du personnel. Ces sérums ont été soumis au test d'agglutination microscopique avec Leptospira interrogans. Des sérums ont fourni une réponse positive avec les antigènes de Leptospira interrogans serovars pomona, sejro hardjo, grippotyphosa, icterohaemorrhagiae icterohaemorrhagiae, icterohaemorrhagiae copenhagen et canicola. Les échantillons avec une agglutination supérieure ou égale à 50 p. cent ont été considérés comme positifs. Quatre vingt treize (23,9 p. cent) des 389 sérums de vaches et 23 (14,19 p. cent) des 162 sérums humains ont donné une réaction positive avec ces antigènes. Trente deux (8,22 p. cent) sérums de vaches et 7 (4,32 p. cent) sérums humains réagissaient avec plus d'un sérovar. Le sérovar le plus fréquent chez les bovins et l'Homme était L.I. grippotyphosa. Le titre le plus élevé en agglutination microscopique était de 1/6400 (N = 5 ; 1,28 p. cent) chez les vaches et de 1/800 (N = 11 ; 6,7 p. cent) dans les sérums humains. Le personnel de traite a les risques les plus élevés parmi les employés. Dans ce document, la corrélation entre séroprévalence de leptospirose et l'âge, le sexe et la productivité des vaches et chez différents employés de troupeaux laitiers est discutée.

INTRODUCTION

Leptospirosis occurs in all farm animal species and one of the most important feature of that is its transmissibility to man and it represents an occupational hazard to farmers. Mashhad suburb in Khorassan province is a major producer of livestock in east of Iran.

MATERIALS AND METHODS

During September 1994 to March 1996, a total of 551 serum samples were collected randomly from 18 modern dairy cattle (No.389, 70.6%) and their personnel (No.162, 29.4%). The typical size of dairy herds maybe 250-1500 cattle. The cows were milked by milking machine. The predominant dairy cattle are Holstein breed. None of the herds were vaccinated against leptospirosis. Of the 389 cattle bled, 76 (12.91%) were males and 313 (87.09%) were females. Ages ranged from less than 2 to over 10 years of age. Ages of cows was determined by using the identification card. Cows which were tested included: milking cows (No.179, 46.1%), dry cows (No.62, 15.93%), heifers (No.83, 21.33%), calves (No.51, 13.11%) and bull (No.14, 3.59%). The personnel who were bled included: milkers (No.61, 33.65%), heat observer (No.38, 23.45%), artificial inseminator (No.23, 14.19%), maternity and hospital workers (No.22, 13.58%), feed workers (No.6, 3.7%), tractor drivers (No.6, 3.7%) and others (No.6, 3.7%). Sera were screened at 1:100 dilution against 22 live antigens using the microscopic agglutination test (MAT) as described by Cole et.al. (1979). Positive sera were those that developed ÂÜ50% agglutination. Seroprevalence differences were assessed using x2 corrected for continuity (Snedecor and Cochran, 1967).

RESULTS

The overall leptospiral seroprevalence among dairy cattle and employees in the 18 herds were 93 (23.9%) out of 389 and 23 (14.19%) out of 162 serum, respectively. The differences between cattle and employees were significant (P>0.05). This survey determined that 61 (65.59%), 30 (32.23%) and 2 (2.15%) cattle serum samples had reaction against 1, 2 and 3 antigens, and 16 (69.57%) and 7 (30.43%) human samples showed positive reaction against 1 and 2 antigens, respectively. Samples showed positive reaction only against 6 antigens (Table I). The most common serovar in cattle and human were L.I. Grippothyphosa grippothyphosa.

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Table I
Prevalence of leptospiral antigens in cattle and employees

Serogroups	Serovars	No. Positive		%	
		Cattle	Employees	Cattle	Employees
Grippothyphosa	Grippothyphosa	33	13	23.98	43.33
Icterohamorrhagiae	Icterohamorrhagiae	32	4	25.19	13.33
Sejroe	Hardjo	24	4	18.89	13.33
Canicola	Hondutrech IV	21	8	16.53	26.66
Icterohamorrhagiae	Copenhageni	11	0	8.66	0
Pomona	Pomona	6	1	4.72	3.33

The least and highest titre for cattle were 1:200 (No.57, 44.88%) and 1:6400 (No.5, 3.93%) and human sera detection 1:200 (No.11, 36.66%) and 1:800 (No.11, 36.66%) dilution. The proportion of sera positive for leptospiral antibodies were significantly higher ($P<0.05$) in females (87.09%) than in male (12.91%) cattle (Table II).

Table II
Serological results for leptospiral antibodies by sex and age of cows

Age (yr)	Females			Males		
	No. Tested	No. Positive	%	No. Tested	No. Positive	%
<2	72	22	23.65	62	8	8.6
2-4	114	28	30.1	11	3	22
4-6	54	23	24.73	3	1	1.07
6-8	58	8	8.6	0	0	0
>10	15	0	0	0	0	0
Total	313	81	87.09	79	12	12.91

Among females and males the leptospiral seroprevalence rate was highest in females (No.18, 30.1%) in the 2-4 and less than 2 years old, respectively. There were no significant differences among different cattle. Among different occupation of infected employees (No.23, 14.19%) seroprevalence rate was highest in milkers (No.7, 30.43%) and the feed workers, tractor drivers and others had the least (No.1, 4.34%) seroinfectious (Table III).

Table III
Serological results for leptospiral antibodies in different occupations in dairy cattle herds

Occupations	No. Tested	No. positive	%
Milkers	61	7	30.43
Maternity & hospital workers	38	5	21.73
Artificial inseminators	23	3	13.04
Feed workers	6	1	4.34
Tractor drivers	6	1	4.34
Others	6	1	4.34
Total	162	23	14.19

DISCUSSION

Leptospirosis is becoming increasingly recognized as an occupational disease of farm workers (Laing J.A., 1988), particularly anyone working in a milking parlour is specially at risk, because it is so easy to get splashed with urine from an infected cow (Blowey R.W., 1990). Chronic infection of cattle is probably of little clinical significance. However, cattle may shed leptospiras in their urine for months or years (Carole A. et al., 1991). The prevalence of leptospiral infection based on serology alone may not be accurate, and the rate of cultural isolation may be comparatively low (Miller D.A.and et al., 1991). Leptospiral infectious may occur in the absence of detectable agglutination titre, unrelated and

unknown or excluded serovars may be missed, and MAT (the usual test) lacks sensitivity and is not reproducible (Feresu S.B., 1992). Despite of its limitation, the MAT is the preferred test in surveys for leptospiral activity (Ellis W.A. and et al., 1982 and Feresu S.B., 1992).

The hazard of infected dairy cattle as a reservoir of leptospira in spreading and transmission of the infection to employees was determined. However, the personnel (No: 7, 30.43%) who actually milked, had the highest risk factor among the farm employees. It may be due to humidity of milking parlour and shedding leptospira with urine and milk from infected cows. The high prevalence of leptospira interrogans reactions in this survey suggests that dairy cattle are a maintenance host for leptospira and the related human are in its high risk. The decrease in sera prevalence with age of cows may not be easily explained, but Ellis W.A. and et al. (1981) found that leptospirosis occurred more frequently in young cattle. Titre ordinarily diminish with age (Tuner L.H., 1967). In order to reduce the incidence and the severity of this disease, it appears desirable to vaccinate the cows.

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