

Communicable Diseases

An outbreak of leptospirosis in cattle and man

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On 20 May 1983 a 23 year old dairy farmer became ill with headache and aching joints. His symptoms worsened during the next week, and he was admitted to hospital on 27 May because he was vomiting and had neck stiffness. He was thought to have viral meningitis; a lumbar puncture produced cerebrospinal fluid containing 300 lymphocytes and 30 polymorphs per μl ; protein and glucose were within normal limits. He was much better the next morning and was discharged on 29 May. He has remained well.

His brother aged 20 took over the milking, and within the first few days he noted that five cows had an atypical mastitis, with a sudden drop in milk yield and clots in two or more quarters of the udder. There was, however, no pain or swelling of the udder. On 8 June a cow aborted. The fetus was submitted to Starcross Veterinary Investigation Centre, where infection with *Leptospira interrogans* serogroup Hebdomadis serotype *hardjo* was confirmed by fluorescence antibody test in fetal lung and kidney, with the help of the Central Veterinary Laboratory, Weybridge. Subsequently the cow was found to have an antibody titre to *L hardjo* on the microscopic agglutination test of 1/1600 at abortion declining to 1/400 after two weeks, confirming recent infection. The farmer's mother read in the farming press a description of the human disease caused by *L hardjo* which closely matched her son's illness and communicated her suspicions to their general practitioner. A specimen of her son's blood was collected on 5 July and compared with the specimen taken on 25 May. Rising titres from <1/10 to 1/40 to the leptospira group antigen were shown by complement fixation test. The *Leptospira* Reference Unit reported titres rising from <1/40 to 1/1280 to serogroup Hebdomadis, serovar *hardjo* predominating, in the microscopic agglutination test.

On 1 July the farmer's brother developed an influenza-like illness. He was treated at home by the general practitioner with oral phenoxymethylpenicillin 500 mg four times daily, and his symptoms improved at first, but on 6 July he was admitted to hospital with headache, vomiting, and photophobia. No abnormal physical signs were observed, and his cerebrospinal fluid contained 240 red cells, three polymorphs, and three lymphocytes per μl . He was treated with intravenous penicillin for five days followed by oral phenoxymethylpenicillin (500 mg four times daily) for a week. He was discharged from hospital on 12 July still suffering from mild frontal headaches. Sera collected

on 2 and 12 July showed a rising complement fixation titre from <1/10 to 1/160 to leptospira. Microagglutination tests at the *Leptospira* Reference Unit indicated infection by *L hardjo*, with antibody titres rising from <1/40 to 1/1280. He has since made a complete recovery and has remained well. Both patients have been confirmed serologically as suffering from *L hardjo* infection. Another cow aborted on 5 July, and infection with *L hardjo* was again confirmed by fluorescence antibody test.

Investigations on the farm

After the second cow aborted urine samples were taken from 10 cows. *Leptospira* were isolated from three of them, and all three isolates were identified as *L hardjo*. Serological examination was also carried out on the 25 heifers due to calve and enter the milking herd in the autumn and on 35 of the 90 cows in the milking herd. A picture typical of epidemic leptospirosis emerged in the milking herd, where 21 of the 35 cows had titres of 1/100 or greater, and of these 15 had titres of 1/400 or more indicating active infection. Evidence of infection with *L hardjo* in one of the five cows with atypical mastitis was also obtained, but all the 25 heifers due to calve were seronegative.

The epizootic nature of the infection in this herd and the possibility of further human cases led to a decision to treat the whole of the milking herd with single injections of dihydrostreptomycin at 25 mg/kg body weight and at the same time to give all treated animals a primary course of two doses of a killed *L hardjo* adjuvant vaccine (Leptavoid-H, Wellcome). Excretion of a single dose of dihydrostreptomycin through the kidney effectively kills incumbent leptospirae, and the vaccine was given to immunise against reinfection, since *L hardjo* is likely to persist in the environment for short periods. The uninfected heifer group, which was grazed away from the main herd and buildings, was given a primary course of vaccination. Since that time there has been no further illness attributable to leptospirosis on the farm.

Comment

Cattle are the reservoir host for *L hardjo*, and persistent carrier animals maintain infection in the kidney. Infection probably entered this herd through the purchase of stock, possibly in May 1982, when the last group of adult stock was bought. A crop of abortions occurring in the autumn of 1982 was at the time shown to be mostly due to *L hardjo* infection, but no commercial vaccine was then on the market and treatment with dihydrostreptomycin alone has limited value in control. The cattle were turned out of winter housing in late April 1983, and during the exceptional rains in the spring of that year the wetness of the pasture is likely to have increased survival and facilitated transmission of infection. Cases of agalactia generally occur within a week or so of infection, but abortions usually do not follow for four to eight weeks.

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Infection in man has been reported in milkers working in the pit of the new commonplace herringbone milking parlour, as in this case. The milker works at udder level and is thus liable to be contaminated by urine, either by direct facial splashes or from aerosols generated when the urine falls to the parlour floor. A survey carried out by the Central Veterinary Laboratory and Veterinary Investigation Centre in 1980 showed that about 23% of cattle in the south west of England have serological evidence of infection with *L hardjo*. High levels of infection have also been found in other parts of the country.

The possibility is thus very real that milkers using this parlour system may acquire infection from carrier cows who excrete the organism. In humans *L hardjo* infection has in recent years accounted for about one quarter of all cases of leptospirosis diagnosed in Great Britain. The usual feature of infection with this serotype is the severity of the headache, but occasionally more serious complaints such as meningitis, as in the patients in this outbreak, and even death, may occur. In general, however, *L hardjo* infections usually give rise to a mild influenza-like illness with a severe frontal headache and a prolonged period of recovery.

Treatment of leptospirosis with antibiotics is controversial. Alston and Broom stated that antibiotic treatment does not benefit patients when, as is usual, it is not begun before the third or fourth day of illness.¹ There have been many reports of treatment with antibiotics, but little satisfactory evidence that they altered the course or outcome of the disease. The general consensus favours parenteral penicillin in large doses for severe illnesses; the treatment should be continued even if it provokes a Herxheimer effect.² Amoxycillin has emerged as the preferred oral treatment because it is well absorbed. It has been used empirically in a number of *L hardjo* infections because the illness is often prolonged, but with only anecdotal evidence that it is effective in shortening the course of the disease. The usual dose is 500 mg three times daily for five days.

References

- Alston JM, Broom JC. *Leptospirosis in man and animals*. Edinburgh: E and S Livingstone, 1958:198.
- Turner LH. Leptospirosis I. *Proc Roy Soc Med Hyg* 1967;**61**:842-55.

Leptospirosis in man, British Isles, 1983

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During 1983, 120 cases of leptospirosis were confirmed by the *Leptospira* Reference Unit, almost double the 1982 figure of 61.¹ Four patients died. Eight infections were thought to have been contracted abroad, all in soldiers. Of the remaining 112 patients, 77 contracted the infection in England, five in Wales, four in Scotland, five in Northern Ireland, one in the Channel Islands, and 20 in the Republic of Ireland.

Cases are classified by serogroup and age of patient in the table;

Age and serogroup

Serogroup	Age (years)							Not stated	Total
	<14	15-24	25-34	35-44	45-54	55-64	≥65		
Icterohaemorrhagiae	2	10*	5	5	3	10	2	2	39
Hebdomadis		8	16*	16	6	7		2	55
Canicola	1	3	1	1	2				8
Other		2**	2**	1*					5
Not determined	1	3	1*	2	3	1	1	1	13
Total	4	26	25	25	14	18	3	5	120

*Case infected abroad.

the total includes six infections in girls and women: a 23 year old with Icterohaemorrhagiae, a 21 year old with Hebdomadis, three patients aged 9, 34, and 47 years with Canicola, and one 48 year old for whom the serogroup was not stated. Of the 55 patients infected with Hebdomadis serogroup leptospires, all but one belonged to serotype *hardjo*, which is associated with cattle: 26 of these patients (24 in England) had contact with infected herds, and in four of these incidents more than one case (two to four) occurred on a single farm. The fourfold increase in reports of this serotype since 1982 is thought to be largely due to increased awareness of the risk of infection among the farming community, especially those working with dairy cattle. An article on the subject appeared in a farming journal during the early summer of 1983. Three regions—South Western, West Midlands, and Oxford—recorded half of the 54 *hardjo* infections.

The number of Icterohaemorrhagiae serogroup infections also increased, from 23 in 1982 to 39 in 1983.

Eight patients with leptospirosis (all male) contracted their infection abroad: three in Belize (one Icterohaemorrhagiae, two Bataviae), three in Brunei (one Australis, one Hebdomadis, one not determined), one in Seychelles (Australis), and one in West Germany (Grippotyphosa).

The disease showed the same well defined seasonal pattern as in previous years. Ninety six cases were reported in the six month period from June to November with peaks in July (23) and October (19). The remaining seven cases had onsets before the year under review. In Icterohaemorrhagiae infections there was a definite high plateau of cases in the three month period August to October, during which 22 of the 39 cases occurred, whereas Hebdomadis infections showed two peaks of incidence, with 21 cases in June/July and 19 in October/November.

Of the 39 patients with Icterohaemorrhagiae infection, 21 had both jaundice and renal failure (four also had meningitis), six had jaundice (one with meningitis), three had renal failure (one with meningitis), one had meningitis only, and two had an influenza like illness; in six the symptoms were not stated. In contrast, the following symptoms were reported in 55 patients with Hebdomadis infection: 16 had meningitis only and 28 an influenza like illness; one had renal failure and jaundice, one renal failure alone, three jaundice alone, and one jaundice and meningitis. In the remaining five the symptoms were not stated. The symptoms recorded in the eight patients with Canicola infections were characteristic of the serogroup: six had meningitis alone, one meningitis with renal failure, and one renal failure alone.

Leptospirosis in Britain is mainly seen in men; this preponderance was particularly marked this year. The distribution of cases among age groups was also typical, with only seven of the 115 cases for which the age was stated not of working age (15-64 years); none of the seven belonged to the almost entirely occupationally acquired cattle associated group of *hardjo* infections.