JOHNES DISEASE IN DEER

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In 1987 Gumbrell[1] summarised 10 cases of Johnes Disease in deer that had been reported through the Laboratory Network from 1979 to 1986 Five of these were from the North Island and five from the South Island.

In 1990 de Lisle[2] described 16 bacteriologically confirmed cases of M paratuberculosis in farmed deer from samples sent to the Central Animal Health Laboratory from 1970 - 1990

In 1990 there were 6,200 deer farms holding approximately 1 million deer in New Zealand (Carter 1991[3])

Johnes Disease is common in sheep and cattle in New Zealand and many deer farms have been established on areas previously grazed by these species so numerous opportunities have probably occurred for M paratuberculosis to spread to farmed deer

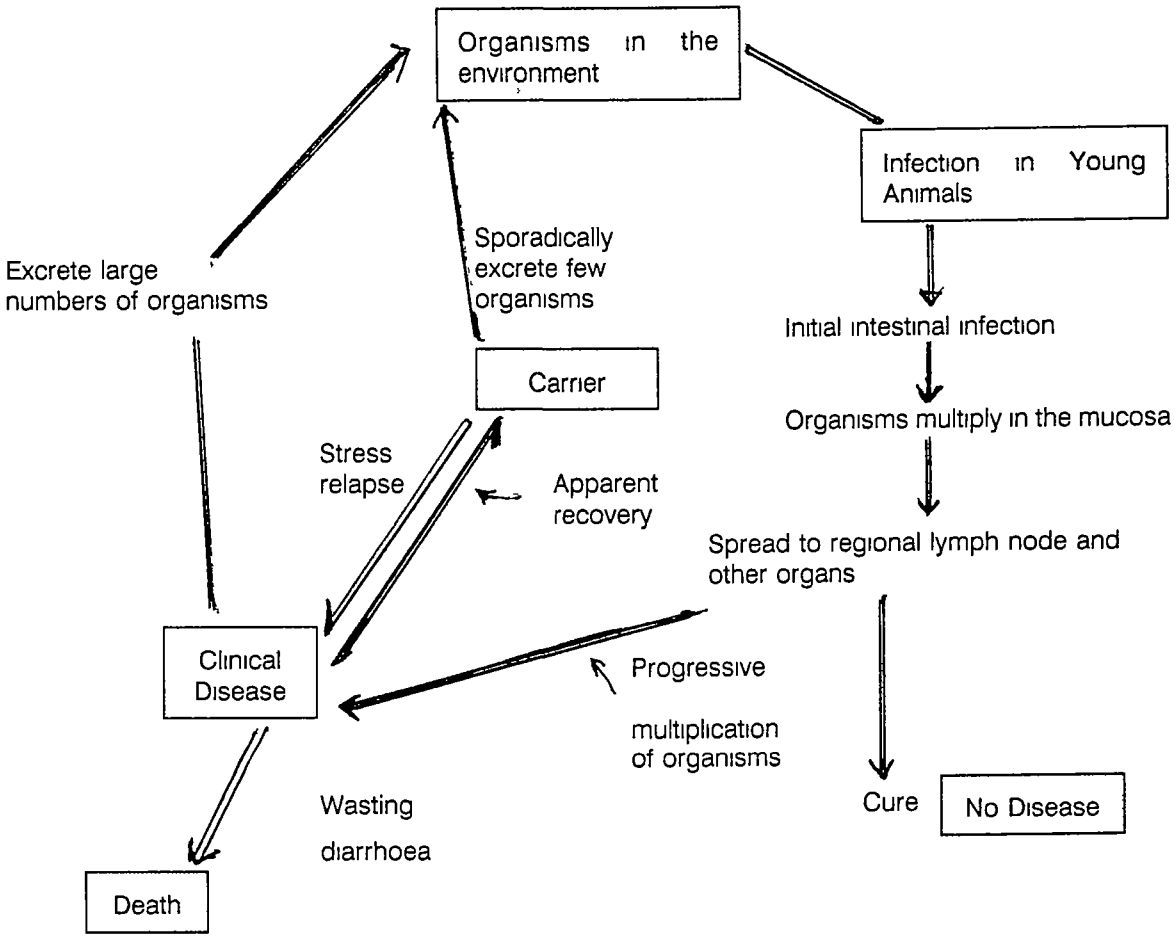
The apparently low prevalence may suggest that the organisms present in New Zealand are not particularly virulent in deer or that New Zealand deer are not especially susceptible to the strains of M paratuberculosis present here.

In the United Kingdom McKelvey[4]described an outbreak with multiple cases in yearling deer on one property, suggesting that the strain of M paratuberculosis in the United Kingdom may be more virulent or that the deer there are more susceptible to Johnes Disease

In de Lisle's paper[2] Table I shows that of the confirmed mycobacterial isolates in deer an increasing proportion are M paratuberculosis

Nyange [5] 1989 experimentally infected deer calves with both M avium and M paratuberculosis and showed the similarities in these two syndromes His study also confirmed that the epidemiology and pathogenesis of M paratuberculosis infection in deer is basically similar to the disease in other ruminants

Epidemiology and Pathogenesis of Johnes Disease



Details of recent cases reported to Lincoln and Invermay Animal Health Laboratories are tabulated Table I The findings of these cases show that

(1) M avium and M paratuberculosis infection can be similar clinically and pathologically

(2) A significant number of lesions (4/10) were found in clinically normal animals slaughtered for meat The lesions were usually enlarged mesenteric lymph nodes submitted a suspicious of tuberculosis possibly with abscesses or granulomatous foci In de Lisles study[3] 8/16 were from Meat Works submissions.

TABLE 1

Johnes Disease Cases 1989 - 92 Lincoln and Invermay

	1	2	3	4	5	6	7	8	9	10
Location	Canty Nr Chch	Nth Canty	Nth Canty	Nth Canty	C Otago	Sthld	Sthld	Sthld	Sthld	Inv
Age	5	2	2/3	2/3	4	Na	Ad	Na	Na	Ad
Sex	F	F	M	M	M	Na	M	Na	Na	F(preg)
No affected	-	3 Tb test react	1/7 Works	1/18 Works	- -	1/124 Blood Test	-	Works	Works	
Clinical loss condition	+ (wks)	+	-	-	+		+ progressive	-	-	+
Diarrhoea	+	+	-	-				-	-	+
Other	Afos faeces				hair loss		extensive skin lesions			
P M Enlarged L/Ns	+	+ 1/3	+	+	+ all nodes			+	+ caseous	
Intestine thickened	+							+		
Microscopic Node	+	+	+	+	+			+	+	+
Intestine	+				+			+		+
Dx/ Culture	M avium	M paratb pooled L/Ns	M paratb Cattle type	Culture to come	Histo only	+ve CFT	+ve CFT	M paratb	M paratb	-ve (contam)

Clinical Signs may be variable from a slow insidious disease to a rapidly progressive wasting disease and rapid death.

Weight loss is the most conspicuous sign and diarrhoea is less common, but often a subterminal or terminal event Affected animals may retain their winter coat and develop patchy alopecia.

Affected animals may be excreting acid fast organisms in the faeces, and may have a positive complement fixation test titre

The gross pathological picture can also be variable but may include emaciation of the carcase, dull hair coat with patches of alopecia, gelatinous body fat deposits and serous effusion into the body cavities.

The intestines may be slightly thickened and oedematous especially in the lower small intestine and caecum. A careful examination of the opened intestine may show pale yellowish irregular thickening, reddening along fold crests. Sometimes erosions are seen but this more commonly occurs with M avium infection. The mesenteric lymph nodes especially those draining the ileocecal area are usually enlarged and oedematous and the cut surface may reveal yellowish caseous foci, abscessation or foci of calcification There may be beading of the lymphatics The liver may be swollen and mottled when slices.

In severe cases which are more likely to be M avium infection the gross pathology resembles Johnes Disease of sheep with more extensive thickening and corrugation of the intestinal mucosa

Microscopically the pathology is also variable, but affected organs have characteristic granulomatous infiltrations with accumulations of large foamy epithelioid macrophages and occasional giant cells

These accumulations can occur at all levels of the intestine i e mucosa, submucosa and through to the serosa and although most commonly in lower small intestine and caecum, the pathology can extent to the abomasum The draining lymph nodes contain granulomatous foci which can coalesce to form necrotic foci which may calcify. Accumulations of epithelioid macrophages can occur in the periportal areas of the liver and in the interstitium of the lung (a feature not seen in sheep or cattle Johnes Disease)

In Ziehl-Neelsen stained sections numerous acid fast staining organisms are seen in these foamy epithelioid macrophages confirming the diagnosis of a mycobacterial infection

However M avium and M paratuberculosis can produce almost identical pathology and culture is required to separate these two infections

Summary

M paratuberculosis and M avium are sporadic infections of deer and should be considered in cases where there is unexplained weight loss, lingering illness or sudden death with diarrhoea, positive tb test reactors, or enlarged mesenteric lymph nodes seen at slaughter. Veterinarians at slaughter plants should submit sections of adjacent gut and liver from deer with suspicious changes in mesenteric lymph nodes.

References

(1) Gumbrell RC (1987) Johnes Disease in deer in New Zealand. Proceedings of Deer Branch NZVA No. 4 pp 174-180

(2) de Lisle GW, Wards BJ, Collins DM (1991) The diagnosis of Johnes Disease in farmed deer. Proceedings of the 3rd International Colloquium on paratuberculosis 1991

(3) Carter CE (1991) Tuberculosis control in the NZ Deer Industry. Proceedings of Symposium on Tuberculosis, Veterinary Continuing Education, Massey University, Publication No 132 pp 203-211

(4) McKelvey WAC (1987) Vet Deer Society October 87 2 (6), 24-8 [Cervus 27, 2]

(5) Nyange JFC (1989) "Pathogenesis of Johnes Disease Syndrome in Deer" Vet Deer Soc 3 (4) 20-23 [Cervus 27, 2]