THE INCONVENIENCE OF LYMPH NODE GROSS LESIONS (NON-*M. bovis)* AT POST MORTEM INSPECTION OF DEER

Adrian Campbell

INTRODUCTION

A number of practitioners receive advice that lymph nodes grossly typical of *M bovis* have been detected in a clients' deer at D S P's For accredited properties this usually evokes the response "It will be avian TB" However, there is always that element of breath holding until a definitive diagnosis has been made - i e "Could it be *M bovis?*"

While it may be viewed as extremely fortunate that such a lesion is not due to *M bovis*, lesions due to other causative agents are not without their drawbacks

The often lengthy process of identifying the causative agent allows many flow on effects to occur It is this "inconvenience" that this paper will discuss when *M bovis* is not the causative agent

This paper will

1 Supply some statistics on non *M bovis* lymph node lesions at inspection
2 Describe the process of causative agent identification
3 Consider the possible impact such uncertainty has on the farm and its owners
4 Give some brief but actual property examples
5 Outline some preventative procedures to minimise the impact of such cases

Note - reference to *M avium* refers to fact to *Mycobacterium avium* complex - including *M intracellulare*

TABLE 1
Results of Culture from Lymph Node gross lesions :
Data from South Canterbury MQM Office 1993-95

	M. avium	*M. paratb**	*Nil Culture*	*M. bovis*	**Total**
Number	3	0	40	25	68
%	5	0	59	36	100

* paratuberculosis

TABLE 2
Results of Positive Cultures from Lymph Node Gross Lesions :
(Lincoln Animal Health Laboratory Data)

	1993	1994	1995
M avium	3 (6%)	7 (9%)	2 (10%)
M paratb	3 (6%)	7 (9%)	3 (10%)
M bovis	47 (88%)	68 (82%)	20 (80%)
Total	53	82	25

TABLE 3
Wallaceville AHL National Data

	M. avium	*M. paratb*	*M. bovis*	TOTAL
1970-1984	58 (8%)	0 (0%)	637 (92%)	695
1985-1988	77 (20%)	3 (1%)	309 (79%)	389
1989-1991	120 (14%)	18 (2%)	705 (84%)	843
1994 only	- (17%)	- (12%)	- (71%)	-

References - See (1)
- also deLisle G W pers comm

Comments

As tabled the number of lymph node lesions grossly typical of, but not in fact *M bovis*, is relatively small when considering the number of deer slaughtered

e g	Nationally	1990	96,000	* year ending June
		1991	178,000	
		1992	281,000	
		1993	444,000	
		1994	335,000	
		1995	437,000	* year ending May

However, on a percentage basis the number of lymph node lesions grossly resembling *M bovis*, but not in fact *M bovis* is significant (8-30% nationally) as a function of *M avium* complex and *M paratb* infections

While anecdotal discussion would point towards an increase in the frequency of such cases, no suitable data exists to suggest or confirm that Fair to say though there are few veterinarians who have not had clients subjected to this wait and see process The group of farmers who have been part of this process is growing

Causative Agent Identification

Once a lymph node has been observed grossly as "suspicious" the unrelenting process of causative agent identification begins

Sometimes this process may take only days - but often when a full diagnostic process is required in excess of 12 weeks may elapse It is this longer diagnostic period especially that allows the many possible inconveniences to occur for the owner/farmer

Potential, causative agents other than *M bovis* are as listed below, in approximate order of frequency -

- *M avium* complex
- *M paratuberculosis*
- *Rhodocuccus spp*
- *Actinobacillus lignieresii*
- *Fusibactarium sps*
- *M vaccae*
- *Corynebacterium*
- Staphlococci
- Others

Note - although *Yersinia pseudotuberculosis*, frequently found in deer, enjoys a suggestive species name for diagnostic confusion, it only derives that name from such TB like lesions in birds! This organism does not cause lesions resembling TB in deer

The diagnostic process starts with histology, with HE and ZN strains which quickly eliminate the non-Mycobacterial agents

Such strains selectively highlight giant cells, epitheloid cells or macrophages packed full of Mycobacterial organisms Unfortunately *M bovis, M avium* complex and *M paratuberculosis* all exhibit this histology preventing differentiation between the three on histological grounds alone

The differentiation of Mycobacteria species in deer is also unfortunately more difficult than in cattle for example

The overall histological architecture of *M bovis* granulomatous lesions in lymph node lesions are inconsistent with this almost pathognomonic structure as seen in cattle This reduces the possibility of differentiating between the three mycobacteria based on typical granulomatous lesion histology

In cattle, *M paratb* does not normally cause lymph node lesions histologically typical of *M bovis* - i e necrosis of tissue However, in deer, *M paratb* does in many cases cause necrosis, confounding a diagnosis based on histology only (2)

Therefore after ruling out non Mycobacterial causes, culture is usually required to differentiate between *M bovis, M avium* and *M paratuberculosis* in deer If other tissues such as associated intestine, lung or liver are included for histology, then apart from in generalised TB cases, lesions in these other tissues probably represents *M avium* or *M paratuberculosis*

The specific site of lymph node lesions is generally of poor diagnostic value (see Case Study) Therefore the ultimate test usually required is culture

Culture at Wallaceville to differentiate these three *Mycobacteria* spp requires a minimum of 6-8 weeks for growth to be confirmed and typed *No growth* is only confirmed at 12 weeks, allowing the cases to be closed, although it must be remembered that the sensitivity of culture is not 100% - ie negative cultures can occur even in *M bovis* infected cases However, this is unlikely to be common

Additional information to add to histology and culture could be serology - especially for Johnes Disease, or the Lymphocyte Transformation Test which can help differentiate the mycobacterial species involved However, the unreliability of Johnes serology, or the low likelihood of heparinised blood being available for the LTT from a carcase, renders these tests practically unavailable or unhelpful

Thus the diagnostic process may take up to, or in excess of, a quarter of a year It is this time frame that is particularly damaging in allowing the possible flow-on effects

POSSIBLE IMPLICATIONS OF "SUSPICIOUS" LYMPH NODE LESIONS

The most immediate effect is that the carcase is detained and frozen until confirmation of the causative agent In non-*M bovis* cases, full carcase/schedule payment certainly happens but payment may be delayed up to 4 months post slaughter Single carcases are unlikely to impact on the owner's finances significantly, but properties that have a large percentage of carcases with non-*M bovis* lesions may be penalised significantly(1) Cost to the DSP is the discarding of the associated deer offal and the carcase not being eligible for the chilled market In addition, a cascade of paperwork, notification and rigmarole is initiated

The issue of notification of deer farmers is viewed very sensitively both by deer owners and their association, the NZDFA - as evidenced by recent AGM remits The remit requested prompt advice on the detection of such "suspicious" lymph nodes

In addition another remit shows how determined the industry is to control bovine Tb The remit in essence is seeking to suspend the Tb status of any property with suspicious lymph node lesions, regardless of risk factors, and to stop deer movements apart from to slaughter until the diagnosis of *M bovis* is rejected.

Of most significance is the impact on the Tb status of the farm of origin It would take a brave or ignorant Regional Veterinary Officer not to be perturbed by the detection of lymph node lesions at PM inspection, grossly resembling *M bovis* Clearly any response is tempered by epidemiological considerations but some action is required for some properties

As evidenced in the case studies to follow, Tb status may revert from accredited to suspended or even infected movement control Only after confirmation that this lymph node lesion is not caused by *M bovis* will the original herd status be reinstated. In the interim period all sorts of havoc is possible. Properties expressly involved in stud operations with live sales of stags or elite females, may find enthusiasm by purchasers substantially reduced, or even all stock movements, apart from to slaughter, stopped

Other livestock, eg cattle, run alongside the deer herd may be simultaneously affected

To help ease this interim response by providing more herd data, whole herd skin testing may be introduced, with obvious costs The interpretation of any skin test reactions may well be interpreted in the case of a false gross lymph node lesion of unknown aetiology more severely than required This "blip" in accreditation is extremely damaging and the stigma of loss of accreditation is highly undesirable - even if it is only temporary All these factors impact significantly on the owner's "peace of mind" and, for that matter, also for the owner's veterinarian Such a process, especially if protracted in time, is not pleasant, with anxiety, inconvenience and financial expense

The management and financial implications of this are immense Stocking rates may escalate significantly if stock cannot be moved, feed shortages result, per head performance reduces, successful flushing for mating may not occur and clinical disease/death may occur These are the worst case scenarios, and would generally be prevented by the last option of elective DSP slaughter for venison However, in the case studies presented, all of these scenarios were present to a certain degree The financial implications are equally crippling

CASE STUDY 1

Area:	-	South Canterbury
	-	Non-endemic
Species:	-	Fallow deer
	-	Simmental cattle stud
TB status:	-	Currently and historically accredited
Prior history:	-	Occasional skin test (MCT) +ves
	-	No false lymph node lesions
	-	Low risk factors
21/1/93	-	50 deer slaughtered
	-	Tb status infected movement control

- No live stock movements - deer or cattle
- Whole herd testing - deer (400) and cattle (150)
- No skin test +ves
- 3 months later - no growth of one, and oversight in culturing the second animal lymph node
- Tb status elevated to suspended
- 3 months culture - avian Tb culture - animal (2)
- Accreditation reinstated

IMPACT SCORE MAJOR!

CASE STUDY 2

Area:
- South Canterbury
- Non-endemic

Species:
- Wapiti/Hybrid/Red
- Charolais stud cattle

Tb status: - Currently and historically accredited

Prior history:
- No skin test (MCT) +ves
- No false lymph node lesions
- Low risk factors

DATE	NO.	GROSS LESION	CULTURE
3/93	1/30	Prescapular Tb status - suspended - then accredited - on culture results	Avian
1/94	1/85	Ileojejunal	Avian
6/94	1/50	Retropharyngeal and mediastinal and other	Avian
12/94	5/30	Retropharyngeal liver + jejunal	Avian
2/95	1/51	Retropharyngeal and parotid	Avian
5/95	1/50	Ileocaecal and ileojejunal	Avian
IMPACT		MINOR	

CASE STUDY 3

Area:	-	Western Bay of Plenty
	-	Non-endemic
Species:	-	Wapiti + Hybrid + Red
Tb status:	-	Currently and historically accredited
Prior history:	-	Occasional skin test (MCT) +ves
	-	No false lymph node lesions
	-	Low risk factors
12/92	-	50 deer slaughtered
	-	1 deer 1 lesion
	-	January bull sale cancelled
	-	Cultured avian
12/93	-	55 deer slaughtered
	-	1 deer 1 lesion - blood test avian
	-	January bull sale occurred
	-	Cultured avian
12/94	-	Repeat of above
Mid-1995	-	55 deer slaughtered
	-	1 deer 1 lesion
	-	No blood results
	-	Animals retrieved back from mid-year female sale
	-	Cultured avian

IMPACT - MAJOR - CEASED PRIVATE AUCTIONS ON FARM

MINIMISING RISK

This section is an attempt to discuss ways to minimise the potential inconvenience arising from lymph node lesions resembling Tb but which are non-specific

1. Properties with no history of non-specific gross lesions

If a property has a significant emphasis on live sales then care should be exhibited as to when finishing deer are slaughtered This is not simple as the natural timing of finishing and the peak schedule will fall within three months of stag sales, as an example

2. Properties experiencing their first non-specific lymph node lesions

This is the most difficult situation to remedy and probably results in the entire process of section (3) above Careful analysis of risk factors, and prior history may minimise this, but

clearly an industry being responsible for Tb control will tend to consider this temporary cost acceptable The owner may well think differently

3. Properties with a persistent non-specific lesion problem

The detainment of carcases can probably not be overcome However, the impact on property status and deer movements may be minimised to the point where non-specific lesions will require confirmation that they are such, but with no change of Tb status in the interim

CONCLUSION

In perspective, the control of *M bovis* is paramount and the level of specificity for non-specific gross lesions is probably acceptable However, any deer farmer who has suffered the anguish of this process would be ready for other alternatives Unfortunately no other alternatives currently exist

To quote de Lisle *et al* (1)

> *"Until further methods of detection, such as polymerase chain reaction, become routinely available, inevitable delays will occur, or premature action will be taken "*

This paper outlines the problems and implications involved with differentiating quickly the Mycobacterium species or other organisms in deer lymph node lesions Little can be done to minimise this process currently

The message from this paper is that our industry must work towards other routine methods to accelerate this Mycobacteria identification process

In the meantime, veterinarians and Regional Veterinary Officers (MAFQual) must understand the impact such a process may have on a particular deer farm and owner, and provide appropriate support

Acknowledgments

Information presented in Tables 1, 2 and 3

- Pearson, Bill, MAFQual, Timaru
- Hutton, Jim, Lincoln Animal Health Laboratory, Lincoln
- de Lisle GW, Wallaceville Animal Health Laboratory, Upper Hutt

References

(1) de Lisle GW, Joyce MA, Yates GF, Wards BJ and Hoyle FP (1995) *Mycobacterium avium* infection in a farmed deer nerd NZ Vet Journal, Feb 1995, Vol 43 (1)

(2) deLisle GW, Yates GF and Collins DM (1993) Paratuberculosis in Farmed Deer Case reports and DNA characterisation of isolates of *Mycobacterium paratuberculosis* J Vet Diag Invest 5, 567-71