Tb-like lesions at the DSP

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Introduction

Tuberculoid lesions that are typical of, or suspicious for, tuberculosis (Tb) are commonly found in deer at slaughter in the mesenteric (jejunal) or ileo-caecal lymph nodes. They are usually single lesions in animals that are apparently healthy and can be from herds with no history of Tb infection. The notification of these "suspect Tb" lesions can cause considerable concern and distress to the owners.

The aetiology of these lesions is varied but can be classified into non-Mycobacterial agents (such as *Rhodococcus* sp. or *Actinobacillus* sp.) or Mycobacterial agents (*M. bovis*, *M. avium*-complex or *M paratuberculosis*).

Obviously there are very different implications for the farmer between these different agents, especially the latter three, in terms of their epidemiology and control.

In 1995, Adrian Campbell presented an excellent paper to the Deer Branch Conference entitled "The inconvenience of lymph node gross lesions (non-*M bovis*) at post mortem inspection of deer". That paper presented case studies on the consequences of finding non-Tb lesions in a deer at a Deer Slaughter Plant (DSP).

This workshop/paper is intended to update the situation and to provide a platform for discussion on how to assist veterinarians to help their clients deal with these problems.

Standard procedure following finding lesions at DSP:

1. Once a suspicious or typical gross lesion is found at slaughter;

    a. Either a MAF veterinarian or an Assure NZ meat inspector will take samples.
    b. The carcass is detained.
    c. The MAF veterinarian notifies AgriQuality NZ that a lesion has been found.
    d. Owners will be notified by the DSP operators and/or the MAFVA veterinarian that a lesion(s) has (have) been found and the carcass is being detained.

2. Fresh and fixed samples of all gross lesions that are typical or suspicious for bovine Tb are sent to a diagnostic laboratory for histopathological examination.

3. The histopathological sections are examined within 4 days of receipt and are classed as "typical Tb", "suspect Tb" or "negative" and the result sent back to the MAFVA veterinarian.

4. If the carcass has been held pending the result it will then be cleared for export if the histopathology is negative..

5. If the lesion(s) is/are "typical Tb" or "suspect Tb" AgriQuality NZ will set the herd's Tb status either to Suspended or Infected and notify the owner. Herds that have a history of

having tuberculoid lesions that are not due to *M bovis*, may not have their status changed until the lesion has been cultured. Culturing of lesions is undertaken by AgResearch Wallaceville at the discretion of the AgriQuality NZ veterinarian.

6. The samples are routinely cultured for *M. bovis* and *M. avium*. If the tissue sample is from a mesenteric (jejunal or ileo-caecal) lymph node then an additional culture (containing mycobactin) is put up for *M paratuberculosis*. These cultures can take up to 12 weeks.

7. In herds where the final diagnosis is critical to either farm management (e.g. pending sales) or management of Tb in the surrounding area, a PCR may be performed. This decision is made by an AgriQuality NZ veterinarian in consultation with the owner and their veterinarian (when the veterinarian is actively involved by the owner).

8. Because the confirmation of suspect Tb lesions at slaughter is part of the surveillance function of the national Tb Strategy, the Animal Health Board (AHB) currently pays for all histopathology on samples coming from slaughter premises and for all laboratory costs authorised by AgriQuality NZ.

9. The results of the PCR and/or culture are reported by AgResearch Wallaceville to the AgriQuality NZ veterinarian and the MAFVA veterinarian, who in turn will inform the DSP. The AgriQuality Veterinarian reports the results of the culture/PCR and its affect on the herd status to the owner

Background Information

Table 1. shows some results of Mycobacterial cultures from deer tissues for 1994 and 95. It can be seen that Mycobacteria were isolated from around 50% of tissues submitted to Wallaceville. Of these 66% were *M. bovis*, 13% *M avium* complex and 15% *M paratuberculosis*. Note that up to 5% of ZN positive lesions were culture negative and it is probable that the majority of these were *M. paratuberculosis (ptb)*.

Table 1. Mycobacterial culture of deer tissues

Year	Total examined	No Mycobacteria isolated	*M bovis*	*M avium* complex	*M ptb*	Culture –ve ZN +ve
1994	505	270 (53 5%)	167 (33 1%)	39 (7 7%)	28 (5 5%)	25 (5 0%)
1995	632	313 (49 5%)	215 (34 0%)	35 (5 5%)	68 (10 8%)	18 (2 8%)

Table 2. shows some statistics from DSPs for the 3 years 1996, 97 and 98 for deer with only lesions found in the mesenteric (jejunal and ileo-caecal) lymph nodes at slaughter. Lesions were more commonly found jejunal lymph nodes (213 vs 31 in ileo-caecal) and *M. bovis* was more commonly cultured from them (8% vs 3% in ileo-caecal).

Table 2. Data from Deer Slaughter Premises 1996-98

Gross Tb lesion	Histology	Culture ileo-caecal LN				Culture jejunal LN			
		No	*M bovis*	neg	ND or pending	No	*M. bovis*	neg	ND or pending
Equivocal	Typical	21	1	17	3	36	0	29	7
	Suspicious	4	0	4	0	30	3	23	4
	Negative	3	0	1	2	8	0	0	8
	ND	2	0	0	2	16	0	1	15
	Total	30	1	22	7	90	3	63	34
Typical	Typical	14	1	6	7	58	8	30	20
	Suspicious	8	0	3	5	39	8	21	10
	Negative	2	0	1	1	8	1	1	6
	ND	7	0	1	6	108	0	0	108
	Total	31	1 (3%)	11		213	17(8%)	52	144

Problems

There are a number of links in the chain where things can go wrong or communication breakdowns can occur.

1. There have been cases where observers have witnessed mistakes made in the identification of animals and there has been mixing of lines of deer. Because a high proportion of slaughtered deer are not identified it makes the detection or correction of the mixing of groups very difficult. Although these errors are usually of little consequence, they have huge implications if they involve lesioned animals.
   In the future, these issues should be overcome by the DSPs being required to report suspect Tb cases against the life-time identification tag of the animal; this requirement is being phased in by the AHB from 1 July, 1999.

2. On some occasions fresh material is not collected and the causative agent cannot be identified.

3. The AgriQuality NZ veterinarian may decide that culture is not necessary for the national Tb Strategy. A decision not to culture will only be made when the herd has a history of *M. bovis* infection. However, it can be very unsatisfactory for the farmer and his/her veterinarian who need to know if the cause is avian Tb or Johne's disease.

4. There may be a negative culture from a ZN positive lesion. In these cases a PCR should be performed to identify the causative agent, otherwise the animal may be assumed to have been infected with *M. bovis*, which may not be the case.

5. Lack of communication is the most frequent criticism of the current system. A lack of uniformity in the reporting of cases and results is often cited as a major impediment to improving the current system. Veterinarians are rarely informed directly of lesion findings and this can lead to ill-informed or incorrect advice to clients. AgriQuality NZ have systems and procedures in place which should ensure adequate reporting to the farmer of their Tb status and the laboratory results. However the lack of uniformity of reporting by the DSPs is an issue which should be addressed by the industry and the Game Industry Board.

6. Some DSPs either lack adequate storage capacity for detained carcasses or are unwilling to hold them for a reasonable length of time. Histopathological examination of samples from suspect lesions should only take 4 days, but some DSPs appear unwilling to hold detained carcasses for this time, partly because a proportion of them turn out to be "suspect" or "typical" Tb and go for culture. Therefore the farmer may be penalised by only being paid out at the local rate for a "local" carcass from a suspect Tb deer, instead of the higher rate for a carcass which is cleared for export. The problem is even greater for carcasses from animals that have "suspect" or "typical" Tb lesions on histology but are subsequently found to be due to something other than bovine Tb, such as avian Tb or paratuberculosis. It is probably unreasonable to expect a DSP to hold a carcass for 12 weeks while they wait for a Tb/paratuberculosis culture, in order to decide whether it can be exported or not and the farmer paid out accordingly. If PCR testing was employed routinely for all 'suspect' or 'typical' lesions, the results could be available in a few days, thereby obviating the need for long term detention of carcasses. However this begs the question; "Who pays for the PCR if it is for the benefit of the farmer and the DSP"?

7. The length of time that the farmer has to wait for a result can cause big problems, especially if movement control is imposed at the time of an auction or sale of livestock. In these circumstances it is reasonable to approach AgriQuality NZ to request a PCR to obtain a quicker result.

8. The splitting of MAF Quality Management into several parts (AgriQuality NZ, Assure NZ and MAFVA) has the potential to complicate the current systems.

There are six different and potentially conflicting requirements of meat inspection:

Venison purchasers want wholesome meat, free of Tb or any other zoonotic disease agents.

DSPs want efficient systems that allow the export of venison from Tb-free animals, without unreasonable delays due to having to hold suspect Tb carcasses until cleared by culture. Currently many detained suspect carcasses are immediately sent for local trade because of delays associated with differential diagnosis of Tb, avian Tb, and paratuberculosis.
DSPs also want a simple reporting system.

Assure NZ carry out routine meat inspection and want a system to assure meat hygiene standards are met by DSPs.

MAFVA maintains standards and QA. If the cause of the lesion is not *M. bovis*, MAFVA may not be interested in the final diagnosis.

AgriQuality NZ and the AHB want surveillance information on the incidence of Tb-lesion animals in the DSP from tested and untested deer, in order to monitor the Tb control programme and to detect herd breakdowns as early as possible. They want a simple reporting system.

Farmers want good communication throughout the process, they need good information on the cause of a lesion and they should have a fair system which returns true value of carcass, especially relating to export of detained suspect carcasses which come back negative.

Farmers who request it, would also benefit from a system which would automatically inform their vet of DSP, histopathological, culture/PCR results and MC status.

Steps a veterinarian may take when called by farmer regarding lesion positive animal:

1. The management of all suspect Tb cases is the primary responsibility of an AgriQuality NZ veterinarian. When a practising veterinarian is requested by a farmer for advice following a suspect Tb case, he/she should ensure they contact the AgriQuality NZ veterinarian who is managing the case.

2. The veterinarian should review details of the case including the history of affected animal (reactor, cull, venison), herd, Tb status and previous history of non-specificity problems, Johne's disease, avian Tb etc

3. The veterinarian should review slaughter details including the number of deer affected out of how many in line, site of lesion, description, etc. Confirm whether or not fresh and fixed tissue was taken and submitted to diagnostic laboratory. Specifically ask if there was any likelihood of mistakes in animal identification, mixing of lines or confusion of head, viscera, carcass ID on the chain.

4. Review histopathological descriptions and other laboratory findings.

5. Confirm with AgriQuality NZ what decisions have been made regarding the status of the farm, how they arrived at these decisions and what tests (culture/PCR) have been requested on the samples sent to AgResearch Wallaceville. Request to be notified of results of tests and decisions on farm status.

6. Update farmer on findings to date and advise on differential diagnosis, most likely cause, and interim steps for Tb, avian Tb, and Johne's disease.

7 When results are notified, confirm diagnosis, farm status, control options etc.

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References

Campbell, A. (1995): The inconvenience of lymph node gross lesions (non-*M bovis*) at post mortem inspection of deer. Deer Branch NZVA Proceedings No 12 87-95