SOME LABORATORY ASPECTS OF THE DIAGNOSIS OF TUBERCULOSIS IN DEER

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The routine laboratory diagnosis of tuberculosis in deer relies on three main methods:

1. A smear of suspect material is specially stained and examined microscopically for acid fast organisms. This test is quick - a result can be obtained within an hour or two of the specimen arriving at the laboratory. The sensitivity is low but the specificity is high for uncontaminated material.

2. Histological examination of fixed suspect lesions. There are two aspects to this examination. We may have the characteristic 'tubercle'. This is a highly characteristic lesion of caseous material with a calcified centre, and a surrounding inflammatory response consisting of macrophages - the 'epithelioid cells - and Langhans giant cells. This lesion is very distinctive and probably represents a good attempt by the animal to contain the infection. Bacteria are usually sparse in this lesion and their detection is not necessary to make a diagnosis of tuberculosis. Other lesions such as abscesses, purulent sinuses and pneumonia, are less distinctive. While tuberculosis may be suspected on various histological features, the detection of acid fast organisms is essential to confirm its presence. There are times when the cellular response or the necrotic material, mask Ziehl-Neelsen stained bacteria and so we occasionally use other stains such as Auramine fluorescence. This stain identifies the same waxy coat of the bacteria as the ZN stain, so does not show any more bacteria, but in some circumstances may make them more visible. For histological examination of suspect material the sensitivity is high, the specificity is high and examination at the laboratory takes around two days.

3. Culture of lesions and lymph nodes. This takes a minimum of six weeks for a positive, and 12 weeks for a case to be declared negative, providing there is no contamination of the specimens. Most of the contamination occurs at the time of collection, and bacteria derived from gut contents or the environment rapidly overgrow the cultures. The cultures can be cleaned up with antibacterial compounds but these have to be tailored to the particular contaminants that occur. Such procedures inevitably delay the completion of the mycobacterial culture. The specificity of bacterial culture is high and it is the only method sufficiently specific to determine the species of Mycobacterium involved. The sensitivity is high from lesions and individual lymph nodes but decreases when a number of lymph nodes are pooled together.

General Approach To Submissions From Tuberculous Or Suspect Tuberculous Deer

1. Provide fresh and fixed sections of suspect lesions.

2. Collect lesions and lymph nodes aseptically and avoid all contamination from hair, soil and gut contents.

3. If forwarding apparently normal lymph nodes, send these fresh, not preserved.

4. State what level of culture is required. Cultures are charged at $30.00 for each node or lesion. For experimental purposes, we make four or five pools of the lymph nodes from deer but for diagnostic purposes, one pool made from all the body lymph nodes may be adequate.

5. Ensure that fresh material is forwarded to the laboratory in a chilled condition with all possible speed.

Public Health Aspects

From the vast numbers of bacteria seen in some tuberculous lesions in deer it is quite obvious that there is a considerable public health risk. Gloves must be worn when performing the necropsy on such deer and all instruments must be thoroughly washed and heat sterilised after use.

Epidemiological Aspects Of Lesions

While it is apparent that tuberculous pneumonia or suppurating sinuses are capable of spreading vast numbers of bacteria to other deer, we should not be lulled into the belief that other lesions are 'closed', and not of danger to other stock. There have been a number of cases where the disease was spreading from deer to deer within a herd, and yet the only lesions were classic tubercles in the retropharyngeal lymph nodes. Some recent work from Northern Ireland has shown that even where the only obvious lesions were in the mediastinal lymph nodes between the lungs, there was in fact at least one tuberculous lesion, often microscopic, in such lungs. Such a lesion can always discharge bacteria into the secretions of the respiratory tract.

Summary

For the most accurate and rapid laboratory diagnosis of tuberculosis please provide:

1. fresh and fixed sections of suspect lesions with the fresh material collected aseptically and all clearly labelled;

2. for reactor animals without visible lesions, collect the lymph nodes aseptically and forward them to us fresh for culture, stating what pooling arrangement is desired.