

DISSECTION AND STERILE COLLECTION OF MAJOR LYMPH NODES IN CATTLE¹

PART 1 – PREPARATION AND EQUIPMENT

1. Introduction

This paper provides guidelines for veterinarians who need to find and remove lymph nodes from cattle in the field or at abattoirs or knackeries. In general this will be for tuberculosis diagnosis or culture when it is important that the node be removed intact and uncontaminated (the culture process can take three months and overgrowth with contaminants is a major problem). Specific information is provided about abattoir collection when it is likely that marked differences will occur. Inspectors at abattoirs usually find nodes by slicing them. Thus while their assistance should be welcomed they should be given clear instructions about not slicing nodes.

Lymph nodes can be accurately classified as inconstant. They vary frequently in size, shape and even number, so that any attempt at specifying them is subject to considerable inaccuracy. In cattle this variation is worsened by the very different levels of fat found in different carcasses. Excessive fat can make an otherwise simple job a very complicated one since the nodes can be almost impossible to find in some cases.

Nodes in young animals tend to be relatively larger than those in older animals.

Lymph nodes are frequently visible where they lie in the fat. They usually have a glistening blue-grey appearance, with only a portion of the node visible, the rest being obscured by fat. They do become easier to identify with experience.

2. Equipment and Techniques

INSTRUMENTS

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|-------------------------------|--|
| <i>Sterilising Equipment:</i> | Portable gas stove |
| | Matches |
| | Stainless steel instrument tray |
| | Hand held gas burner with wind proof slow flame |
| <i>Instruments:</i> | 3 or more pairs of sharp scissors and tissue (toothed) forceps |
| | Gross PM gear – Knives |
| | – Steel |
| | – Rib cutters |
| | Rubber gloves, for working with hot instruments |

¹ Prepared by Dr Lee Cook, Veterinary Officer, New South Wales Department of Primary Industries

Buckets for water and disinfectant
Brush
Paper towel
Disinfectant

Containers: Plastic bags (preferably zip sealing) or 70mL sterile plastic bottles – pre-labelled prior to collection
Portable fridge or esky and ice bricks
Plain vacutainers for blood samples

TECHNIQUE

Sterile technique: Put instruments in tray of water on stove
Maintain water boiling at all times, and top up tray as needed
Use nearest pair of instruments and replace used sets to the rear of the tray
In the field elevate the carcase if possible to reduce dust contamination

Grossly dissect to the area of the node, or so the node is partially visible, without cutting it. Flame the area thoroughly to sterilise the surface. Do a larger area than you anticipate needing to dissect to allow for problems in finding the node.

Use instruments from the boiling water and dissect the node out, taking care not to cut it. Remove as much fat as possible from the node, but be careful not to drop it. Flame the node lightly and drop it into the sterile container.

Wipe dirty instruments clean (paper towel is ideal) and replace them to the rear of the tray of boiling water.

(It is possible to flame instruments using the burner rather than boiling them. This means they are easier to handle because the handles are not hot, only one pair is needed, and less other equipment is needed. The major disadvantages are that fat burns onto them very thoroughly and the flaming can damage the metal).

Use only one container for each node, except nodes which occur in small groups, such as the anterior/middle mediastinals or the hepatics.

If you are uncertain about how sterile a given node is, indicate this on the container – it will influence the decontamination used at the laboratory.

3. Despatch

Arrange collection with the processing laboratory so that the specimens can be despatched on the same or next day after collection. Special media may need to be prepared several days before the samples are received.

Do not freeze samples unless so instructed by the laboratory staff. Freezing may reduce the number of organisms in the sample but can be done once.

Pack containers inside plastic bags to ensure security in transit and include a note in the top of the esky that specimens are for TB culture.

Use sufficient ice bricks to ensure that specimens are still cold when they reach the laboratory.

4. Samples Required

| | |
|--------------------------|--|
| <i>Essential:</i> | Medial Retropharyngeal (left and right) Tracheobronchial (Bronchial) (left and right) Mediastinal (anterior and posterior) |
| <i>Highly Desirable:</i> | Tracheobronchial (Bronchial) (cranial (or apical) and medial) Other thoracic nodes |
| <i>Desirable:</i> | Mandibular Parotid Lateral Retropharyngeal (Suprapharyngeal) (Medial) Internal Iliac Mesenteric (sample from duodenum, jejunum and ileum) Supramammary / Scrotal (Superficial inguinal) |
| <i>Other:</i> | Hepatic Prescapular Prefemoral (Precrural) Submaxillary |

All other major nodes should be sliced thoroughly, including the balance of the mesenterics.

After collection of nodes lungs should be carefully palpated and sliced if necessary.

After collection of nodes liver should be observed and sliced if necessary.

If suspected lesions are found in any node, large nodes may be sectioned and submitted half fresh and half in formalin. Small nodes should be submitted whole with the lesion noted on the container.

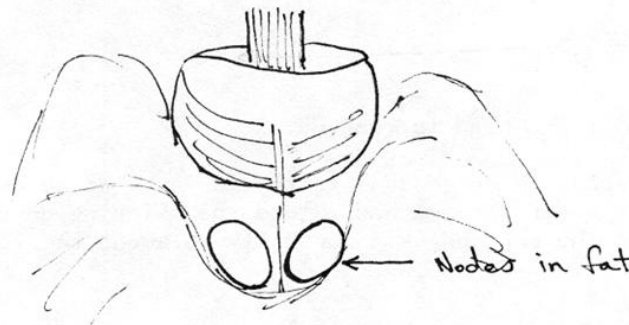
PART 2 – DETECTION AND COLLECTION OF NODES

HEAD *(Easier if the head is removed)*

Ensure the trachea is cut caudal to the larynx. Place the head upside down. Skin it to expose the jaw and extend the skinning down each side of the head to remove the ear and skin rostrally to about the level of each eye.

Medial Retropharyngeal *(Essential)*

- (a) Insert a steel or knife into the larynx and pull it rostrally. Anchor the steel into the palate so tension is maintained – this raises the retro-pharyngeal fat. The surface fat can be removed with a knife, prior to flaming, if it is very bloody. Dissect deeply into the fat until the node is found (it may be immediately visible, or up to 70mm deep, depending on the fatness and conformation of the beast).
- (b) If the head is hanging and the tongue dropped (abattoir), the nodes are readily seen on either side of the tongue, dorso-medial to the hyoid bones. They are sometimes cut accidentally when the tongue is dropped.
- (c) The nodes can be obtained, but less predictably, using a lateral approach without removing the head. Dissect deeply behind the caudal angle of the jaw, dorsal to the larynx. Each side has to be dissected using a separate incision.



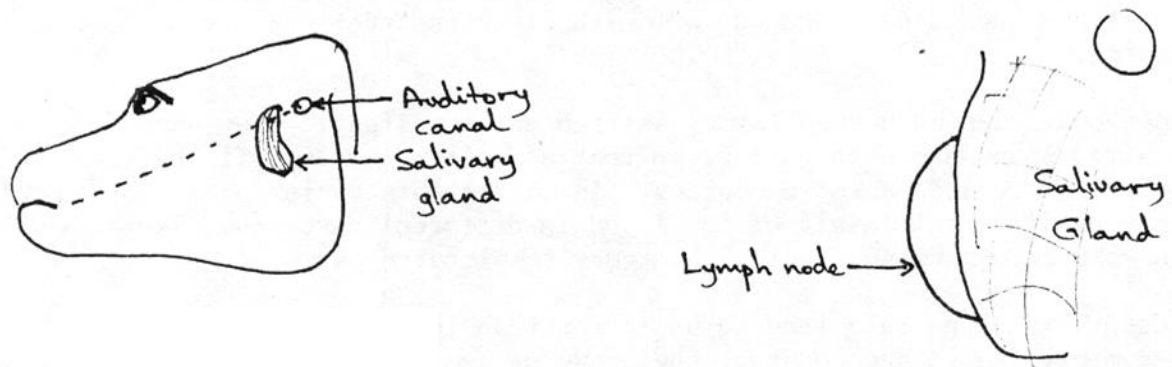
Lateral Retropharyngeal *(Desirable)*

(Suprapharyngeal)

If the head is upside down these are situated deeper and lateral to the medial retropharyngeals between the pharynx and the (ventral) straight muscles of the head below the atlas bone (C1) (deeper than the superficial atlantal node).

Parotid (*Desirable*)

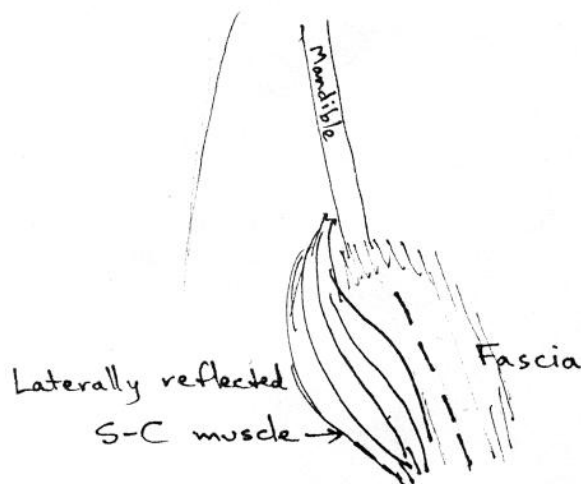
Lies deep under the parotid salivary gland, with about 10% of the node projecting at the cranial edge. Imagine a line from the exposed ear canal to the lateral commissure of the mouth – the node is under the salivary gland in this line with the rostral edge usually visible. This node has a long “tail” extending deeply backwards under the salivary gland towards the ear canal and it is difficult to fully dissect. It can help to remove some of the salivary gland first.



Mandibular (*Other*)

Lies under the fascia immediately under the cranial attachment of the (severed) sterno-cephalic muscle.

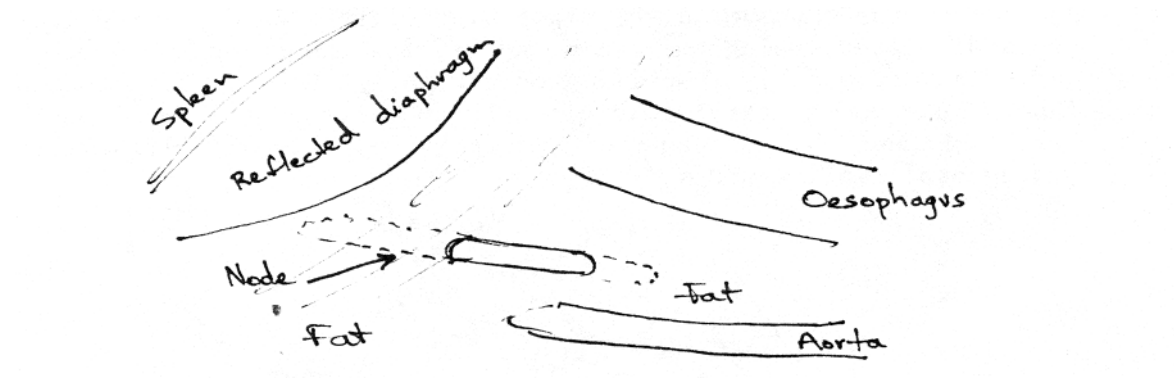
Dissect this muscle from its medial attachment to the underlying fascia and reflect it laterally. Cut through the underlying fascia and the node is more or less apparent depending on fat levels.



THORAX

Posterior Mediastinal *(Essential)*

- (a) To collect it without opening the thorax, the rumen should be moved caudally and the diaphragm opened around the upper half of the thorax. The node occurs in the fat ventral to the aorta and dorsal to the oesophagus and mediastinal attachment of the diaphragmatic lobes of the lungs close to the diaphragm. It is frequently visible in the fat. It may be very long – occasionally up to 200mm.
- (b) If the heart and lungs are removed (taking care not to cut the posterior mediastinal and leave part of it with the aorta), the node is obvious in the fat between the two diaphragmatic lobes, dorsal to the oesophagus.

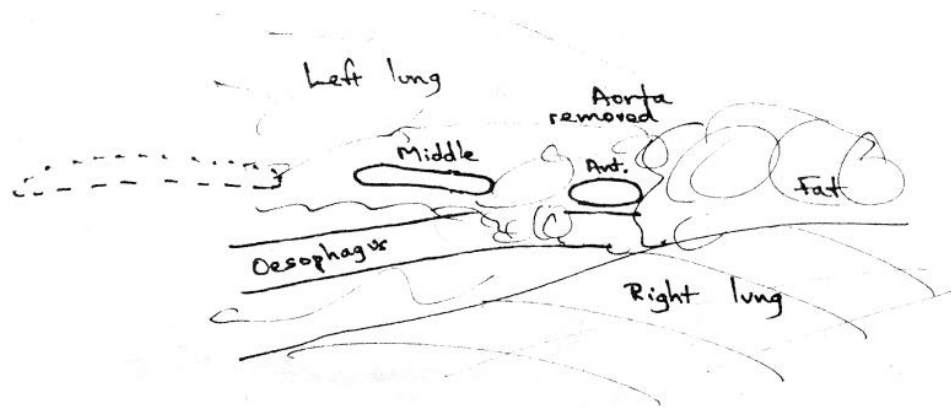


Anterior, Posterior & Middle Mediastinal *(Essential and Highly Desirable)*

- (a) These can all be readily dissected without removing the lungs if the carcase is lying on its left side and the right thorax opened. If care is taken to reduce blood contamination the nodes can usually be visualised, lying dorsal to the oesophagus. All are long and thin, but have much size variation. They lie dorsal to the oesophagus. Fat animals make visualisation more difficult.

It is easier to begin with the posterior, closest to the diaphragm. The middle is found just cranial to this, and the anterior further cranial again. The latter is usually near the base of the heart or just cranial to it.

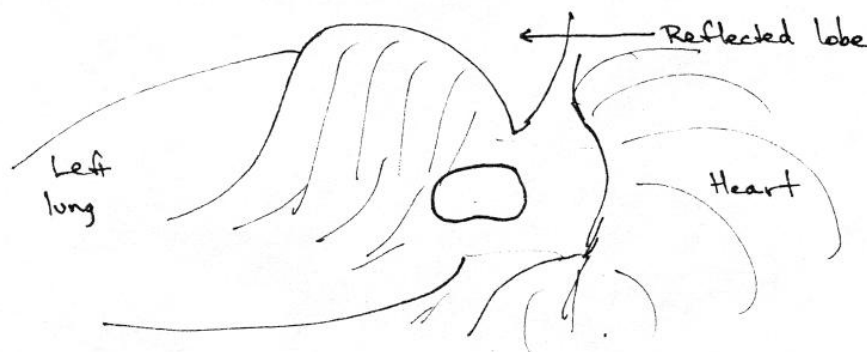
- (b) If the heart and lungs are removed they are placed on a suitable surface and the lungs separated laterally. The nodes are then located in the same way as specified above. The anterior can be difficult to find or not present at all. There may be several small nodes rather than individual larger ones. Palpate and/or incise the lungs.



(Left) Tracheobronchial *(Essential)*

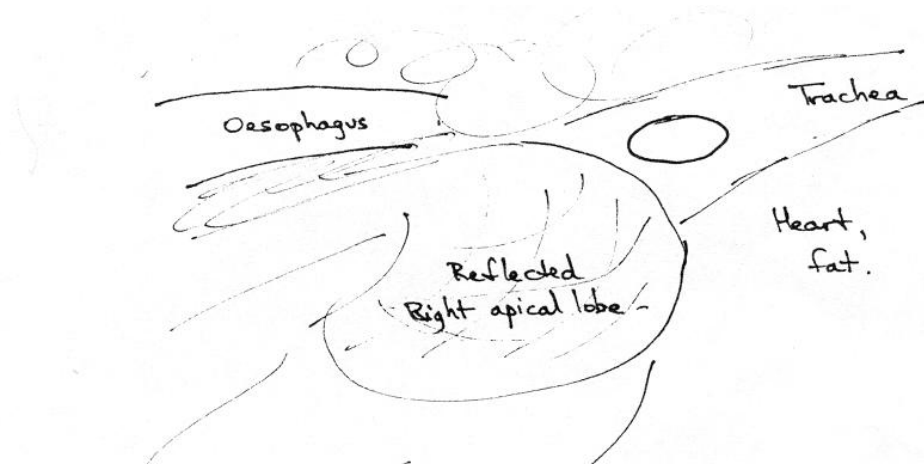
This can be very difficult to find depending on the fatness of the beast. It can be very deep (40mm) in the fat, and only 25mm across, and it is of variable but roughly spherical shape.

It is best located by reflecting the left apical lobe cranially and laterally, then dissecting into the fat to the left of the main bronchus into the lung. In poor animals it may bulge in the fat.



(Right) Tracheobronchial *(Essential)*

There is usually, but not always a right bronchial, but it is smaller and more difficult to locate. Sometimes there is more than one. It can be found by reflecting the right apical lobe, and it usually lies against the trachea just where the main bronchi diverge, but caudal to the right apical bronchus.



(Cranial) Tracheobronchial *(Highly Desirable)*

This is located at the base of and cranial to the smaller bronchus which directly enters the right apical lobe.

(Medial) Tracheobronchial *(Highly Desirable)*

If present this is located caudal to the bifurcation of the main left and right bronchi.

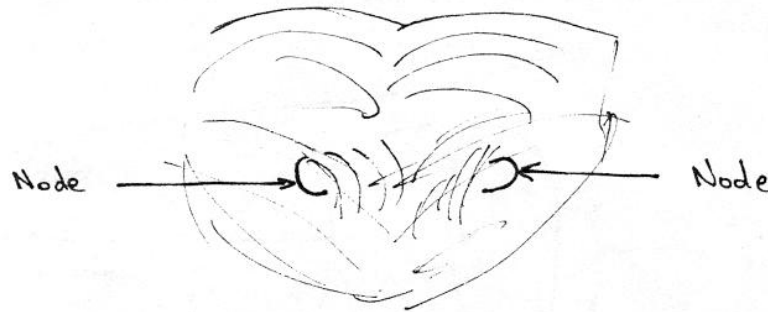
Other nodes *(Highly Desirable)*

Any other nodes which can be identified and collected from the thoracic cavity should be included.

EXTERNAL BODY *(Do nodes on one side of the carcass, then other side)*

Supramammary *(Desirable)*

- (a) Preferably remove the whole udder, being careful to cut close to the abdominal wall, especially in the caudal section. Place the udder teats down, with the rear facing you. The nodes are located just lateral to the crest visible on each half. They are quite large, relatively thin, and roughly kidney-shaped. Very occasionally they join. There may be additional smaller glands cranial to the main gland.



- (b) Alternatively one leg of the carcass can be lifted and the caudal end of the udder dissected away from the abdominal wall. The node is often readily visible. Turn the carcass over for the other side, or continue to remove the udder and locate the second node as the udder is separated.

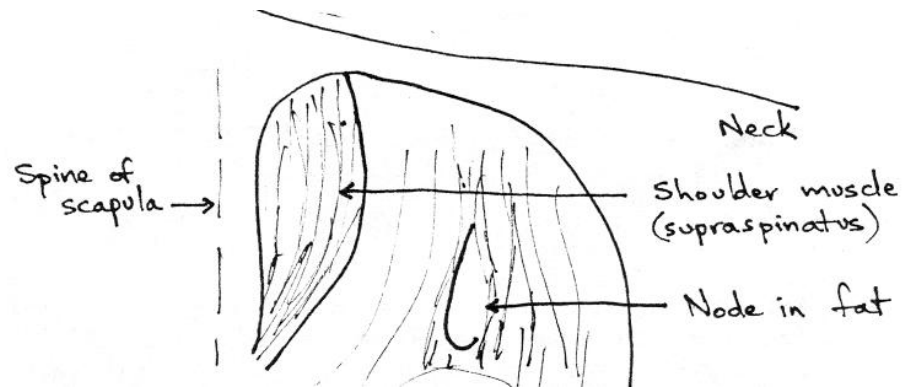


Scrotal *(Desirable)*

In the bull, the superficial inguinal nodes lie in the fat at the neck of the scrotum, caudal to the spermatic cord. They are frequently multiple.

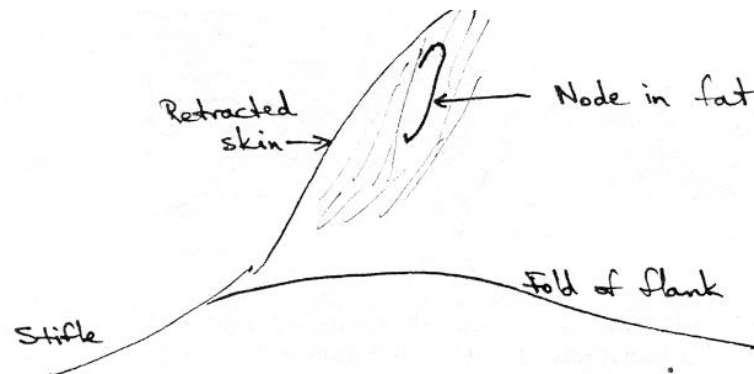
Prescapular (Other)

Locate the spine of the scapula and make a long incision parallel to it and 50-80mm cranial to it. This will sever the sheet-like omo-transversarius. The cut should be extended vertically (towards the feet) to sever the brachiocephalicus. These muscles and the underlying fat can be reflected cranially to reveal the large pad of fat (in the reflected tissue) which contains the node. Part of it is usually readily apparent.

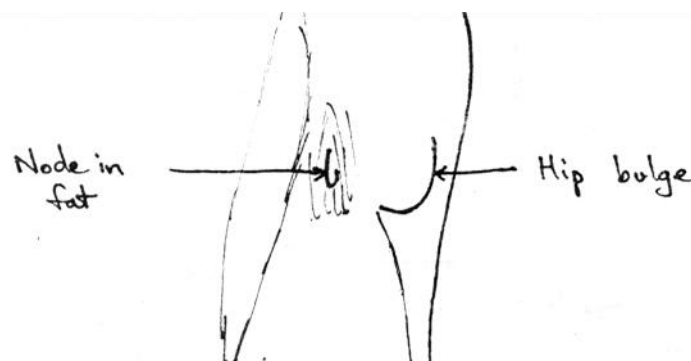


Prefemoral (Precrural) (Other)

- (a) Simply cut vertically through the skin just cranial to the patella, and extend the cut dorsally. The node is in fat, and may be difficult to locate. In a freshly dead animal it may help to palpate the node prior to cutting the skin.



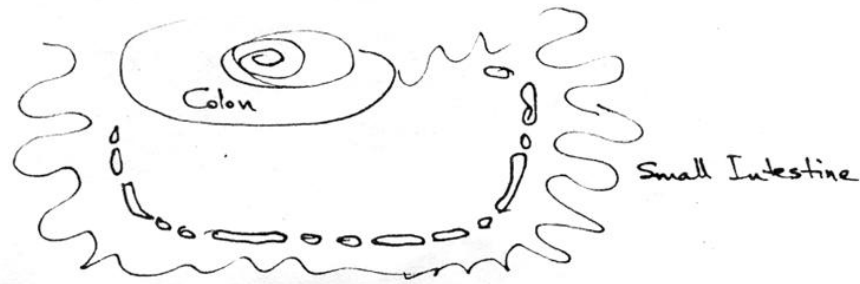
- (b) If the carcass is hanging (abattoir), inspectors may approach the node from either the inside or outside. It is found in the fat lateral to the visible swelling of the hip (tuber coxae), and can be quite deep.



ABDOMEN:

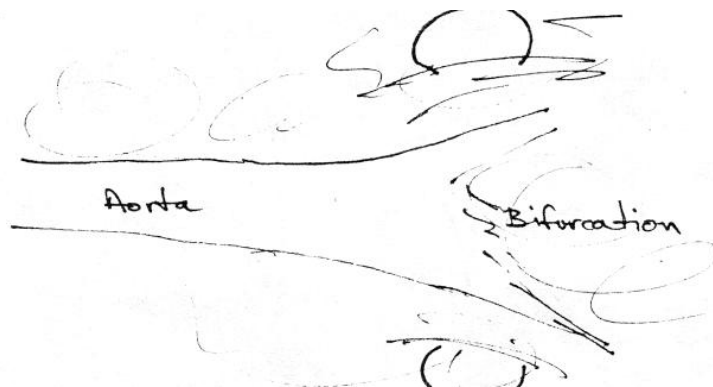
Mesenterics *(Desirable)*

The intestines can be removed (but kept out of the dirt) or examined more or less in situ. In either case, once any section of the mesenteric chain is located, an end can be found and the nodes sampled or sliced along the length after obtaining the optimum visualisation. There is approximately one metre of nodes, and individual nodes can be small or up to 300mm long.



Internal Iliacs *(Desirable)*

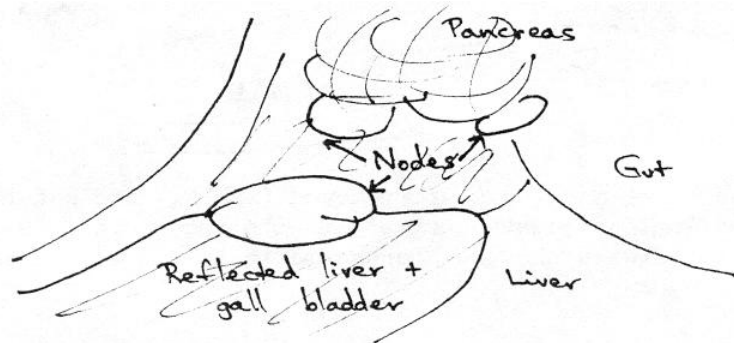
- (a) In a carcase on the ground, it is best to remove the viscera, but not essential. If the viscera is left in place, and the carcase is on its side, the upper node on each side can usually be found in the fat as described below. It is usually best to turn the carcase over to find the node on the down side.



- (b) In a hanging carcase (abattoir) these are easily found once the abdominal contents are removed or the carcase split. They are just caudal to (above) the bifurcation of the aorta where it forms the iliac arteries. They are usually closely adherent to the body wall, and partially visible in the fat.

Hepatics (Other)

- (a) By opening the carcase on the right side (left side down) the liver is exposed. After moving the rumen and lifting the liver to expose the gall bladder, usually by pulling or carefully cutting the attaching fascia, the nodes are visible close to the bile duct. They may be almost obscured by the pancreas. Usually there is one slightly larger and several smaller nodes.



- (b) When the liver is removed at an abattoir, these nodes are frequently severed and left on the viscera.

Spleen (Other)

If the carcase is opened on the left side, the spleen can be reached by lifting the ribcage and reaching around the rumen. It need not be flamed if it is untouched prior to taking a 4cm square sample.

