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Clostridial Diseases In Deer

C. welchii Type D and *C. septicum*

Clostridial bacteria have been associated with deer diseases throughout New Zealand, and in some cases have probably caused death.

The *Clostridium* species most often found are:

C. welchii which causes pulpy kidney (enterotoxaemia) in sheep and in deer is associated with a similar condition.

C. septicum which causes malignant oedema in sheep.

The cause of tetanus (*C. tetani*) in farmed animals has not been isolated routinely from deer tissues, and there is likewise uncertainty about the role of two other clostridia isolated from deer, *C. oedematiens* and *C. chauvoei*.

Clostridium welchii type D

There is strong circumstantial evidence that *C. welchii* type D produces a condition in deer which is similar to pulpy kidney in sheep.

The organism is always present in the environment and has often been isolated from the intestines of sheep and deer.

In deer, it is most often found in animals less than 1-year-old. It seems to affect a low proportion of a herd, and usually has been isolated from deer that have died sporadically.

The organisms are probably ingested with grass and they affect a deer after a change in the gut allows them to proliferate and produce a toxin which is absorbed into the animal's system.

Symptoms: Because sick deer die quickly, symptoms are seldom seen. In cases where *C. welchii* has been isolated as a heavy pure growth, deer have suffered from depression, dysentery, and sometimes a staggering gait, for 1–2 days.

Post-mortem findings: In deer, the organism is associated with haemorrhage, varying in severity, found in muscles and on the serosal surface of the intestine. Within the intestine, there is varying haemorrhagic enteritis.

The lungs are congested and oedematous and there is fibrinous exudate in the pericardium. The liver too is often congested and, as with sheep, the kidney cortex autolyses rapidly.

An epsilon toxin can be found in the intestinal contents, and glucose in the urine.

Diagnosis: Conditions that can be confused with clostridial infections are malignant catarrhal fever, yersiniosis, and transport stress.

Diagnosis is established by isolation of the organism, and by laboratory examination of tissues. Specimens for diagnosis should be fresh and fixed:

- Lung.
- Kidney.
- Brain.
- Liver.
- Lymph node.
- Intestinal contents (fresh).

Case study: In May 1976, about 60 unweaned calves were running with hinds when 5 calves developed foul-smelling dysentery, and subsequently 3 died. The post-mortem findings were:

Varying-sized areas of severe haemorrhage in the diaphragmatic and cardiac muscles.

Friable intestines, often with markedly blood-stained contents and small ulcers in the abomasum.

Oedematous and congested lungs and brain.

Some fibrinous exudate in the pericardial sac.

Glucose and protein were found in the urine.

The histological findings in all three calves pointed to toxæmia as the cause of death:

- In the kidneys the convoluted tubules were autolysed, whereas the medulla and glomeruli were far less affected; and there was severe cortical and glomerular congestion, with occasional haemorrhages.
- The livers were moderately congested in the sinusoids and central veins.
- In skeletal and cardiac muscles, small perivascular recent haemorrhages occurred between the fibres.
- One brain had bilateral foci of malacia and gliosis.

C. welchii type D was isolated from the intestinal contents, rib and lymph nodes of one calf, and the mouse biological test for the bacterium was positive in another.

Prevention: Vaccination is the best method of preventing the disease, but sheep vaccines have not yet been registered for deer. Calves should be vaccinated at weaning, whether weaning takes place before or after mating. Hinds should be vaccinated about 6 weeks before they calve, so their immunity can be transferred, in colostrum, to their calves, thus protecting the young till weaning.

Treatment: Sick deer may be treated with injections of antitoxin or penicillin.

A change in diet may reduce the chance of other animals in the herd developing the disease. Sheep seem most likely to develop pulpy kidney if fed on lush grass with a high carbohydrate content. Cutting down on soluble carbohydrate in the gut, perhaps by feeding hay or moving deer to rougher pasture, should slow the proliferation of clostridia in the gut.

Clostridium septicum

Malignant oedema is less common than pulpy kidney ,

but its symptoms, prevention, and diagnosis are similar. Blackleg may, or may not, be present.

C. septicum has occurred sporadically in deer of all ages throughout the country, and possibly infects through wounds as well as from the gut.

If *C. septicum* has been isolated from a heavy pure growth in fresh deer tissue, it indicates that it was probably the cause of death. But when it has been isolated from autolysed material, its significance is dubious, especially as it is a common post-mortem invader.



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