

FEATURES

- Enterotoxaemias
- Muscle (gas) gangrene
- Tetanus and botulism

CLOSTRIDIAL DISEASES IN SHEEP

The clostridial organisms are a broad group of bacteria which can cause a wide range of diseases due to the toxins which they produce. Their effects can be divided into three groups: those that affect the muscles (gas gangrene group), those that affect the nervous system and those that cause gastrointestinal infections (enterotoxaemias). The bacteria are widespread in the environment and cannot be avoided or eradicated which is why vaccination is the most effective method of control.

1. Enterotoxaemias

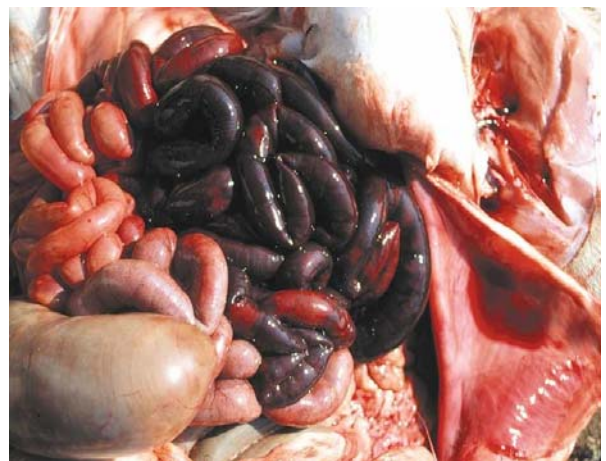
C. perfringens A ("Redgut" and wound infection)

Whether this bacterium is the actual cause the condition known as redgut is still a controversial issue. In South Africa the condition occurs in sheep which are grazed entirely on lucerne or clover pastures, without receiving any source of roughage. Sheep die acutely and show blood filled small intestines on post-mortem. The cause is thought to be a large amount of gas production followed by displacement and strangulation of the intestines. It has been shown that providing roughage will eliminate this problem. *C. perfringens* A is included in multicomponent clostridial vaccines but manufacturers at present make no claim for the prevention of redgut syndrome.

C. perfringens A can also occasion-

ally cause wound infections which can be fatal.

Photo 1: Redgut in small stock occurs when they are grazed exclusively on lucerne or clover pastures.



C. perfringens B (Lamb dysentery)

There are focal areas in SA where *C. perfringens* B causes problems in lambs. They develop a gastrointestinal condition within the first week of life which is characterised by pain, bloody diarrhoea, and they die very rapidly. At post-mortem the gut will show ulceration and haemorrhage. Treatment of affected lambs is seldom successful and the control is vaccination of ewes with vaccine containing the organism. The ewes then provide colostral immunity which will protect the lambs.

***C. perfringens C* (Necrotic enteritis)**

The occurrence of this condition in sheep in SA is unknown but it has been diagnosed in piglets so the bacterium is present in the country. When this organism causes problems in lambs it causes a syndrome very similar to that of lamb dysentery. If diagnosed the condition can be prevented by vaccinating ewes with multicomponent clostridial vaccines such as Covexin 10 and Ovivax 6.

***C. perfringens D* (Pulpy kidney)**

Pulpy kidney is perhaps the single most important cause of deaths in small stock in SA. It is sometimes called over-eating disease because it is precipitated by the increase of nutritional level of animals either by giving concentrate rations, moving animals to lush pastures or deworming of heavily parasitized sheep.

In SA pulpy kidney occurs most commonly in yearlings but is seen in older sheep that have not been vaccinated. Lambs die acutely without showing symptoms. Post mortal examinations are usually mainly negative with the exception of rapid breakdown of the kidneys. However this can be seen with some

other conditions such as prussic acid poisoning (geilsiekte) and pasteurellosis. Bear in mind that the kidneys of carcasses in an advanced state of decomposition will also have "pulpy" kidneys.

Vaccination of sheep is the only method of control; lambs of vaccinated ewes can be vaccinated from 3 months of age, although weaning is the usual age for vaccination.

As with all clostridial vaccines pulpy kidney vaccination must be repeated within 3-4 weeks and annually thereafter. Multicomponent clostridial vaccines such as Covexin 10 and Ovivax 6 contain all the components discussed above.

Photo 2: Pulpy kidney in sheep causes acute deaths with no symptoms, and a mostly negative post mortem except for the rapid breakdown of the kidney tissue (insert).



2. Muscle gangrene group

The gangrene group of diseases in sheep occur after some kind of wounding which allows the invasion

of bacteria into the tissues:

***C. chauvoei* (black quarter)**

This occurs in sheep most often after shearing, when the cuts from shears allow the invasion of *C. chauvoei* bacteria which are ubiquitous in soil and manure. Some days after shearing sheep develop a fever, show depression, lameness and die rapidly soon after the appearance of symptoms. On post mortem the affected muscles will be swollen, show gas accumulation and a black discoloration. The diagnosis of the condition can be confirmed on examining muscle smears in the lab or performing bacterial isolations. There are other clostridia such as *C. novyi*, *septicum* and occasionally *C. sordelli* which can also cause black quarter. Vaccination of sheep with a multicomponent clostridial vaccine such as Covexin 10 or Ovivax 6 is the only economic method of control.

***C. novyi* (Big head/Swelled head/dikkop)**

This condition occurs when rams fight and bruise the skin around the base of the horns. The *C. novyi* bacteria invade through small wounds in the skin and grow in the bruised tissue causing massive swelling of the head. The rams may survive if treated with antibiotics but most commonly they

die of the toxins produced by the infection. The condition can be confused with "bottlejaw" (parasite infestation, blue tongue, plant poisoning with "dubbeltjies" and snakebite. Big head can be controlled with vaccination with a multi-component clostridial vaccine.

Photo 3: Big head occurs in rams as result of fighting



***C. septicum* (Post-lambing gangrene, "Braxy")**

Ewes that have difficult births particularly when lambs are very big can develop gangrene of the uterus after lambing. The *C. septicum* organisms invade the uterus through small wounds which then multiply in the bruised tissue of the uterus. The ewes die very rapidly after lambing due to the toxin produced by the bacteria. Another condition caused by this bacterium is called braxy: it is the invasion of the abomasum or stomach of the animal after it consumes frozen grass or ice water.

Photo 4: Braxy is a gangrenous condition of the stomach of sheep after eating frozen grazing.



Other *Clostridia* spp.

There are other less common clostridia such as *C. sordelli* which are included in vaccines because of they can occasionally cause gangrenous infections. *Clostridium haemolyticum* is an organism which secondarily infects livers with primary liver fluke damage. The bacteria produce a toxin which causes haemolysis or destruction of red blood cells resulting in red discoloration of the urine, anaemia and death. The condition has never been diagnosed in SA but the organism is included in some imported vaccines.

3. Nervous system

Tetanus (*C. tetani*)

The *C. tetani* bacteria occur in the soil and when the spores contaminate deep wounds they germinate and secrete a powerful toxin. This occurs most often in small stock when castration or docking is done using elastrators, which cause ideal conditions for the growth of the tetanus bacte-

ria.

The powerful tetanus toxin causes spastic paralysis which is almost always irreversible. Lambs die soon after showing symptoms due to paralysis of the respiratory muscles. Vaccination of ewes with vaccines such as **Ovivax 6** or **Covexin 10** will provide lambs with optimal colostrum immunity at 3 weeks of age when it will be safe to castrate and tail-dock lambs.

Botulism (*C. botulinum*)

Although it is more common in cattle than sheep, small stock can develop botulism either on veld or when kraaled. Botulism bacteria grow in carcasses and produce a very powerful toxin which causes a flaccid or floppy paralysis. Sheep become stiff, walk with difficulty and finally lie down. The tongue become paralysed and the swallowing reflex disappears. Death occurs soon after the sheep become recumbent. There is no economically viable method of treatment as the antiserum is only of value early in the course of the disease. Vaccination of sheep at weaning will prevent development of the disease.

All photos courtesy of Schering-Plough Animal Health

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