International Dairy Topics

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Enterotoxigenic E. coli

Enterotoxigenic E. coli (ETEC) produce enterotoxins in the calf's intestines that induce a secretory diarrhoea. Several different enterotoxins have now been identified and a specific ETEC may well be capable of producing more than one enterotoxin. Heat labile (LTI, LTII) and heat stable (STa, STb) enterotoxins can be produced by ETEC. In calves ETEC producing low molecular weight STa account for the majority of neonatal diarrhoea problems.

Pathophysiology

The first requirement is that the pathogenic ETEC is able to attach itself to cells in the calf's gut to create the disease. Once attached the ETEC must be able to produce and release enterotoxin, which induce the epithelial cells lining the calf's gut to release a fluid rich in chloride. Water and other ions then follow in a mass efflux which, with the exception of some reabsorption in the colon, becomes the watery diarrhoea.

Clinical signs

Signs can vary from a mild diarrhoea that calves can recover from on their own to peracute syndromes that can kill in 4-12 hours of the appearance of the diarrhoea because of dehydration.

The clinical picture seen depends on the pathogenicity of the ETEC type, which can be quite variable and influenced by the passive immunity received via the colostrum. In the mild form the faeces may just appear 'loose' and the calves continue to nurse and recover spontaneously.

In the peracute form calves become weak, dehydrated and comatose within hours of the disease's onset. Diarrhoea is voluminous and watery faeces cover the perineum, tail and hind legs. Rectal temperatures are usually normal or subnormal. In some cases bradycardia and cardiac arrhythmia are seen as a consequence of hypocalcaemia and hyperkalaemia.

Pathology

Peracute ETEC infections result in severe secretory diarrhoea and a classical metabolic acidosis. Dehydration is present.

Diagnosis/differential diagnosis

Diagnosis is based on age of animal, presenting clinical signs and laboratory findings. It can be a difficult task to differentiate this condition from E. coli septicaemia or salmonellosis on clinical signs alone.

Diagnosis requires the isolation of an ETEC. Histopathological examination of ileum and jejunum is useful. As other enteric pathogens may be present, such as cryptosporidium, rotavirus and coronavirus, these should be screened for.