Benign Theileriosis

Ian Poe BVSc. MANZCVS
Senior District Veterinarian Mid Coast Livestock Health and Pest Authority

A protozoan red blood cell parasite of cattle historically referred to as *Theileria buffeli* has been present in Australia for many years. It was a common incidental finding in blood smears taken from cattle in Queensland and coastal NSW where bush ticks where prevalent. It has long been considered a benign infection, with clinical disease being rare. Smeal (2000) reported that while the parasite was common in cattle in NSW between the far north and central coasts, acute disease had only been confirmed in 3 animals in that region between 1990 and 1994.

Over the last 5 years there have been several cases of clinical disease in cattle attributable to *Theileria* spp in NSW. 8 cases of anaemia associated with *Theileria* parasitaemias were reported by Izzo et al (2010).

Disease in NSW is caused by protozoan parasites of the *Theileria buffeli/sergenti/orientalis* group. Typing which has been done on isolates from Australia indicates that disease appears to be associated with the ikeda variant, whilst buffeli and chitose variants appear relatively less pathogenic. Whilst the theileria species present in Australia are capable of causing disease, it is important to distinguish these species from the more pathogenic exotic species including *T. parva* which causes East Cost fever and *T. annulata* which causes Tropical Theileriosis.

Generally ticks are considered to be the vector responsible for spread of *Theileria* sp. In NSW the *Haemophysalis* sp. are considered the main vector, however transmission has also occurred experimentally via march flies and lice. Infection may also occur from mechanical transmission during routine husbandry procedures. Transplacental infection can also occur. On a number of affected properties owners of affected stock have not observed ticks on cattle.

**History and Clinical Signs**

In coastal regions such as the mid north coast of NSW Theileriosis is seen in 2 distinct classes of animal. The most frequent presentation is in adult stock introduced from districts where the parasite is not present. Typically this occurs when inland or southern cattle are moved to the coast. Typically disease is seen about 6-8 weeks following introduction. Results of a questionnaire conducted on affected properties (Bailey 2011) reported that disease was seen on average 38 days post introduction, with a range of 7-74 days. Young home bred calves have also been affected on several properties in the Mid Coast, North Coast and New England LHPA districts. Typically affected calves are 2-3 months of age when first noticed to be unwell.

In non coastal regions disease has been reported following movement of “coastal” cattle, carrying the organism in red blood cells, to non coastal regions. Transmission to homebred cattle may occur with disease occurring 2-6 months later in the home bred cattle.

The disease is characterised by a regenerative haemolytic anaemia. Common presentations of the disease include late term abortion, stillbirths, dystocia, weakness, lethargy and death. Clinical findings include innapetance, pyrexia, tachycardia, tachypnoea, pale mucous membranes and
jaundice (See figure1). Affected cattle often collapse when mustered. Aggression has been noted in some cases. Death rates appear to be highest in heavily pregnant cows.

**Diagnosis**

The history and presenting clinical signs are often sufficient to arouse suspicion of theileriosis. As theileria may be found in the red blood cells of healthy cattle diagnosis is based on the confirmation of a regenerative anaemia together with the presence of organisms and the absence of other diseases which may cause anaemia in cattle. Differential diagnoses for haemolytic anaemia in cattle include babesiosis and anaplasmosis, copper toxicity, post parturient haemoglobinuria, bacillary haemoglobinuria, leptoospriosis, kale poisoning, water intoxication and onion poisoning.

It is common for severely affected animals to have packed cell volumes <10%, and in my experience reported levels of percentage red blood cells parasitised can be extremely variable. Blood smears show anisocytosis with polychromasia and basophilic stippling. Howell-Jolley bodies and nucleated red blood cells are also seen. The organisms appear as 1.0-2.5µm long, comma-, signet-, or rod-shaped basophilic inclusion body within the red blood cells. Elevations in hepatic enzymes are frequently observed, presumably due to hypoxia induced hepatopathy.

The most striking feature seen at necropsy is an enlarged ochre coloured liver. Livers are frequently 1.5 times normal size with rounded margins (See figures 3 and 4). The spleen is also enlarged (See Figure 4). Histopathology changes are generally consistent with anaemia.

**Treatment**

Treatment options for theileriosis are currently limited in Australia. Antimicrobials which have been used include oxytetracycline, halofuginone and imidicarb dipropionate. Results using all 3 drugs have been variable. Halofuginone (Halocur Oral Solution 0.5mg/ml, Intervet/Schering – Plough Animal Health) at a dose rate 10 times (1.0mg/kg) the recommended rate for cryptosporidiosis has been used by some. However side effects, including oesophageal and oral irritation have been reported (P Carter and, A Poynting, pers comm.). This irritation may be reduced if treatment is followed by flushing of the oral cavity with liberal amounts of fresh water. Imidicarb dipropionate at a dose rate of 2.5mls/100kg given by subcutaneous injection has been used. Recently it was reported that Erythromycin, given at a rate of 8mg/kg for 4 days may have some effect on reducing parasitaemia in cattle. Carter (2011 pers comm.) reported that calves treated with erythromycin to control Eperythrozoon infection demonstrated a reduction in theileria parasitaemia within a few days of treatment. Further work is required to determine the efficacy of erythromycin in the field.

Effective drugs including primaquine and buparvaquone are currently not registered in Australia for use in cattle.

A number of veterinarians have performed blood transfusions on affected animals, and anecdotally have reported an in increased survival of affected animals (Izzo et al 2010).

Reduction of stressors on affected cattle, in my opinion, is an extremely important aspect of handling affected cattle. The stress associated with mustering and yarding cattle can frequently lead to death.
Discussion

Obviously further work is needed to better understand the disease in NSW.

A research project to look at the potential of vaccine development is being considered. It has been suggested that exposure to the benign Chitose and buffeli strains may impart some cross immunity to the more virulent Ikeda. A live vaccine based on the benign variants may be feasible.

Further investigation is also required to better understand possible vectors for transmission.

References


A Poynting. Gloucester Veterinary Hospital. Personal communication.


MG Smeal. Parasites of Cattle. The University of Sydney Postgraduate Foundation in Veterinary Science:306.

Figure 1. Membranes of an affected cow showing anaemia and jaundice
Figure 2. Liver from an affected cow

Figure 3. Cut surface of the liver from an affected cow
Figure 4. Spleen from an affected calf