

Problems in Differential Diagnosis of Haemophilus Somnus Infections (“Thrombo”) of Feedlot Cattle

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Thromboembolic meningoencephalomyelitis (TEME) or “Thrombo” is possibly the most common cause of acute death of feeder cattle in midwestern feedlots during the winter months, December through February.

TEME is a bacterial septicemia caused by a microaerophilic Gram-negative rod for which Bailie¹ has proposed the new name, *Haemophilus somnus*. It has also frequently been referred to as an Actinobacillus-like agent. This organism can be isolated in pure culture from brain lesions, lungs, lymph nodes, cerebrospinal fluid or joint fluid of affected cattle.

TEME is a good descriptive term only for the peracute form of this infection. This form is characterized by sudden death, often before the clinical signs of elevated body temperature, weakness, stiffness, prostration and CNS disturbance can be observed. Upon post mortem examination, the most striking lesions to be found are the multiple foci of hemorrhage and necrosis distributed at random throughout the brain. These foci are often grossly visible after serial cross section through the brain tissue. They are the lesions for which TEME was named. Another common lesion less frequently described is an excessive accumulation of cloudy fluid within the joint cavities. Unless the cranium is opened, the brain examined, and the joints incised, the practitioner conducting the post mortem examination obviously fails to observe these characteristic lesions. A problem in accurate differential diagnosis thus arises.

The vascular lesions produced by *Haemophilus somnus* infections are not necessarily limited to the brain. Hemorrhages in the muscles of the shoulder and the neck may easily be mistaken for those commonly attributed to *Clostridium sordellii*. Lesions in heavier skeletal muscles may resemble those of blackleg. Lesions of the gastrointestinal tract and in the kidneys may be suggestive of *Clostridium perfringens* enterotoxemia. A super-

ficial post mortem examination is insufficient, and laboratory assistance may be advisable in attempts to differentiate between acute deaths caused by *Haemophilus somnus* and clostridial pathogens. The possibility exists that the vascular damage caused by *Haemophilus somnus* may produce localized anaerobic conditions which in turn may permit secondary clostridial growth.

With selected field isolates, one of the authors has experimentally reproduced many of the lesions often observed in natural cases of the disease. Experimental reproduction is equally successful by either the intravenous or the intratracheal route of administration to susceptible calves.

Pancieria and his co-workers² have noted that TEME is not an appropriate descriptive term for the other possible forms of *Haemophilus somnus* infections. They have described an acute form best characterized by a dry hacking cough and mild depression that can affect as high as 90% of the animals in a group. A fairly frequent post mortem finding in cattle dead of “thrombo” is a heavy, congested and consolidated lung reminiscent of acute shipping fever pneumonia. A fibrinous pleuritis of varying severity is often seen. *Haemophilus somnus* can be isolated in pure culture from these lesions—and not the *Pasteurella multocida* or *hemolytica* that one might have suspected. It is obvious that TEME may be misdiagnosed as an acute pasteurellosis.

Pancieria *et al.*² have also called attention to a subacute or chronic syndrome causing lameness, stiffness and a reluctance to move which can persist for several weeks after onset. This manifestation is rather frequently observed in feedlots where acute TEME deaths have occurred. In these feedlots, a very high percentage of cattle develop positive titers of complement fixing antibody to *Haemophilus somnus*. Preliminary serological studies using this complement fixation test indicate that infection is of widespread incidence.

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Unless the bovine practitioner performs a very thorough necropsy examination, he may easily miss the cardinal lesions of TEME. Unless the correct tissues are examined, and microaerophilic culture techniques are employed, *Haemophilus somnus* will not be recovered by the diagnostic bacteriologist. It would be of great interest to learn how many cases currently diagnosed as "shipping fever," polioencephalomalacia, or clostridial infection might actually be unrecognized *Haemophilus somnus* septicemias. With increased awareness of its apparently widespread incidence may come a demand for adequate preventative measures aimed at control of this disease.

Summary

In addition to characteristic "thrombo," *Haemophilus somnus* infection may result in acute respiratory disease or chronic stiffness of feedlot cattle. Unless the bovine practitioner performs very

complete post mortem examinations, he may entirely miss the lesions of this disease, or mistake them for those of shipping fever or clostridial infection.

Clinical signs and lesions characteristic of field cases may be experimentally reproduced in susceptible calves by either intravenous or intratracheal inoculation with pure *Haemophilus somnus* cultures. Complement fixation tests confirm the widespread incidence of this infection. Development of immunizing agents for use in feedlot cattle may be warranted.

References

1. Bailie, W. E. Characterization of *Haemophilus somnus* (new species), a Microorganism Isolated from Infectious Thromboembolic Meningoencephalomyelitis of Cattle. Ph.D. Dissertation, Kansas State University, Manhattan, Kansas. 1969.
2. Panciera, R. J., Dahlgren, R. R. and Rinker, H. B. Observations on Septicemia of Cattle Caused by a *Haemophilus*-like Organism. *Pathologica Veterinaria* 5: 212-226. 1968.

"Buiatrics" is the study of cattle diseases

The Management of Beef Breeding Programs

(Continued from page 30)

to *bulls* which *sire calves* that present *fewer dystocias*. These *bulls cannot* be selected (at this time, at least) on the basis of *phenotype* (body size or conformation). They must be selected on the basis of *performance records*.

A Plan For Improving Reproductive Performance

Any improved management system designed to increase beef cow reproductive performance must produce:

1. A high percentage of the herd with normal estrous cycles during the first 20 days of the breeding season. This can be accomplished by increasing the interval from calving to the start of the breeding season. This means the *breeding and calving seasons* must be *reduced to 45 days or less*. The cattle must be *fed* to be in *good flesh* at calving and *gaining* in body weight until the *end* of the breeding season.
2. A high first service conception rate.
The interval from calving to breeding must be increased to allow the reproductive tract time to recover. The breeding and calving seasons *must be short*. The cows must be *gaining body weight* steadily from *calving* until the *end* of the breeding season.
3. Low calf losses at or near birth. Calf losses can be reduced by *intensive care* during a *short calving season*. Heifers should be *mated to bulls* that *sire calves presenting few calving problems*.

We suggest the following management practices:

1. Feed heifers to gain a pound a day from *weaning through the breeding season*. The English breeds should weigh at least 650 pounds at the start of the breeding season.
2. Start breeding yearlings (or 2-year-old nulliparous heifers) twenty days before the breeding season for the cows. Breed heifers no longer than 45 days. Keep more replacement heifers than needed and cull on the basis of early pregnancy.
3. Breed heifers to a bull that sires calves that are associated with few calving problems.
4. Separate young cows from the older cows in the herd, or they won't be able to compete for available feed.
5. Have all cows in good condition at calving time. They should gain 100 to 150 pounds between weaning and calving, so body weight after calving will equal or slightly exceed body weight at weaning. Cows that are suckled down at weaning time should gain more.
6. All cows should gain *0.5 to 0.75* pounds per day after calving until the end of the breeding season.

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