

Malignant Catarrhal Fever in Utah

A diagnosis of malignant catarrhal fever (MCF) was recently made at the Utah Veterinary Diagnostic Laboratory (UVDL). The case was presented as a 1 year old Angus heifer that had died on pasture. There was no history of clinical signs, only that the heifer was found dead. The only gross lesions at necropsy were edema of the walls of the transverse and spiral colon. Histologic lesions of necrosis of epithelium were noted in the esophagus, rumen, reticulum, omasum, abomasum, and there was histologic evidence of vasculitis of the abomasum, large intestine, adrenal glands, kidney, liver, trachea, lung and brain. One of the differential diagnoses for vasculitis in a ruminant is MCF. This diagnosis was confirmed by Polymerase Chain Reaction (PCR) testing.

After the diagnosis of MCF, the owner was asked about exposure to sheep, a classical source of MCF. Ewes with young lambs had recently been introduced to an adjacent pasture. There was some possibility that in addition to fence line contact, the sheep had escaped the fence and commingled with the cattle. The owner of the sheep moved them to another location soon after the cow died, and they were lost to follow up. There was no known history of disease in the sheep.

Since 2003, MCF has been diagnosed at the UVDL in one sheep, one buffalo, and the Angus heifer described above. This might seem to indicate that MCF is an uncommon disease in Utah, or that it is not important in dairy cattle, but there is a possibility that it is more prevalent than one might think. Diagnostic requests for MCF, or interest by owners in pursuing the diagnosis when it is considered a differential diagnosis, are uncommon.

General Description of MCF

Recently, MCF has been reported with increasing frequency and virulence in many developed countries, including fatal infections of dairy cows, possibly in association with farmed and ranched exotic ruminants including bison, water buffalo, antelope, gaur, and banteng, as well as animals that may be wild including elk, mule deer, white-tailed deer, pronghorn antelope, and bighorn sheep. Wild bison appear to be much less susceptible than farmed bison, possibly due to crowding and remaining in one place of the latter. Viruses described as “identical or closely related to” agents of MCF have been isolated in U.S. zoos from white-tailed gnu, white-bearded gnu, gaur, greater kudu, Formosan sika deer, axis deer, topi, hartebeest and nilgai.

Li et al. reported in *Journal of Veterinary Diagnostic Investigation*, January, 2006 on a 2003 outbreak of MCF in southern Idaho. A bison feedlot had exposure to sheep for 19

days. With peak losses from 41 to 55 days after exposure, as many as 41 bison died from MCF per day, with total death loss of 825 of 1611 bison (51.2%).

It is interesting that many articles on MCF mention it in white-tailed deer but not in other wild ruminants. One thing I have noticed in Utah is that I never see white-tails, which are ubiquitous in the Northeast and upper Midwest, but we have many mule deer as well as pronghorn antelope, bighorn sheep and elk. So how important might our wild ruminants be as sources of MCF? In a large study by Hong et al. in *Journal of Wildlife Diseases* in July, 1996, over 2500 serum samples were collected from wild ruminants, mostly in California, Idaho, Montana, Washington, and Wyoming. Asymptomatic animals with antibody to MCF virus, indicating a high probability of previous exposure, included mule deer (2%), nearly as prevalent as in white-tails (3%), but also 9% of elk, 25% of pronghorn antelope, and 37% of bighorn sheep. The same study also found that 53% of domestic sheep with no history of clinical MCF or known association with MCF had antibodies suggesting previous exposure.

A recent report from the Netherlands describes MCF that was associated with the death of 18 of 46 dairy cattle (39% mortality). Lambs had been introduced to the dairy farm shortly before the outbreak. (Van Wuijckhuise et al., *Tijdschr Diergeneeskd* Oct. 2007).

MCF Viruses

Malignant catarrhal fever (MCF) is a viral disease. The viruses that cause MCF are sometimes reported by different names. The most commonly used names for the two viruses are alcelaphine herpesvirus-1 (AHV-1) and ovine herpesvirus-2 (OHV-2). Outbreaks of MCF associated with either type, or a mix of both types have been reported. The incubation period is not precisely known, but has been reported to be between 9 and 200 days.

The first reports and the greatest prevalence of MCF have been found in Africa. The virus is usually subclinical in antelope of the subfamily *Alcelaphinae* including wildebeest, hartebeest and topi. As noted above, however, MCF has been increasingly reported in developed countries around the world.

Clinical Signs of MCF

Clinical MCF has been reported most commonly in domestic cattle and buffaloes, but has also been found in pigs. In all of these species, recent exposure to sheep, especially lambs, is often part of the history. In a course on exotic and emerging diseases presented by Dr. Jesse Hostetter, Iowa State University, it was reported that >90% of domestic sheep shed OHV-2 via nasal secretions. Sheep virtually never have clinical signs of MCF. Clinical signs in species including domestic cattle can include fever (may be 106-107⁰ F), nasal discharge, ophthalmitis, corneal opacity, sometimes crusting and occlusion of nares so that open mouth breathing results, generalized lymphadenopathy, severe inflammation of the conjunctival, oral, and nasal mucosae (with necrosis in the oral and nasal cavities sometimes extending into the esophagus and trachea), trembling, depression, convulsions, aggression, circling, head pressing, diarrhea, skin lesions, and arthritis. Pigs can exhibit vomiting as well. Personal communication from pathologists who have diagnosed MCF reveals that the most common history is death of the affected

animals, without much history of clinical signs. In veterinary school we learned to suspect MCF when marked corneal opacity and copious nasal discharge were observed in cattle that had been exposed to sheep, especially lambs, but these classic signs are often not present in MCF cases. Redness of the coronary band or interdigital spaces is also described, but is not commonly reported.

Morbidity and Mortality

MCF is usually a low morbidity (possibly underdiagnosed) but high mortality disease. The percentage of a herd affected in an MCF outbreak is often less than 5%. Nevertheless, there are reports of morbidity greater than 30%. Mortality is usually 90-100%, often greater than 95%. The first report of MCF in dairy cattle in the United Kingdom was in 1987. 10% morbidity and 100% mortality was observed. The outbreak began in 9 month old calves housed with 19 Suffolk ewes that lambed. (Sharpe R et al., Veterinary Record, June 1987).

A report by O'Toole et al., Veterinary Record, May, 1997 describes cattle from 4 farms that recovered from MCF in Wyoming. 11 cows survived for up to 2.5 years following PCR-confirmed clinical MCF. Most had keratitis for the rest of their lives, and tissues harvested after death from all 11 cows were positive for the OHV-2 MCF virus, suggesting that chronic persistent infection is common in recovered cattle.

Post Mortem Diagnosis of MCF

In Dr. Hostetter's course, pathologists polled regarding the most *distinctive* diagnostic findings in MCF cases reported enlarged lymph nodes (64%) or splenic necrosis (29%). However, most sources agree that the single most *common* finding is widespread necrotizing vasculitis of many organ systems, which may only be evident histologically. Confirmation of the diagnosis is by PCR, as in the cases at UVDL.

Gross lesions of MCF can include redness, erosion, and necrosis of almost every organ system. Inflammation of the CNS and widespread lymph node enlargement, often described as looking like lymphoma, can be seen also. As in the cases showing only vasculitis, confirmation of the diagnosis is by PCR.

Significance of MCF in Dairy Herds in Utah

Because PCR diagnosis is not commonly pursued, and clinical signs are varied, can look like many other diseases, or are absent, the prevalence of MCF in dairy cattle is unknown but perceived to be low. Increasing MCF in the western US, especially in farmed bison and wild elk, pronghorn antelope, and bighorn sheep is well documented. What is clear from the worst MCF outbreaks in farmed bison as well as in dairy cows in other developed countries is that exposure to sheep, especially lambs, has been associated with all of them. Because MCF is present in Utah, dairy producers should be cautious about exposure of dairy cattle to sheep, especially lambs.

Manure Pits can Pose Fatal Danger

Many veterinarians and others familiar with the dairy industry know of human fatalities associated with manure handling systems. Several years ago in another part of the US, 5 members encompassing multiple generations of the same family died one by one trying to save the others from a manure pit under a dairy barn. Recently, however there was a fatality in northern Utah which was caused by something I do not recall hearing of previously.

A young employee had only been working on a dairy farm for a few weeks and was apparently chasing some cows that had escaped from their pen. He was believed to be unfamiliar with that part of the farm, according to the media account. He walked across the frozen surface over the corner of an 8 foot deep manure pit. The amount of time that passed before he was noticed missing by other workers on the farm is unknown, but may have been as long as one hour. When authorities were called it was discovered that he had fallen in and drowned. A member of the local sheriff's department said the contents of the pit had "quicksand like" consistency, and made it nearly impossible to escape.

Not only farm employees, but children, grandchildren, visitors or even trespassers driving recreational vehicles, etc. could certainly be at risk when manure storage facilities are not easy to see. Some manure pits become overgrown with vegetation and are not obvious to people unfamiliar with dairy farms. Dairy producers may not wish to use signs or fences around manure facilities. However, some kind of warning sign for trespassers, making family members and employees aware of the edges of manure storage facilities, and including a safety tour of the farm for new employees should be considered.

Veterinarians remain the single most influential advisor on most dairy farms; clients often listen to their veterinarian. This might be a good time to remind your clients that making employees and family members aware of the boundaries of manure pits or other safety hazards on farms can be a lifesaving measure.

Once again I am glad to hear from our readers, including suggestions for future topics of interest. Please contact me at (435) 797-1899 M-W, (435) 797-7120 Th-F or David.Wilson@usu.edu

David Wilson, DVM
Extension Veterinarian

Utah State University is an equal opportunity/affirmative action institution.