Prototheca Mastitis

Prototheca is a colorless algae commonly found in manure, soil and water. Prototheca was first linked to bovine mastitis in 1952, but was not considered a significant pathogen until relatively recently. The species most often associated with bovine mastitis are P. zopfii and P. wickehamii.

Source / Transmission
Prototheca is widespread in the environment of dairy cows, particularly in wet or humid areas. Infections occur when the teat end is exposed to very large numbers of the organism (the infectious dose is thought to be higher than for other pathogens). Although Prototheca has primarily been considered an environmental pathogen, some recent studies have found that one particular strain of Prototheca zopfii is isolated from the majority of mastitis cases.1,2 This, along with the fact that there is no effective treatment for Prototheca and infected cows typically develop chronic infections, suggests that Prototheca may be considered as a contagious pathogen.

Infection
In many cases, cows infected with Prototheca will go undetected until the affected quarter is nearly dry. Unlike other mastitis pathogens, the initial immune reaction in the udder to Prototheca is mild. Most cases are subclinical, with few episodes of mild clinical mastitis where the milk may be only slightly abnormal. However, infections remain chronic with a progressive decrease in milk production over time as the organism damages more of the gland. The somatic cell count (SCC) of affected cows may be only slightly elevated or may be greater than 1,000,000 cells/ml. In cases where it is only slightly elevated it may be due to the dilution effect of the healthy quarters.

Risk Factors
Wet areas in the cow’s environment may pose a risk for infection. As with other pathogens that are resistant to antibiotic therapy, poor hygiene and contaminated intramammary infusion equipment are also risk factors. Some studies have found increased rates of Prototheca in early lactation and in herds with compromised immunity.3

Diagnosis
Prototheca may be diagnosed by bulk tank or individual cow culture. Prototheca may grow slowly on traditional culture media designed to enhance growth of bacteria. This may result in some false negative culture results. However, as Prototheca is becoming more common, diagnostic laboratories may use selective culture media or other techniques to improve detection of Prototheca when present in a milk sample.

As Prototheca is prevalent in the environment and could conceivably contaminated bulk tank milk, a positive bulk tank culture may not necessary mean that infected cows are present in the herd. However, because of the economic significance of Prototheca infection, a positive bulk tank culture does warrant further investigation. It may be prudent to culture cows with elevated SCC. One US laboratory4 offers strain-typing as a way to determine if Prototheca found in bulk tank milk is likely to be the result of environmental contamination or mastitis infection.

Control
There is no treatment for Prototheca mastitis. Affected cows should be clearly identified and milked last in the milking order until they can be culled. The use of SCC data to identify potentially infected cows for culture is recommended. Environmental sources should be investigated and eliminated and good hygiene practices should be emphasized.

References

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