Mastitis in Dairy Cattle

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Unbalanced udder caused by mastitis before first calving.

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Figure 1. Mastitis milk showing *Streptococcus agalactiae* and excess leucocytes.

Figure 2. Fat globules in normal milk.
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The purpose of this circular is to make available to the dairymen of Oregon information on mastitis for which requests are frequently received. Mastitis, garget, or caked udder is the cause of some 20 to 25 per cent loss of market milk.

MASTITIS: CAUSE AND TREATMENT

1. What is mastitis?

Mastitis is an inflammation of the udder.

2. How seriously is production affected by mastitis?

Conservative estimates by competent authorities place national losses due to mastitis at more than 20 per cent and possibly as high as 40 per cent. Obviously exact figures are not available.

In the individual cow, production may be reduced temporarily or permanently in one or more quarters. This is repeated in every affected animal in the herd. Profits are in inverse proportion to the amount of mastitis present in the herd. In many herds mastitis has made dairy production economically unsound.

3. Is mastitis contagious?

Yes! Chronic cases as well as acute cases shed organisms that are infective to other teats of the same cow or other cows. The organisms are commonly carried on the hands of milkers, especially if wet milking is permitted.

4. What causes mastitis?

Microscopically it has been shown that bacteria are predominately the cause. Injuries, such as bruises, cuts, and sores, aid the entrance of the infective bacteria.

5. What bacteria cause mastitis?

Approximately 80 to 90 per cent of clinical mastitis is caused by Streptococcus agalactiae but any of many different bacteria may cause occasional cases. (See Figure 1.) The condition may be either acute or chronic.

*Acknowledgment: All photographs used in this circular were made by Dr. O. H. Muth, Department of Veterinary Medicine, Agricultural Experiment Station.
6. Are all cases of mastitis immediately detected?

No. The infection may be of a chronic nature causing little or no swelling, or pain, and little or no change in the gross consistency of the milk.

This chronic condition may at any time become active. Flakes, slugs, and other gross changes in appearance of the milk, as well as off-flavor and peculiar odor are the usual characteristics of mastitis milk. The production of milk is usually reduced considerably.

Acute cases cause redness of the teats and udder, swelling, fever, and pain. The condition may remain local in the udder or the cow may become sick generally, with serious involvements, even loss of udder or death of the animal.

7. How does mastitis manifest itself in a herd?

Listed below are some of the most frequent symptoms of mastitis:

a. Blind quarters and meaty udders.
b. Lumps in udders.
c. Difficulty in straining milk.
d. High bacteria count.
e. Lumps, flakes, strings, and whey in strip cup.
f. End of teat sore or sealed over.
g. Sore or swollen teat causing cow to stand uneasily or even kick.
h. Milk reduced in amount and changed in odor, flavor, and appearance.
i. Udder swollen, red, and hot.
j. Cow sick and off feed.
k. Udder may become blue, cold, necrotic and slough off, and cow may die.

Any or all of these conditions may be apparent in a herd.

8. What conditions may cause a sudden outbreak?

Cow pox wounds at ends of the teats, incomplete milking due to new milkers, cold wet floors and quarters, milking machine difficulties such as change of pulsation time, or too great a vacuum, or machine left on too long, and injuries of various sorts may cause new outbreaks or aggravate latent cases. The most serious cause is usually an infected cow in the milking string.

9. Are all breeds susceptible?

There is no immunity to mastitis and all breeds are affected.
10. What are the probabilities of a clean herd becoming infected?

The causative bacteria are universally distributed. Therefore continuous care and proper preventive measures should always be exercised.

11. What age cows are affected?

All ages may be affected and the cow therefore is continually subject to the disease. The older animals are more likely to be affected.

12. May heifers have mastitis before their first calving?

It is possible, because of several reasons, but the most common is the habit of pail fed calves sucking each other after feeding. When infected milk is used the organisms are placed on the teats by the calves' mouths. The same may be true when sucking infected nurse cows. These heifers occasionally show udder swelling during development and blank or infected swollen quarters at calving. (See cover.) Young calves while receiving milk should have isolated stalls where sucking others is impossible. When isolation is not feasible calves should be tied separately for about an hour after feeding until the impulse for sucking is allayed.

13. Can mastitis be treated successfully with drugs?

Only after following satisfactory sanitary measures and desirable milking and isolation procedures should treatment be attempted. Supervision of treatment should always be in the hands of a veterinarian as improper treatment may cause severe udder damage.

14. Is it necessary to treat all infected animals?

If any animals showing the presence of infective bacteria remain in the herd, there will be a continuous source of danger to the herd.

15. How effectively have drugs eliminated the infection?

Drugs have been used in eliminating streptococci, especially S. agalactiae. Their efficiency in properly selected cases after microscopic examinations and when injected by veterinarians ranges from 50 to 95 per cent cures. The efficiency varies with the prevailing conditions.

16. What treatment should be given?

Condition of the udder, type of organisms present (as determined by microscopic examination), and stage of lactation are to be considered in selecting a treatment.
17. What drugs are being used with success by recognized authorities?

Some of the various drugs in common use are:
   a. Flavines.
   b. Tyrothricin.
   c. Silver oxide.
   d. Sulfanilamide and oil.

18. Is treatment expensive?

Treatment is expensive. The slaughter of infected animals is also expensive. But retaining the infected animals is the most expensive. Treatment on a herd basis rather than waiting for acute cases to appear is considered the proper procedure.

19. How should treatment be checked?

By microscopic examination of the milk. Several microscopic examinations are desirable but one examination three weeks after treatment is reasonably accurate and should be made to ascertain if additional treatment is necessary.

20. Will animals once cured be immune to mastitis?

No. Infection may enter at any subsequent time. Animals previously infected apparently are more easily reinfected. It is, therefore, essential to employ good sanitation practices and provide the best of care for all animals.

PROTECTING A HERD FROM MASTITIS

Sound dairy methods with a fundamental knowledge and practice of principles of sanitation and hygiene are essential.

1. Feed lightly a week to ten days before calving and continue to do so until the udder returns to normal and then increase feed gradually.

2. Grow replacements to overcome the continual threat caused by bringing new animals that may be infected into the herd.

3. Buy replacement animals, if necessary to make purchases, that are in full production a month or longer after freshening, so milk can be bacteriologically analyzed and the udder examined when milked out. Isolate all purchases until these examinations have been made.

4. Use strip cup on each animal every milking. (Figure 3.)

5. Place infected cows at one end of milking string if an isolation stable is not available. Never let infected animals stand beside
healthy ones. Always milk such animals last and preferably by hand in case of those quarters that are affected. Infected milk should be boiled or treated with disinfectants before it is discarded.

6. Drying off infected quarters is often the most satisfactory way to control spread. Occasionally such quarters produce normally in the subsequent lactation but usually the organism persists and may become active later or shed the infection to others while in the quiescent stage.

7. Do not use teat plugs or tubes and immediately treat all teat wounds with care.

8. Call the local veterinarian at the first sign of mastitis as this is the time when the greatest amount of production loss can be averted.

9. All cows that show any signs of udder trouble should be thoroughly stripped. Milk left in the udder definitely aggravates the infection by leaving a well inoculated culture medium there to increase contamination of newly formed milk.

10. Infected cows, especially, should be dried off carefully.

11. The milking machine mechanism should be unmolested as change in vacuum or pulsating rate is a likely means of injuring teats and making them more vulnerable to infection. Do not leave machine on too long.
12. Sanitation includes a careful and well regulated series of procedures that cannot be covered here, but brief reference is made to several essential measures:
   a. Do not permit wet milking.
   b. Wash hands after milking each cow.
   c. All dairy quarters should be clean, dry, and amply ventilated, and comfortable.
   d. All milking equipment should be sterilized by steam or adequate chemical means. A chlorine solution of 200 parts per million is satisfactory.
   e. Never milk onto the floor. Infected material may be carried by flies, litter, or direct contact to an uninfected quarter. Milk on the floor is a good medium for the growth of bacteria.
   f. Painted or whitewashed walls are highly desirable.
   g. Lime or superphosphate on floors is beneficial and particularly in stables where scrubbing of floors is impossible.
   h. Floors and standing platforms should be dry and warm, and good litter is essential.
   i. Gutters should drain freely and be cleaned at least twice daily.
   j. Proper ventilation not only aids the general health of the animal but helps reduce humidity and keeps floors dry.
   k. Clipping of udders and rear quarters facilitates cleaning cows.
   l. Hands as well as udders should be washed clean and dried immediately before milking.
   m. Use one towel to wash and dry each udder and then discard or rinse towel in an approved chlorine solution.
   n. Milking machine should be handled so teat cups do not contact floor, litter, or anything but the teats.
   o. Rinse, then disinfect, teat cups in chlorine solution after each cow.
   p. Dipping teats in disinfectant solution after milking is considered valuable.
   q. Do not allow calves to suck cows in milking string.