Mastitis in cattle

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M ASTITIS (sometimes called mammitis) is a term used to denote inflammation of the mammary gland. It is a common complaint among dairy cattle and this is not surprising when one considers the enormous development of this gland, the delicacy and complexity of its structure, and the fact that it is placed in a position where it is subjected to pressure from the cow's legs and liable to injury from the horns of her herd-mates and other outside sources.

It has often been said that the modern dairy cow's udder is a man-made organ. When the ancestors of our cows roamed the world in a wild state, their udders were small inconspicuous vessels which supplied sufficient milk to nourish their calves, and no more. The calves suckled frequently and possibly the udders seldom carried more than a pint or two of milk.

Today the udder has become a huge mass of highly sensitive tissues secreting vast quantities of milk—more than 10 gallons daily in many instances. The udder has four openings to the contaminated air of the cowshed and in the process of milking there is always a risk of bacterial infection being transferred from udder to udder in the herd.

IMPORTANCE

Mastitis, tuberculosis, brucellosis and Johne's disease are usually referred to as the "Big Four" of cattle ailments throughout the world.

As a result of the high incidence of mastitis in all dairying countries, the annual financial losses from this disease alone are enormous, and add greatly to the production cost of milk and milk products.

Deaths of cattle may occur from blood poisoning following severe mastitis infection; milk production may be substantially lowered by the permanent or temporary "loss of a quarter" in high-producing animals; milk and milk products may be down-graded due to high bacterial content and, in addition, the dairy farmer is compelled to spend time and money in the prevention and control of the disease.

Added to this are the expenses involved in increased culling and last, but not least, is the danger to human health resulting from milk-borne bacteria in countries where pasteurisation is not practised.

CAUSE

Mastitis is an infectious disease and may be caused by any one of a number of different bacteria or a combination of several of them.

As previously indicated, the udder is a particularly susceptible organ because of its size and construction. As the cow walks, a large distended udder is constantly subjected to pressure and pummelling by the hind legs. Kicks, bruises and horn-prods can cause major or minor injuries and badly-adjusted or badly-operated milking machines can damage the tissues—all creating ideal conditions for the rapid growth and multiplication of bacteria, many of which find milk a highly suitable medium for propagation.

Infected milking machine cups, wash-water or wash-cloths, or the hands of the operator can convey the bacteria from one cow to another and the impossibility of keeping cowsheds and yards bacteriologically clean offers countless opportunities for infection to occur, particularly when injuries create suitable conditions for their entry into the tissues.
TYPES

Most cases of mastitis may be loosely grouped under these three main headings:

1. Hyper-acute.
   This type of mastitis differs from the other two in that the cow appears generally sick, being depressed, feverish and with a total loss of appetite. The udder is hot and painful to the touch and there may be a small secretion of blood-stained fluid. Some differences occur according to the type of bacteria responsible.
   (a) Staphylococcal or Gangrenous Mastitis usually occurs within the first week of calving. The animal frequently goes down and the trouble may be mistaken for milk fever. The affected teat and the lower part of the quarter become purple or black and a claret-coloured fluid is secreted. If left untreated, a large proportion of the affected animals will die. In those which survive, the affected quarter or quarters may slough or drop off.
   (b) Streptococcal Mastitis is similar except that there is no gangrene or death of the quarter. The secretion is purulent (containing pus) and may be thick and custard-like. The quarter is usually permanently affected and may be left completely “blind.”
   Other forms of hyper-acute mastitis are encountered resulting from infection with various bacteria, but these are less common.
   While hyper-acute mastitis does not usually respond well to udder injections of penicillin or other antibiotics, these should be tried. In addition, systemic treatment with antibiotics such as sulphamezathene should be carried out. These injections require the attention of a qualified veterinarian, but where such services are not available, sulphamezathene injections, as used in the treatment of “foul foot,” may be tried.

2. Acute.
   This type occurs suddenly without affecting the general health of the animal. The quarter is hot, swollen, hard and painful. The milk from the affected quarter will be found to contain flakes or clots. These are most noticeable in the first few ounces of milk drawn from the teats, and the use of a strip cup in which the first milk is passed through fine wire gauze will assist in detecting any clots or flakes in the early stages of the disease.
   Later, the milk is replaced by a yellowish-brown watery fluid containing flakes and clots. In some cases, this fluid assumes a custard-like consistency.
   The affected quarter may respond to treatment and recover fully, but complete or partial loss of the quarter commonly results.

3. Chronic.
   Clots occur periodically in the milk and there is a gradual loss of function in the quarter which usually becomes increasingly hard and fibrous after each attack. The milk appears fairly normal except for the intermittent appearance of clots or flakes. In some instances, the quarter ceases to secrete milk without becoming hard and fibrous merely resembling a quarter which has been completely milked out.
   The chronic or sub-acute cases of mastitis are the type most commonly encountered and are responsible for most of the losses resulting from this disease.

TREATMENT

Penicillin, either alone or in combination with other drugs, is still the most commonly-used preparation for the treatment of mastitis by udder injection. It is sold in tubes with special nozzles for direct injection into the teat canal.

The recommendations below are based on those given by the Commonwealth Serum Laboratories. If other antibiotics are used they should be used according to the manufacturer’s instructions.

For streptococcal mastitis give three doses, each of 25,000 units (actually sold as larger amount to allow for wastage), allowing a 24-hour interval between each dose; or two doses, each of 100,000 units allowing a 72-hour interval between.

For staphylococcal mastitis give three doses, each of 100,000 units with a 24-hour interval between each dose.

Technique.
   (a) Wash the udder thoroughly with warm soapy water, or with warm hypochlorite solution (1 1/2 oz. or three tablespoons of commercial sodium hypochlorite
solution to one gallon of warm water). Wring out the wash cloth and dry the udder.

(b) Milk out the infected quarter into a bucket containing a disinfectant.

(c) Swab the teat opening with a clean piece of cotton wool saturated with methlyated spirit. (Allow the spirit to evaporate before inserting tube.)

(d) With clean hands remove the cap from the tube without touching the nozzle.

(e) Hold the end of the teat firmly between the finger and thumb and insert the nozzle of the tube gently into the teat orifice. Squeeze in the whole of the tube contents. The tube must be squeezed from the base towards the nozzle to eject all the contents. Discard the empty tube. Holding the end of the teat firmly to prevent escape of the penicillin suspension, massage the teat upward several times to distribute the penicillin suspension into the milk cistern.

(f) Repeat this treatment after each afternoon milking until the required number of doses have been given.

**PENICILLIN AND CHEESE MANUFACTURE**

The use of penicillin affects the milk used for cheese manufacture, due to its action against the lactic acid forming bacteria necessary in the initial cheese-making process.

For 24 hours after dosing with 25,000 units of penicillin in a quarter, the penicillin level of the milk is high enough to affect cheese manufacture if only one quarter in 50 has been treated. If the dose rate has been higher then the levels will remain higher for longer periods.

The safe times for sending milk to cheese factories, after treatment, for cows in full lactation, are:

- After treatment with 25,000 units—36 hours
- After treatment with 100,000 units—72 hours
- After treatment with 300,000 units—9-10 days

**PREVENTION**

The main aims in preventing mastitis are to reduce the number of mastitis-causing organisms in the milking-sheds and yards; to prevent as far as possible, all forms of udder injury which offer an easy entrance for the germs, and to reduce the chances of the organisms being conveyed from one cow to another.

**Hygiene.**

Careful attention to hygiene—clean sheds and yards—and disinfection of teat cups, wash cloths, and the milker’s hands will help.

The use of hypochlorite solution (1⁄4 oz. commercial hypochlorite to a gallon of water) is recommended, but this solution uses its effectiveness rapidly if the water is contaminated with organic matter such as milk or manure. It should be changed after each 12 to 14 cows.

The teats should be washed with warm soapy water, excess moisture removed with a wrung-out cloth, and disinfection carried out with the hypochlorite solution.

Incidentally, a new disinfectant marketed Hibitane udder wash, appears to hold promise as it is non-irritant and not affected by organic matter.

Teat cups should also be sterilised and placed in position as soon as possible after sterilising the teats. After milking each cow, the cups must be cleaned by plunging them into a bucket of warm water containing one heaped dessertspoonful of washing soda to the gallon. Raise and lower them a few times to wash off the milk, then shake off the water and immerse in hypochlorite solution for 10 to 20 seconds, before putting them on the next cow.

**Preventing Udder Injuries.**

Cows with pendulous udders are more liable to udder injuries than those with well-shaped vessels that are well attached and extend well forward and upward. Where possible, breed from animals with shapely udders.

Dehorning—preferably during calf-hood—will cut down injuries from horn-prods, and attention to fences and the elimination of barbed wire will help.

Good milking machine maintenance and correct usage of the machines will prevent many injuries. Excessive vacuum pressure causes redness and prominence of teat openings and small sores at the tips of the teats, and may result in painful warty growths.
Pulling off the cups without releasing the pressure has similar effects. Too rapid pulsations and leaving the cups in position too long allow the cups to crawl up the teats and cause injuries to the linings of the teat canals. Weights applied to the claws may be necessary for cows with small teats. Faulty inflations may cause uneven milking and teat injury.

Preventing Disease Transmission.
Clean cloths, clean wash-water and clean hands will help to prevent this. Calves allowed to suck may transmit infection from quarter to quarter and from cow to cow. Calves and pregnant heifers should be segregated from the milking herd.

Hand-stripping after machine milking increases the chance of cow to cow infection.

Try to milk the first-calf heifers first, then the "clean" cows next, with "suspects" and cows known to be affected last of all.

Dispose of chronic cases—they are always a potential source of infection.

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