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Mastitis

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Diseases *of* DAIRY CATTLE

MASTITIS

By J. CRAIG, M.R.C.V.S., Senior Veterinary Surgeon

MASTITIS, or inflammation of the udder, is responsible for tremendous losses to the dairying industry throughout the world. The disease may be caused by several different types of bacteria, the most common of which, the *Streptococcus*, is responsible for about 80% of all cases of mastitis. The *Staphylococcus* is involved in about 10% of cases and the remaining 10% are caused by other micro-organisms.

These disease-causing bacteria are commonly present in nature, existing in cowsheds, yards and pastures and constantly gain entrance to the udder through the teat canal. A healthy udder can resist these mild infections, but if the natural resistance of the organ is reduced, the bacteria multiply rapidly and we soon encounter serious infections.

Faulty milking machine pressures, injuries to the udder from blows, horn thrusts, and wire cuts as well as chills from cold winds are among the many causes of lowered resistance. Once a cow has contracted a mastitis infection, the disease may be transmitted to healthy cows by the milker's hands or contaminated cloths and milking equipment.

SYMPTOMS

The first sign of infection is an alteration in the character of the milk, which may become watery, contain clots, or be tinged with blood. In some

cases it is pus-like and has a most offensive odour. Depending on how severe the infection is, the udder will show heat, pain and swelling, or there may be little change. Sometimes a chronic infection will persist throughout the life of the animal, reducing milk yield and causing progressive hardening of the affected quarters. In cases of gangrenous mastitis, the quarter becomes cold and black, and may slough away, to be followed by death of the animal in many cases.

TREATMENT

In the past, the medicinal agents popular at one time or another in mastitis treatment have been many and varied, but in more recent years penicillin has proved to be of very great assistance in this respect. Vaccines have frequently been advocated for the treatment and control of mastitis, but it is necessary in the interests of the dairyfarmer, to point out that no vaccine has yet been discovered which will either cure or prevent the disease.

While penicillin is highly efficient against Streptococcal infection, it is considerably less so against Staphylococcal and other mastitis-producing bacteria. Penicillin is now available in the form of a suspension, which is put up in collapsible tubes fitted with a nozzle which may be inserted into the teat duct, enabling the drug to be injected direct from the tube into the affected quarter. Each tube contains 25,000 units of penicillin. The nozzle is sterilised at the time of packing, and is covered with a screw-on cap which ensures that it will remain in a sterile condition right up to the time it is required for use. Alternatively, "Mastics" may be used. These are small slender "pencils", about match-stick size, each consisting of 25,000 units of penicillin, and contained in a solid base which is soluble in milk.

Treatment consists of three injections each of 25,000 units, repeated at intervals of 24 hours for three days, and, according to convenience, they may be given after either the morning or afternoon milking. The quarter should be completely stripped out immediately prior to treatment, and the end of the teat should be cleansed by swabbing with methylated spirits before the nozzle is inserted into the teat duct. All the contents of the tube should be squeezed into the quarter, and this should be followed by massage in an upward direction to ensure that the suspension is thoroughly dispersed. The dose injected is left in the quarter until the next milking, and while the cow is under treatment the normal milking routine should not be disturbed.

Penicillin is non-irritant and does not cause any damage to the udder tissues. Should the response not be satisfactory a further course of three injections may be given. It must be recognised that Staphylococcal mastitis cannot be differentiated clinically from other forms of the disease, but in cases where doubt exists, milk samples may be submitted for laboratory examination, which will enable a definite diagnosis to be established. With Staphylococcal mastitis,

100,000 units of penicillin daily in each affected quarter may be advocated.

Sulphanilimide powder (four ounces initially, then two ounces at eight hourly intervals for 48 hours) may be given as a drench mixed with about a pint of water, and be of assistance in controlling the systemic upset seen in cases of acute mastitis; alternatively Sodium Sulphamezathine is equally useful, given in injections under the skin—dosage rate, 15 c.c. of 33 $\frac{1}{3}$ % solution for each 100 lb. of body weight.

Recently, much work has been carried out with the newer anti-biotics, streptomycin and aureomycin, although the latter is not as yet available for intramammary use in this State. The results obtained from these trials have been very encouraging, especially with regard to non-Streptococcal mastitis. Streptomycin can be obtained locally, but treatment with this drug is about three times as expensive as the use of penicillin. The technique to be employed is similar to the intra-mammary infusions described previously and consists of three injections each of 250,000 units of streptomycin in oil wax suspension. These are given at 48-hourly intervals, and have been successful in curing infections which have been resistant to penicillin therapy.

NOTE.—In connection with the intramammary administration of penicillin suspension, it should be noted that penicillin-treated milk affects the lactic acid forming bacteria necessary in the initial cheese making process. In view of the serious financial loss to factories from the degrading of cheese, farmers are requested to keep all milk from penicillin-treated quarters out of the factory milk supply during treatment and for at least four milkings after the last treatment.

PREVENTION AND CONTROL

Efficient milking is an important factor in the prevention of mastitis, and if the milk is withdrawn from the cow in the most efficient manner, mechanical injury to the udder is avoided. There

should be a rigid routine in the milking shed, and especially there should be no delay in starting the milking after the udders have been washed or handled in any way. The milking operation, whether by hand or by machine, should be as rapid as possible, and the degree of vacuum at which the milking machine operates should be under efficient control. This is best provided by a weighted vacuum relief valve, or by a spring loaded poppet type with covered spring. The machine should not be

operated at a higher vacuum than that necessary to keep the teat cups on, and 15 inches of vacuum is recommended as the maximum. This should NOT be exceeded.

If this routine is carefully followed, the quarters will be rapidly and completely emptied, and there will be no necessity to spend time in stripping. After efficient milking there is no necessity to strip, and the small amount of milk left in some quarters will be recovered at the next milking. If left in

“STREPS” AND “STAPHS”

Many of the diseases of domesticated animals are caused by micro-organisms, tiny forms of life which are variously described by the layman as “germs”, “microbes” or “bacteria”. The largest of these micro-organisms would not be more than 1/25,000th of an inch in length, while the smallest are so minute that they cannot be seen, even with the aid of the highest-powered microscopes.

Streptococci and staphylococci are the types of bacteria most frequently referred to in veterinary articles. Most dairy farmers know, for instance, that about 80% of the cases of mastitis are due to “strops” and about 10% to “staphs”.

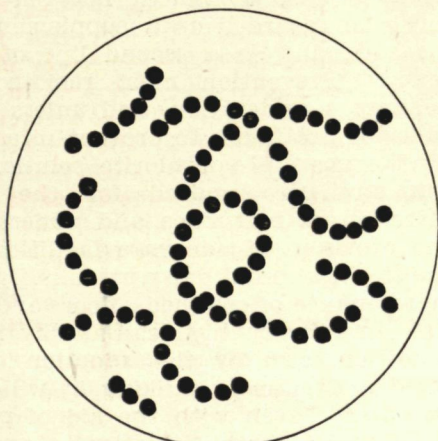
The words are derived from the Greek (“streptos”—a chain or necklace; “staphyle”—a bunch of grapes, and “coccus”—a seed or kernel).

The streptococci are small spherical bacteria which remain grouped in chain formation like strings of beads.

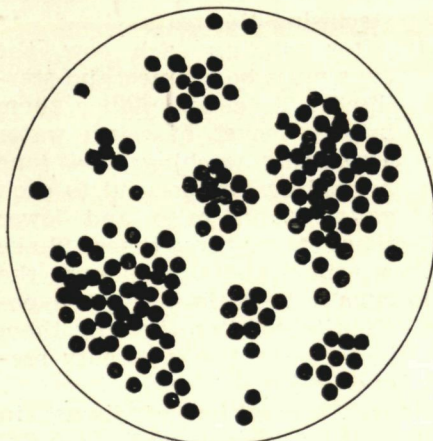
The staphylococci are in clusters like tiny bunches of grapes.

Other types are the diplococci in which the spherical organisms remain in pairs; bacilli, in which the organisms appear as slender rods, and spirilla in which they are wavy or curved.

The word bacteria was originally applied only to the rod-like micro-organisms but is now applied to micro-organisms as a whole, irrespective of their shapes.



STREPTOCOCCI



STAPHYLOCOCCI

the quarter it will do no harm. The physical violence of stripping, of unduly high vacuum, or of leaving the cups in position too long does harm, whereas leaving half a pound or more milk in the quarter does not.

If we have efficient milking, we have a sound basis on which to build a system to prevent bacterial infection of the udder in the milking shed. The sheds must be kept clean and free from dust. The aim must be to have the teats clean and sterile, and the teat cups of the machine or the hands of the milker also clean and sterile. The procedure should be as follows:—

- (a) Wash the teats with warm, soapy water. Wring out the washing cloth and dry off excessive moisture.
- (b) Sterilise the teats with a solution of hypochlorite. This can be made either from powder or liquid preparations on the market. The strength of the preparation is indicated by the manufacturer in terms of the available chlorine, and this should be used to prepare a solution containing at most one part of chlorine to 800 parts of water. The solution must be made fresh at each milking, and can be applied with a cloth.
- (c) Place the sterilised teat cups in position as soon as possible after sterilising the teats.
- (d) After milking each cow, the cups must be cleaned and sterilised. To clean, plunge them into a bucket of warm water containing washing soda (one heaped dessertspoonful to each gallon) and raise and lower them two or three times. Shake off the water and plunge the cups into a bucket of hypochlorite solution, holding them in this for ten to twenty seconds.

The early recognition of disease in the udder is important, and a careful watch should be kept on every quarter

at each milking. Slight signs of inflammation can be detected easily enough if looked for. If a quarter is swollen and feels hot, this is usually an indication of infection. Sometimes there are no signs of heat or swelling in the quarter, but the milk is altered or contains clots.

These clots can be detected most easily by passing the first few streams of milk through a fine wire gauze, or a so-called "strip cup." The use of the strip cup is strongly recommended, and the test should be used on every cow once daily if possible.

Any cows showing signs of mastitis should be taken out of the line and milked last in addition to recommended treatment, and any cows purchased should be healthy and free from mastitis.

Calves and pregnant heifers should be kept as far away as possible from the milking herd. When a cow is coming to the end of a lactation period, and a decision is reached to dry off a cow, cut down the food intake, then cease milking altogether, and turn her out. Do not practice irregular milking to dry off a cow. Calves should be dehorned so as to lessen the injuries caused to udders by cows horning one another.

SUMMARY

It must be emphasised that no matter what promise treatment may offer, it must be regarded as a supplementary measure, and as a second line of defence. Prevention must remain the primary consideration, and unless precautions are taken to prevent infection by the use of hypochlorite solution in the strength required for the disinfection of teat cups and udders, by the provision of adequate facilities for the sterilisation of dairy utensils, by the maintenance of cowsheds, floors and fittings in a thoroughly clean and hygienic condition, and by the adoption of a rapid and efficient milking, it will not be possible even with the aid of penicillin and other anti-biotics to control the disease.