

# Treatment of Bovine Mastitis

## Drugs and their administration

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AS POINTED out in the previous article on Mastitis, treatment of mastitis<sup>1</sup> should be accompanied by the initiation of various sanitary measures. Treatment without improvement of the sanitation in milking of the herd is almost certain to be unsatisfactory in the long run, because of subsequent reinfection of treated animals. The treatment should be considered as an adjunct to a control program rather than depending on it to control the disease alone. The average practitioner of veterinary medicine is called on more frequently to treat an acute case of mastitis in a herd where little or no sanitation in milking is practiced and too often the owner is unwilling to take the steps necessary to control the disease. However, there is an increase in the number of dairy herd owners who, through costly experience, are now willing to take all measures to control mastitis.

In order to best serve his dairy clientele, the veterinarian should be well informed on both sanitary and treatment technics. The discussion of sanitation appeared in the previous publication. The discussion of treatment to follow will complete the information on control of mastitis.

There is a number of points to be considered in the choice of the drug to be used in the treatment of any case of mastitis.

1. The type of infecting agent. Most of the agents now on the market are effective only against streptococci. Since many cases of mastitis are caused by

agents other than streptococci it would be useless to use these in a case of staphylococcal mastitis. Laboratory diagnosis is essential for intelligent choice of drugs to be used.

2. The stage and severity of the infection. Some of the drugs are too irritant to be used in the acute stages of the infection. The use of these relatively irritant materials in these cases will invite disaster, such as complete loss of the quarter.

3. The cost of the material. The number of calls to the dairy must be considered because some of the drugs require administration 3 or 4 days in succession, which increases the cost of treatment considerably.

4. Convenience of administration is also a factor in the choice. For example, acriflavine is quite low in cost, but requires large amounts of material (600 to 1500 cc. per quarter), necessitating the use of special equipment as compared to using 10 to 120 cc. of material taken out of a rubber capped vial and injecting it with comparative ease.

### Administration of Drugs

The actual administration of the various drugs must be done in an approved manner. Instruments must be sterile and the material used kept free from contamination. A separate injector tube for each quarter to be treated is essential. Preparation of the quarter for the injection is important. First the quarter should be milked out completely. The udder should be washed with a chlorine-soaked cloth and then the end of the teat and the orifice disinfected with an effective disinfectant

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such as tincture of iodine. This procedure will prevent the transfer of any organism from cow to cow through the use of a common injecting needle and will prevent the introduction of any organism from the outside.

### **Acridlavine**

A brief discussion of the various agents now used for the treatment of mastitis will aid in the selection of a drug as mentioned previously.

Acridlavine was one of the first drugs found to be effective in mastitis. It is quite low in cost but is more difficult to handle than others because 600 to 1500 cc. of the solution is administered per quarter. If very many quarters are to be treated several large containers are necessary. Because of the injection of a relatively large volume of fluid, it requires more time to make the injection.

Acridlavine has been quite effective in the treatment of chronic streptococcal mastitis, but is contraindicated in acute cases. It is quite ineffective in most cases of staphylococcal mastitis. Acridlavine is somewhat irritant to the tissue and considerable change in the secretion and some swelling is noted in the treated quarters for a few days after infusion. This irritation can be considerably reduced if 20 per cent sucrose solution is used as a vehicle for the drug.

### **Silver Oxide**

Various commercial preparations of silver oxide in mineral oil such as Novioxil, Silvo, etc., have been found effective in chronic streptococcal mastitis. These preparations are easily administered and are fairly reasonable in cost. There are a number of disadvantages to the use of silver oxide. It is quite irritant when injected into the lactating quarter, an occasional quarter will fail to lactate after treatment and will atrophy or undergo fibrosis. Three injections, 24 hours apart are recommended, necessitating three calls to the dairy. Silver oxide is ineffective in cases of staphylococcal mastitis. Milk from treated cows must be discarded for at least 14 days after treatment, a period about

twice as long as for any other agent used in the treatment. This loss of milk adds to the cost of treating.

Administration of silver oxide preparations in the non-lactating udder is usually non-irritant and effective in many cases. Advantage of treatment at this stage is that only one injection is made and no milk is lost, provided, of course, it was marketable before treatment.

### **Sulfanomides**

Sulfanilamide and sulfathiazole per os have proved quite beneficial in acute stages of mastitis, although complete elimination of the infecting organism is seldom accomplished by this method alone. Heavy suspensions of sulfanilamide in oil may be injected into the udder with beneficial results. In order to be effective, higher concentration of sulfanilamide must be maintained in the gland than can be obtained through oral administration. Such commercial preparations as Sulfanidol and Sulvetil contain 35 to 38 per cent sulfanilamide in mineral oil. These preparations are the least irritant of any of the agents now used in the treatment of bovine mastitis. Sulfanilamide in oil is effective in streptococcal mastitis but is not efficient in staphylococcal cases. The use of sulfanilamide in oil is often quite beneficial in acute stages of mastitis.

The disadvantages of sulfanilamide in oil treatment is the need for repetition of the injections every 24 hours for 4 days. This materially increases the cost of treating.

### **Tyrothricin and Penicillin**

Tyrothricin, a substance produced by *Bacillus brevis*, has been shown to inhibit the growth of most streptococci. Those causing bovine mastitis are no exception. However, the staphylococci are much less susceptible to this agent. Commercial preparations such as Ty-Sin, Tyro-Brev, Tyrothricin and Tyro-Mulsin all contain the same active principles and vary in concentration of tyrothricin and vehicle used.

Tyrothricin preparations are usually injected only once. They may be repeated

in some cases where necessary, but one injection is sufficient many times. These products are quite easily administered and economical. Irritation is slight to moderate after the injection of tyrothricin products.

In the above discussion it will be noted that none of the therapeutic agents are effective against the staphylococci. The discovery and research work on penicillin has raised the hopes of the veterinarian as to the possibilities of this drug against the mastitis organisms, especially the staphylococci. The use of penicillin in the treatment of mastitis so far is quite limited. The work that has been done, however, is very encouraging and as soon as this drug is available to veterinarians, it will solve many of the difficult problems in mastitis treatment. In the treatment of acute mastitis where the life of the animal is endangered, penicillin will undoubtedly be of great value.

#### Limitations

One of the difficulties of using penicillin is the need for repeated administration over a period of time. Injections at intervals of 24 hours for 2 days or in some cases every 12 hours may be necessary. It is necessary to maintain a therapeutic level of the drug in the udder over a period of time. Since penicillin is rapidly absorbed by the tissues and eliminated, this administration will add considerably to the cost and inconvenience of treating.

It should be emphasized that after treatment careful laboratory examination should be made to ascertain the effect of treatment. Two or three examinations should be made before a quarter is considered cured. Only through such examinations can an effective program of treatment and control be carried out.

<sup>1</sup> Vet. Stud. 5(3)111.

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Native Chinese sows are noted for their prolificacy and large litters. They mother their pigs well and one exceptional sow had 32 teats and produced one litter of 25 live pigs. They mature somewhat earlier and usually breed at five months. Their pigs weigh about  $\frac{1}{3}$  less and grow slower than ours.

## Toxic Effects of Locally Applied Sulfonamides

Toxic effects from local application of sulfonamides may be classified in the following manner: (1) Toxic effects which may arise from systemic administration. (2) Those due to drug hypersensitivity or allergy. (3) Those due to direct local damage or irritation of the tissues.

The toxic effects associated with systemic administration are due to the presence of the drug in the circulating blood. When sulfonamides are implanted in a wound on the skin, or in the eye or nose, they are gradually absorbed into the blood and excreted in the urine. However, absorption is so slow, as a rule, the blood level never becomes high and the possibility of systemic toxicity is rather low. Absorption from the peritoneum is more rapid than from wounds. Sulfonamide is absorbed more rapidly than sulfathiazole, therefore in using large amounts of sulfanilamide some systemic toxic effects would be expected.

In testing the toxicity of the various sulfonamides on fibroblasts, macrophages and epithelia using solutions of the drugs ranging from saturation downward the toxicity depended upon the solubility of the drug ranging in decreasing order. That is sulfanilamide, sulfathiazole, sulfapyridine, and sulfadiazine, going from a less to a more toxic drug.

In effect upon granulation tissue using sulfanilamide, sulfathiazole, and sulfapyridine a slight inhibition of fibroblast proliferation was produced by sulfathiazole and sulfapyridine, but not by sulfanilamide. Sulfanilamide and sulfapyridine has a slight toxic effect on striated muscle but was not sufficient to contraindicate the local application of these drugs.

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Poults require at least twice as much vitamin D as do chicks, or in terms of U.S.P. units, 350 units per pound of feed. This would be supplied by feeding at least one percent of a good grade of ordinary fish-liver oil. The sun may be counted on here as a factor.