Complications in mastitis treatment

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Mastitis and its treatment continue to be an important topic of debate all over the world. The pair of scientists (Nocard and Mollereu) who clinically identified bovine mastitis for the first time during 1884, tried administration of 4% boric acid paste intra-mammary as a treatment. Right from there, veterinarians everywhere have been trying all types of treatment, some of which even boarders on quackery, against this disease. The benefits and ill-effects of various methods of treatment have widely been discussed. But all types of treatment, whether modern or traditional, allopathic or indigenous, have failed to produce good results consistently. The field veterinarians of Kerala also, have been familiar with the problems, failures and frustration on treating mastitis cases. The availability of many new generations of antibiotics and other drugs has not significantly altered the results so far.

This article tries to impart a clearer understanding of some common factors to be considered for treating mastitis. The intention is not to suggest what drug to use and when, but only to advocate judicious use of available drugs and technology by the field vet. For this we must know the factors capable of complicating the outcome of mastitis treatment.

A) Etiological factors

The udder in its normal state may harbour upto 134 different species of bacteriae, in addition to fungi. Some species of these bacteriae, and some species from outside, totalling together to about 95 species, are capable of producing mastitis either alone or in combination. Thus mastitis is a complex system of diseases. It is not possible to remove any of these organisms from the premises except streptococcus agalactiae, even under the most stringent management. so total eradication of mastitis by management is out of question.

The presence of so many etiological agents makes it impossible to develop an effective vaccine against mastitis. It also excludes identification of a single antibiotic as effective against mastitis in a particular area. The clinician may find one antibiotic to be generally effective in an area for a limited period of time only. When it becomes ineffective we tend to hink in terms of development of drug resistance by the bacteriae. But it should be remembered that drug resistance doesnot develop in such a short period of time. It could be due to a different pathogen gaining predominance in the area.

B) Factors of pathogenesis

The disease, as manifested to a veterinarian is the result of body defense mechanisms being at work against the invading pathogen. The changes in consistency of milk due to bacterial multi-plication leaves the alveoli and ducts occluded with the milk proteins whereas the watery portion is separated and could be milked out or reabsorbed.

The net result is total hardening of the udder and loss of production even after the invading bacteriae have been controlled by treatment . In many cases, the elimician tends to think the antibiotic to be ineffective when elots in milk pessists on second or third day of treatment and changes to other drugs. Many fied veterinarians describe this as fibrosis also. Actual fibrosis is taking place only after 4-5 days from the manifestation of the disease, whereas changes mentioned above may occur on the very first day itself.. Once occured these changes are irreversible. Thus any treatment regime against mastitis should include anti-inflammatory drugs, and drugs like oxytocin to facilitate easy clearance of secretory system of udder.

C. Factors affecting the selection of antibiotics:

As the chief weapons against mastitis considerable thought should precede selection of antibiotics. The Department of Animal Husbandry is currently engaged in an effort to provide culture and sensitivity study facilities even at the Veterinary

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Dispensary level. But the few field vets who have taken pains to have antibiotic sensitivity tests performed on milk samples from their area either at veterinary college or in private labs have found the results usually contradicting, to what actually happened during treatment. Many times the drugs which the antibiotic sensitivity test (AST) indicated as effective against the pathogen failed to bring about cure, whereas some drugs, to which the pathogen seemed resistent during AST, produced good results on treatment. This is true even when the milk sample was collected on the very first day of illness before being treated by the clinician. The possible causes could be listed as follows.

1. Studies done in-vitro gives only an indication of what may happen inside. The AST considers dispersing of the antibiotic through the media, and at what concentrations it can check bacterial multiplication. But inside the body the serum levels attained depends on many other factors like dosage, route and interval of administration. Thus in a case like mastitis where 3-4 times the normal dose is given, enough serum concentration of the drug could be achieved to kill even moderately resistent pathogens. In field practice the interval between drug administration is very long upto 24 hrs usually. So an effective drug may fail to produce results.
2. All drugs are not excreted equally through all routes from the body/Drugs. with a higher excretion rate through milk are more effective against mastitis. A drug like oxytetracycline, which is excreted chiefly through milk may be effective against mastitis caused by particular organism, but powerless against dermatitis caused by the same as excretion of oxytetracyline through skin is very little. But AST will indicate the organism as sensitive to oxytetracyclin in both cases.

Thus selection of antibiotics based on AST may go wrong if the above factors are not taken into account.

D. Factors of faulty diagnosis:

When even the latest generation of antibiotics fail to provide result, the current trend among some of us is to term it as fungal mastitis and treat accordingly. The milk sample may provide some fungi also if subjected to culture. Thereafter any mastitis case with similar symptoms is immediately diagnosed an fungal mastitis and treated. The following points may be considered before diagnosing a case, as fungal mastitis.

1) It is of very very rare occurance. only a minute fraction of the reported cases could be actual fungal mastitis. It is never epidemic.
2) Fungal mastitis rarely produce systemic signs. It can be ruled out in cases starting with pyrexia and anorexia. Secondary bacterial infection, which of course can produce such changes is uncommon in early days of fungal mastitis. This is because a competitive antiganism exists between these two in udder. Thus fungi being isolated from milk sample after days of treatment is due to the removal of bacterial competition by antibiotics.
3. Fungal mastitis is usually self limiting and is not considered worthy of clinical attention.

Based on all these, a successful mastitis treatment regimen should also have the following attributes.

a. Use of drugs to facilitate removal of stagnant milk solids form udder.
b. Use of anti-inflammatory drugs.
c. Acquiring a thorough knowledge of pharmacokinetics of antibiotics
d. Cautious interpretation of AST results.
e. Disregard fungal mastitis from clinical view point.

These are only general guide lines. The opinion and situations may differ in different areas. Instances are there that some cases of mastitis may not respond to any type of treatment. But the point emphasised is that treatment of mastitis in field should be more scientifically oriented if results are to be improved upon.