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Mastitis in Dairy Animals

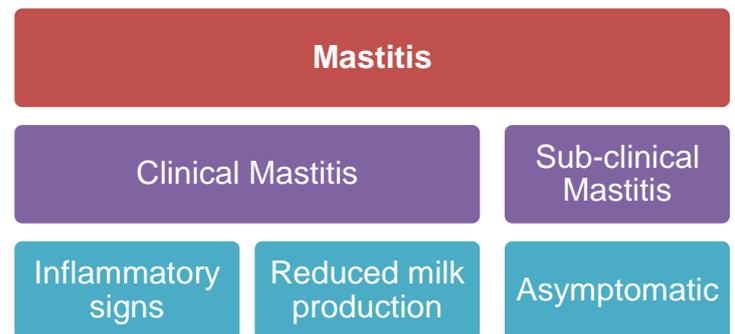
Introduction

Mastitis is an infectious disease condition resulting in an inflammatory reaction in the mammary gland of mammals. It is the most common disease in dairy animals characterized by various degrees of severity - ranging from a mild disease with no gross changes in the secretion (milk) but an increase in inflammatory cells (somatic cells) in the milk, to a moderate disease with an increase in inflammatory cells and gross changes in the milk.

Mastitis is the most widespread and costly disease in dairy cattle occurring throughout the world. It is of particular concern for farmers in developing countries like Nepal. Costs due to mastitis include reduced milk production, condemnation of milk due to antibiotic residues, veterinary costs, culling of chronically infected cows and occasional deaths. Recently, success in treatment of mastitis is more troublesome due to antimicrobial resistance in bacterial isolates.

Type of Mastitis

Mastitis is often described as subclinical or clinical.



Subclinical mastitis is the presence of an infection without apparent signs of local inflammation or systemic involvement. Detection of subclinical mastitis is best done by testing milk for somatic cell counts (SCCs) (predominantly leukocytes) using either the California Mastitis Test or automated methods provided by dairy herd improvement organizations. SCCs are positively correlated with the presence of infection.

Milk yield decreases in cows with subclinical mastitis. The loss of milk from inflammation is directly proportional to the individual animal SCC; as SCC rises, milk production decreases.

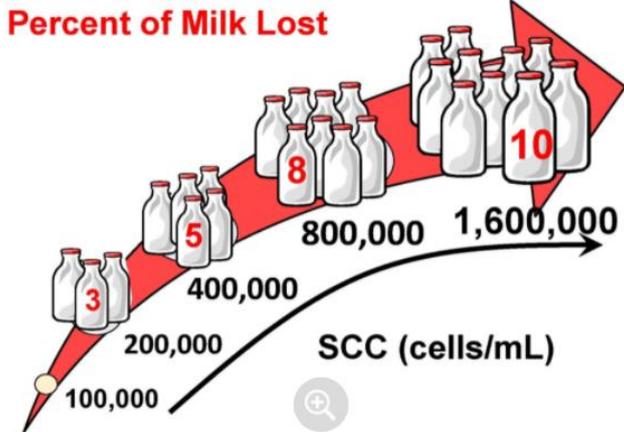


Fig 1: Milk loss and somatic cell counts
(Courtesy of Dr. Ronald Erskine)

Clinical mastitis is an inflammatory response to infection causing visibly abnormal milk (eg, color, fibrin clots). As the extent of the inflammation increases, changes in the udder (swelling, heat, pain, redness) may also be apparent. Clinical cases that include only local signs are referred to as mild or moderate. If the inflammatory response includes systemic involvement (fever, anorexia, shock), the case is termed severe. If the onset is very rapid, as often occurs with severe clinical cases, it is termed acute or severe mastitis.

Table 1: Common Etiological agents of mastitis

Etiological Agent	Usual Source	Clinical type of mastitis
<i>Staphylococcus aureus</i>	Mammary gland of other cows, udder lesions, skin and mucous membranes	Subclinical, chronic, acute and peracute, including gangrenous mastitis. A high percentage of subclinical carriers can occur in a herd
<i>E. coli</i> , <i>Klebsiella</i> , <i>Enterobacter</i>	Feces, Environmental contamination, bedding, floor, housing.	Coliform mastitis. Peracute (toxaemia) usually occurs just after calving in cows. Life threatening. Acute, chronic and subclinical infections can also occur. Little or no fibrosis

<i>Streptococcus agalactiae</i>	Intramammary in the milk duct	Acute or chronic with recurring clinical cases.
<i>Streptococcus dysgalactiae</i>	Buccal cavity and genitalia of cattle	Acute
<i>Streptococcus uberis</i>	Skin, tonsils, vagina, faeces	Acute, can occur in dry period
<i>Trueperella pyogenes</i>	Skin and mucous membrane	Suppurative mastitis, summer mastitis, fowl-smelling secretion

Process of Udder Infection

The process of udder infection leading to mastitis is shown in Fig 2

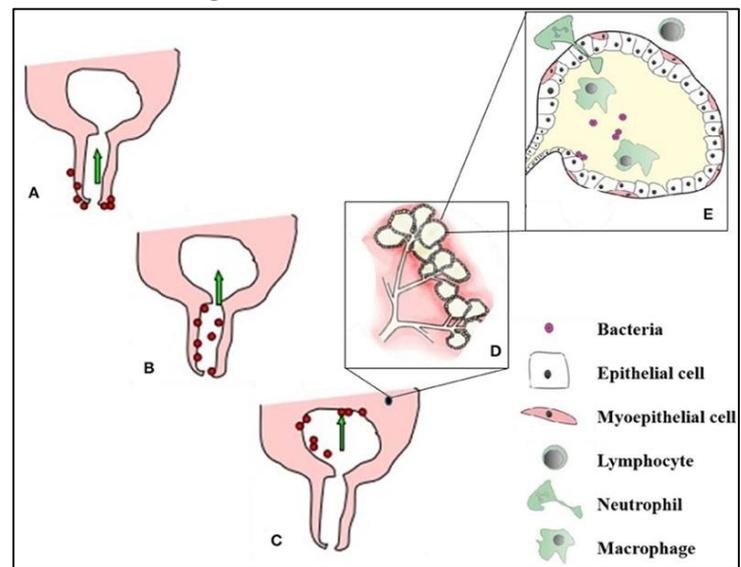


Fig 2: Process of udder infection

Source: DOI:10.3389/fvets.2021.607311

Note:

(A) - Organisms invade the udder through teat canal,

(B, C) - Migrate up the teat canal and colonize all parts where the milk gets and finally setup the infection in mammary gland,

(D) - alveoli and secretory mammary epithelial cells.

(E) - After getting bacterial infection, cellular defense mechanism become active and phagocytic cells (from blood) effort to engulf and kill the bacteria, phagocytosis by products and release of bacterial toxins damage to the secretory mammary epithelial cells.

Cases of Mastitis Brought at CVL

A total of 228 milk samples were received at CVL in FY 2077-78 (Shrawan 2077-Falgun 2077) for bacterial culture and sensitivity. A total of 84 samples failed to obtain a positive bacterial culture. *Staphylococcus* is found to be the primary cause of mastitis in dairy animal followed by *Escherichia coli*. Below Fig 3 presents the number of bacterial isolates that were obtained in milk microbial culture.

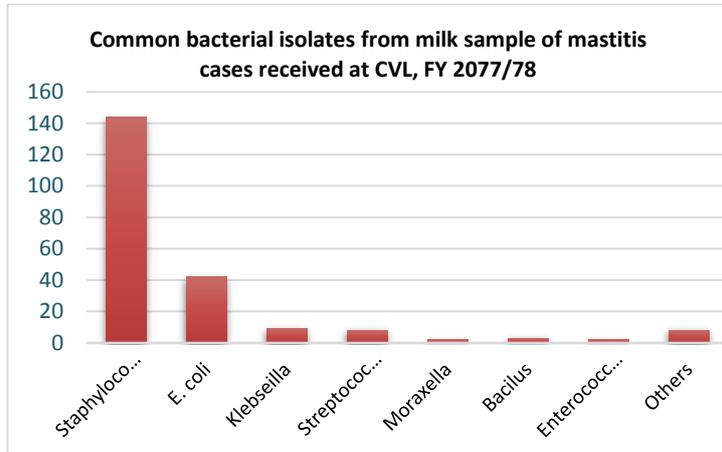


Fig. 3: Common clinical bacterial isolates in milk.

The AST pattern for four commonly used antibiotics for different bacterial isolates from milk is presented in Fig 4. Gentamicin and Tetracycline resistance is commonly observed in the isolates. Resistance to the antimicrobial agents limit the therapeutic value of these antibiotics in treatment of mastitis. Selection of suitable antibiotics for treatment of clinical as well as subclinical mastitis require the laboratory testing of milk by culture and antibiotic sensitivity tests. Antibiotics that are sensitive to the causal bacteria should only be used in the treatment of mastitis as per recommendation and it should be strictly followed.

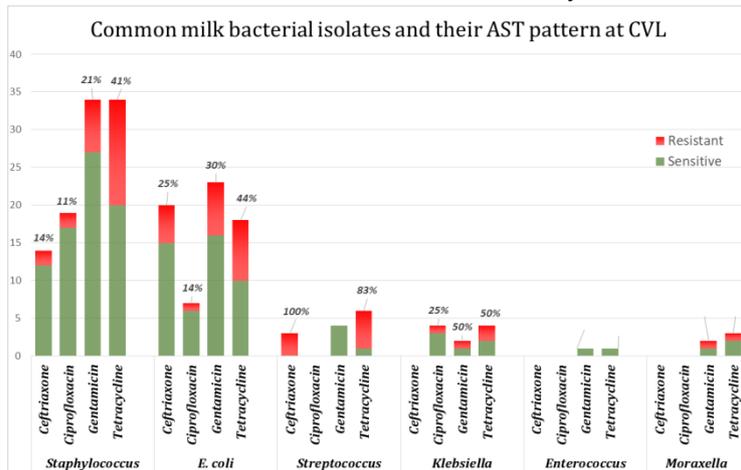


Fig 4: Antimicrobial sensitivity

NSAID such as aspirin, ketoprofen, meloxicam, flunixinmeoglumine, carprofen etc can be used for the treatment of acute and subacute mastitis. Antibiotics should be selected on the basis of Antimicrobial Susceptibility Testing (AST). However, antimicrobial agents such as Gentamycin, Streptomycin, Ceftriaxone, Ceftizoxime etc.

Prevention

Hygienic teat management

- Good housing management, effective teat preparation and disinfection, teat dipping pre and post milking with and effective teat dip

Prompt identification and treatment

- Use of the most appropriate treatment for the symptoms.

Dry cow management and therapy

- Cows are dried off abruptly and teats are cleaned before dry cow antibiotics are administered, including the use of teat-end sealants

Culling chronically affected cows

- Cows that become impossible to cure and represent a reservoir of infection for the whole herd.

Regular testing and maintenance of the milking machine

- Teat cup liner replacement and milking machine servicing

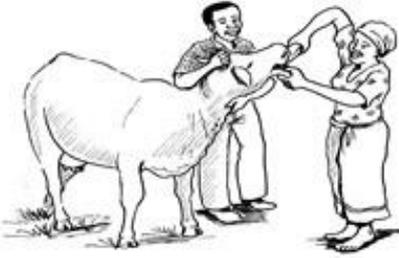


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त्रिपुरेश्वर, काठमाण्डौ

पशुपंक्षीमा लाग्ने संक्रामक रोगहरुको रोकथामका उपायहरु



६-६ महिनाको फरकमा जुका विरुद्ध औषधि खुवाउने ।



विभिन्न रोगहरु विरुद्ध नियमित रूपमा खोप लगाउने ।



रोगी र निरोगी पशुलाई एउटै भाडामा दाना वा पानि नखुवाउने ।



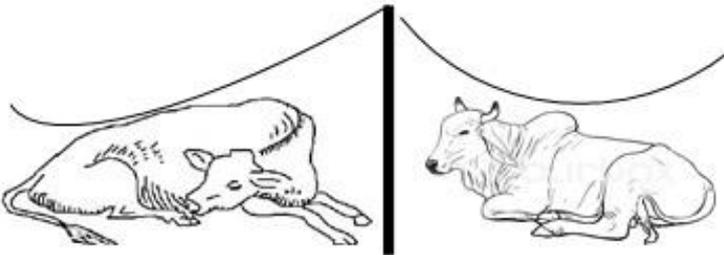
रोगी पशुपंक्षीलाई विक्री नगर्ने ।



रोगी पशुपंक्षीको मासु नबेच्ने ।



रोगी पशुको दुध नबेच्ने ।



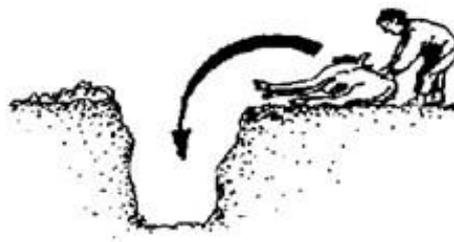
रोगी पशुलाई निरोगी पशुबाट अलग राख्ने ।



रोगी पशुलाई चरन क्षेत्रमा चराउन नलैजाने ।



विरामी पशुहरुलाई प्रसस्त मात्रामा नरम घाँस तथा पानि उपलब्ध गराउने ।



पशुहरु मरेमा गहिरो खाल्डो खनि गाड्ने ।



यीसम्पूर्ण ज्ञान सबैलाई बाढी र रोग नियन्त्रणमा सहयोग गरो ।

थप जानकारीको लागि: www.cvl.gov.np, फोननं. ०१५३६१९३८