**FORMS OF MASTITIS**

Clinical mastitis refers to cases which can be diagnosed clinically without reference to laboratory tests. However, culture is necessary to establish the bacterial species involved. Clinical mastitis is differentiated by the severity of the disease process into peracute, acute and chronic forms.

Peracute mastitis with severe local (including gangrene) and systemic signs is clinically very dramatic, but is the least common form of mastitis. Usually occurs shortly after calving.

Acute mastitis is characterised by varying degrees of inflammatory swelling of the udder and gross abnormality of milk but no marked systemic signs. Many of the bacteria that cause peracute infections may also cause less severe acute disease. Other less highly pathogenic bacteria may also be involved.

Chronic mastitis involves no systemic signs of disease and more subtle long term changes in the udder characterised by progressive induration. The milk may show only minor changes, such as a slightly watery consistency, with few if any clots.

Subclinical mastitis cannot be detected clinically, but results in loss of milk production. It is the most economically important disease of the dairy industry.

**CORE LEARNING MATERIAL**

- Inflammation of the mammary gland is called mastitis — it is the single most important infectious cause of wastage in the dairy industry

- A large variety of micro-organisms may cause bovine mastitis

- About 90% of infections are due to *Staphylococcus aureus*, *Streptococcus agalactiae*, *S. dysgalactiae* and *S. uberis*

- *S. aureus* and *S. agalactiae* are referred to as 'cow associated' because they are adapted to the mammary gland and are primarily spread during milking

- Other mastitis causing bacteria are loosely referred to as 'environmental' because they do not persist in the mammary gland and are usually transmitted by methods other than milking. The most important of these are *E. coli* and other lactose fermenting members of the *Enterobacteriaceae* — coliform mastitis

- A sample of mastitic milk, collected aseptically, is the preferred specimen

**Mastitis Causing Pathogens**

*Bacillus cereus* is a saprophyte which is occasionally reported as cause of acute or peracute mastitis. Associated with feeding brewer's grain, and in some cases in iatrogenic infections due to administration of contaminated intramammary preparations.

*Clostridium perfringens* Type A causes severe mastitis with high fever, swelling, gangrene and gas. Rare.

*Corynebacterium bovis* is a commensal of teat. Commonly isolated from milk and occasionally may
cause mild inflammation with minor cellular response.

*Corynebacterium ulcerans* is an uncommon cause of mild acute mastitis

*Enterobacter aerogenes* is a cause of coliform mastitis (see *Escherichia coli*).

*Escherichia coli* is an increasingly more common cause of acute mastitis with affected quarter slightly swollen. Milk is watery to serous and contains flakes. Occasionally more severe systemic signs (endotoxaemia).

*Fusobacterium necrophorum* causes marked abnormality of milk but no systemic signs. Rare. Anaerobe.

*Klebsiella pneumoniae* is a cause of coliform mastitis (see *Escherichia coli*).

*Leptospira interrogans serovar pomona* and *L. borgpetersenii serovar hardjo-bovis* cause pyrexia and an associated mastitis, typically with a flaccid udder and agalactia (milk drop syndrome).

*Mannheimia haemolytica* is a rare cause of severe acute mastitis with marked swelling and fever.

*Mycobacterium fortuitum* may cause severe damage to affected quarters. Other saprophytic mycobacteria can cause similar changes. Rare.

*Mycobacterium lacticola* rarely causes mild acute mastitis. History of use of oil based intamammary infusions.

*Mycoplasma alpidesens* is an occasional cause of severe mastitis in all quarters. Has been reported once in Australia.

*Mycoplasma bovis* is probably the most pathogenic of the mastitis causing mycoplasmas. All quarters tend to be involved with marked changes in the milk. Not yet reported as a cause of mastitis in Australia.

*Mycoplasma bovigenitalium* is as for other mycoplasmas. Reported rarely in Australia.

*Mycoplasma canadense* : as for other mycoplasmas. Not reported as a cause of mastitis in Australia.

*Mycoplasma californicum* is as for other mycoplasmas. Not reported as a cause of mastitis in Australia.

*Nocardi a asterides* is an occasional cause of acute and chronic mastitis with pyogranulomatous lesions and draining sinus tracts.

*Pasteurella multocida* is a rare cause of severe acute mastitis with marked swelling and fever.

*Prototheca sp.* are achlorogenic algae which have been isolated from usually sporadic cases of chronic mastitis.

*Pseudomonas aeruginosa* is a relatively uncommon cause of mastitis. Contamination of intramammary infusion or udder wash water. Severe mastitis, which may be characterised by chronic inflammation with periodic flare-ups.

*Serratia marcescens* may occasionally cause mild chronic mastitis.

*Staphylococcus aureus* is the most common cause of clinical and subclinical mastitis. Occasional peracute cases of severe gangrenous mastitis with systemic signs and high fatality.

*Streptococcus agalactiae* is a common cause of clinical and subclinical mastitis.

*Streptococcus dysgalactiae* is a relatively common cause of acute mastitis usually with marked swelling of quarter and gross abnormality of milk.
Streptococcus pneumoniae occurs in the upper respiratory tract of humans. Rare cause of acute mastitis resembling that caused by S. agalactiae although may be accompanied with high fever. Not fatal.

Streptococcus pyogenes occurs in the upper respiratory tract of humans. Rare cause of acute mastitis resembling that caused by S. agalactiae.

Streptococcus uberis is a relatively common cause of acute mastitis usually with marked swelling of quarter and gross abnormality of milk. Occasionally there may be a severe local reaction accompanied by moderate systemic signs, and is therefore called peracute.

Trueperella pyogenes causes sporadic peracute mastitis in Australia, mainly in lactating cows and usually in association with other organisms, including anaerobes. Also associated with endemic "summer mastitis" in dry cows and heifers in the northern hemisphere.

Clinical mastitis has occasionally reported to be associated with the following fungi —

Aspergillus fumigatus causes an acute with abscess formation.

Aspergillus nidulans causes an acute with abscess formation.

Candida sp.

Cryptocococcus neoformans

Geotrichium sp.

Pichia sp.

Torulopsis sp.

Trichosporon sp.