

Mastitis

It is the inflammation of the mammary gland

It is the most common and most expensive disease in dairy cattle

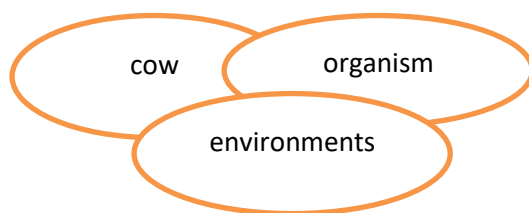
Etiology:-

Stress & physical injuries

Infection invading bacteria

Other M.os { fungi ,yeast possible virus }

How does mastitis develop?



Cows:

Predisposing condition

Existing trauma {milking machine ,heat or cold, injury}

Teat end injury

nutrition

lowered immunity{following calving ,surgery }

organism

environments

factors affecting susceptibility to mastitis:

interaction of

host

organism

environments

1}Host factors :

Presence or absence of natural resistance to mastitis

State of defense mechanism

Stage of lactation

Stress factors

2) agent factors

Number of organism in gland

Pathogenicity of organism

Presence of virulence factor

State of host defense for resistance to infection

3} environment factors

Design and function of milking machine

Milking environment

Milking hygiene practice

Type of housing and bedding

Weather

Milk in case of IMI:-

Milk production decline

Total fat production reduce

In case of clinical mastitis appearance of milk changes resulting in

Watery milk , clot ,discoloration

Casein level decrease

Lactose synthesis decrease pulling Na & Cl characteristic bitter or salty taste to mastitic milk

Level of milk enzyme lipase increase ,oxidizing milk fat into F.As lead to rancid milk and off flavor

Protein in the form of albumin and immunoglobulin increase

SCC increase

Type of mastitis:-

1} contagious mastitis

2} environmental mastitis

1} contagious mastitis :

Bacteria live in or on udder &teat lesion

Spread:

From cow to cow

During milking by milk contaminated fomites at milking, sponge ,milker's hand , milking machine

M.Os:-

S.aureus: major cause of mastitis difficult to cure especially during lactation so prevention is essential

Strept.agalactia : very sensitive to penicillin so it is high cure rate

M.bovis

Sometimes Strept.uberis

Forms:-

Usually chronic or sub clinical mastitis

2} environmental mastitis :

Habitat: cows environment { faeces , soil ,bedding ,water }

Spread : mainly at drying off& around calving time

Most cases is seen at calving or early lactation

Contamination from infected environment can be introduced with intra mammary tube if teat end is not sterile when ttt occur

M.Os:-

Strept.dysagalactia

Strept.uberis: usually respond to ttt but difficult to cure

Coliform{E.coli , klebsilla}

Pseudomonas

Forms: often cause severe or clinical mastitis

Pathology of mastitis :-

Comparison category	Contagious mastitis	Environmental mastitis
indicators	Usually sub clinical with periodic clinical episode often in the same cow Associated with lactation	High rate of clinical mastitis Associated with dry cow period
Primary source	Milk of infected cow & udder	Cows environment Soil , bedding ,manure ,feed ,water & contaminated object
Method of transmission	Quarter to quarter Cow to cow usually during milking	Contaminated milking machine , operators ,udder wash cloth or sponges ,feed ,water ,etc
Most common causative agent	G+ bacteria: Strepto .aglactia S,areus Other: Mycoplasma Spp	G- bacteria: E.coli Klebsilla Enterobacter G+ bacteria: Strepto.uberis Strepto.dysglactia Corynebacterium Enterococcus.Spp Coagulase - staphylococci

Characteristics of key mastitis pathogen

pathogen	Source	duration	Detection method	Infection site in udder	Cure rate during lactation
s.areus	cotagious	long	Increase SCC Occasional clinical mastitis	Within secretory cell	Less than 35% Chronic
Strepto.aglactia	Contagious	Long	Increase SCC	Surface of secretory cell	More than 90%
M.bovis	cotagious	Long	Increase SCC Occasional clinical mastitis	Surface of secretory cell bacteremia	Very low
Strpto.dysglactia	Environment al Sometimes contagious	varies	Increase SCC Occasional mild clinical mastitis	Surface of secretory cell	More than 75%
Strepto.uberis	Environment al Sometimes contagious	varis	Increase SCC Occasional clinical mastitis	Surface of secretory cell Some invasive	50% Spontaneous cure
E.coli coliform	environment al	short	Mild to sever clinical mastitis	Surface of secretory cell occasionally bacteremia	More than 85% Spontaneous cure
Coagulase – ve staph	environment al	varies	Increase SCC Occasional mild clinical mastitis	Surface of secretory cell	More than 70% Spontaneous cure

Symptom of mastitis:-

Generally symptom

Redness ,swelling ,heat ,pain, loss of function

Decrease production ,change in composition ,change in appearance of milk

Per acute mastitis:

Sudden onset

Sever inflammation of udder

Serous milk

Lead to aglactia

Inflammation may result from organism it self , enzyme from bacteria ,toxins ,leucocyte product

Acute mastitis :

Sudden onset

Moderate to sever inflammation in udder

Decrease production

Serous milk or fibrin clot

Systemic signs are similar but less sever than per acute

Sub acute mastitis :

Mild inflammation

May be no visible change in udder

Small flakes or clot in milk

Milk may have off color

No systemic signs of illness

Chronic mastitis :

May persist in sub clinical form for months or years with occasional clinical flareup

Sub clinical mastitis:-

Most common form of mastitis characterized by

No gross inflammation in udder

No gross change in milk

Decrease milk production

Milk quality decline

Treatment :

Not economical during lactation

Often done during dry period with infusion with antibiotics

Mechanism by which mastitis reduce pregnancy rate overall productive performance

Increase cortisol

Lead to decreasing of FSH & LH

Impairs estrus ,ovulation & oocyte development

PGF2alpha

Impairs uterine function, conception & embryonic development

Increase body Temp.

Increase embryonic mortality

Decrease feed intakes

Impairs normal physiological and hormonal function & ovulation

Detection and diagnosis of mastitis :

Clinical mastitis

Visual observation of cows and milk

Sub clinical mastitis

Indirect detection must be used

Increased SCC

Bulk tank SCC

CMT

Sterile milk culture :

Finds mastitis causing organism

Electrical conductivity

Antibody eliza

Mastikit

SCC:-

IT'S THE MOST Frequently used for detection of mastitis

Bulk tank SCC 1000S/ML	PERCENT INFECTED QUARTERS IN HERD	PERCENT MILK LOSS
200	6	0
500	16	6
1000	32	18
500	48	29

CMT:-

score	Milk charecter	SCC
Negative	Milk remain watery	100000
trace	Thin film appear on bottom Of well when milk is swirled	300000
Weak positive	Thickening in milk indicating mild mastitis	900000
Moderate postive	Milk mixture immediately With some gel formation which pour in continuous stream	2700000
Strong postive	Milk mixture forms agel that peaks in middleand pour in thick stream	8000000

How to prevent mastitis:

Dry cow therapy

Eliminating sub clinical mastitis that may present at drying off by intra mammary infusion of aslow release antibiotics into every quarter of every cow

Vaccination

Against coliform bacteria {E.coli strain j 5 baterin }

Teat sealent

Orbseal

Cow segregation &culling

Especially in case of chronic mastitis

Teat dipping &cow sanitation

Germicidal teat dipping before and after milking to kill most bacteria

Pre milking teat disinfection

Dry wipe include teat end attach cluster

Environmental sanitation

Avoid over crowding

Provide adequate ventilation

Avoid accumulation of manure& waste

Milking order

It will depends on afactors{herd size , prevelance to infections,lav out of building}

Risks of contagious pathogen can be minimized by adapting following milking orders

Heifer group

Fresh cows

High yielder

Medium yielder

Low yielder

High cell count cows

Mastitic and other treated cow

Nutrition:

Number of micro elements have been shown to influence resistance to mastitis e.g,

VIT A, VITE, COPPER ,SE ,beta carotene

Mastitis treatment:

Aim of mastitis ttt

Return cow to normal production

Prevent mortality

Reduce spread of infections

Prevent new infections

Prevent drug residue in milk

Specific therapy:-

1} antibiotic therapy

Used for dry cow therapy

Treat clinical mastitis in lactating cow

Antibiotic therapy must be effective against bacteria causing mastitis
{bacterial culture}

General principle for administration of APX intra mammary

Udder should be completely milked prior to drug administration

Teat should be wiped with an individual alcohol pad for each teat & dried with an individual towel

Single use of syringe 1/4 is essential to avoid transmission of pathogen

Most intra mammary APX mastitis drugs are directed at G+ bacteria

Post ttt milk withdrawal period is required generally lasting for 2-3 days

Systemic APX therapy

Are often administered in case of severe clinical mastitis when the cow has generalized signs of disease

2} anti inflammatory therapy

Clinical mastitis treated with corticosteroid or with NSAID {FLUNIXIN IN CATTLE}

Anti inflammatory are used when the udder is visibly swollen, inflamed & milk has abnormal appearance

Corticosteroid has immunosuppressive effect so long term use is not recommended

Supportive ttt:

-Treat the symptom

-Pain, temp, swelling, dehydration, etc.

- Reduce risk of APX residue
- Organic herds
- Antihistaminic
- Fluid therapy for dehydration

Control of contagious mastitis :-

- Teat dipping in germicidal before and after milking
- Treat quarter with with dry cow APX at end of lactation
- Milking order
- Flush milk claws with hot water or germicidal after milking infected cow
- Clean hands ,latex gloves
- Cull persistently infected cows
- Minimize teat end lesion

Control of environmental mastitis:-

- More difficult to control than contagious pathogen
- Most are resistant to germicidal and APX
- Key is identify source and remove it {bedding ,pond ,mud}
- Clip of flame udder
- Clean proler ,stalls ,bedding
- Barrier dips

- Keep cow standing after milking by feeding
- Sterile single dose infusion product
- Sterile infusion technique