Mastitis

AVS 172
University of Idaho

Pictures courtesy of: Dr. H.D. Tyler, Iowa State University, Dr. M. A. Barnes, Virginia Tech, Dr. Mark Kirkpatrick, Tillamook Cheese, OR.

Mastitis

• Definition of the Disease
• $ Losses
• Causes and types
• Prevention & treatment
**MASTITIS**

- What is it?
  - Inflammation of mammary gland due to bacteria or injury

- Signs/symptoms
  - Udder is hot, very hard, and tender
  - Increase in temperature, refusal to eat, dull eyes, rough coat

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**Mastitis: sources, cont’d**

Essentially all mastitis is caused by pathogen invasion of the streak canal

- any condition which increases pathogen population or teat end exposure increases incidence of new mastitis infection
Estimated losses due to mastitis per year

<table>
<thead>
<tr>
<th>SOURCE OF LOSS</th>
<th>$ Loss/Cow</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced milk production</td>
<td>$121.00</td>
<td>66.0</td>
</tr>
<tr>
<td>Discarded milk</td>
<td>$10.45</td>
<td>5.7</td>
</tr>
<tr>
<td>Early cow replacement costs</td>
<td>$41.73</td>
<td>22.6</td>
</tr>
<tr>
<td>Extra labor</td>
<td>$1.14</td>
<td>0.1</td>
</tr>
<tr>
<td>Drugs</td>
<td>$7.36</td>
<td>4.1</td>
</tr>
<tr>
<td>Veterinary services</td>
<td>$2.72</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>$184.40</td>
<td>100</td>
</tr>
</tbody>
</table>

Current concepts of bovine mastitis, 4th ed., 1996
National Mastitis Council, Inc., Madison, WI
Mastitis: somatic cell counts (scc)

Somatic cell counts:
- SCCS 0-3 = < 142,000/ml
- SCCS 4-5 = 142 - 565,000/ml
- SCCS 6 = 565 - 1,130,000/ml

Maximum allowable:
- currently = 750,000/ml
- soon = 500,000/ml
- EU = 300,000

Coop incentives:
- < 200,000/ml
- ~ $.20/ cwt incentive

Herd Loss $$$ from High SCC

Example:
200-cow herd (60 1st lact. cows)
avg. SCCS = 4.0
Avg. yield = 60 lbs./cow/d
shipping: 4,380,000 lbs milk/yr

60 x 1.5lbs loss x 310d = 28,000
140 x 3.0 lb. loss x 310d = 130,000
milk loss = 158,000 x $15.00/cwt
milkloss = $23,700/yr

incent. loss = $.20 x 43,800 cwt
incentive loss = $32,460/yr

Total loss/yr = $26,140/yr (5% of gross!)
Factors Affecting Mastitis

- Majority of new infections occur during:
  - Milk left in udder
  - Immune system compromised
- Frequency of milking affects risk of infection

Mastitis pathogens:

- Strep Agalactiae
- Staph Aureus
- Strep non-ags (Uberis, Dysgalatiae)
- Coliforms
- Yeasts, nocardia, mycoplasma, pseudomonas
MICROORGANISMS

• Contagious (cow to cow transfer)
  – Subclinical
  – Long duration
  – Shed in milk
• Environmental
  – <5%
  – Clinical

COMMON MASTITIS ORGANISMS

• 1. ----------------------*, uberis, dysgalactiae
• 2. ----------------------*, epidermis
• 3. ---------------------- E. coli, klebsiella
• 4. ----------------------*
• 5. Yeasts
**Staph Aureus:**

- 1. Extremely infectious; subclinical or clinical cases increase SCC

- 2. Staph aureus produces many enzymes which retard ability to cure the infection:
  - a. ____________________: inactivates penicillin
  
  - b. toxins ____________________

**The Staph Aureus Problem**

- a. Usually is infected in several quarters
- b. Suffers 30% milk loss / infected quarter
- c. Stays in the herd for at least one lactation
- d. ______________________
- e. Extremely contagious; ______________________
MANAGEMENT PRACTICES

• Use 1.0% iodophor dip on all teats, Culture

• Backflush between cows

• ---------------------------------------

• Culture liners periodically to check effectiveness

• -------------------------------; cull!

Streptococcus Agalactia

• 1. Lives in the ------------------------

• 2. Antibiotic treatment ------------------

• 3. It can be irradiated
MANAGEMENT PRACTICES

1. Controls centers around the milking parlor

2. -------------------------------, milking hygiene, ------------

3. Quick treatment

Coliform (Environmental)

- *E. Coli*
  - Bacteria is in the cow's ------------------------
    - -------------------------------
    - -------------------------------
    - -------------------------------
  - Down cow
  - Can cause death!
MANAGEMENT PRACTICES

• Frequent milking, ------------------ injection

• Anti-inflammatory and antibiotics

• -------- fluid

• Basic good hygiene

• Keep the stall clean, cow comfort

Mycoplasma

• Introduced to the herd by the new arrivals!

• Causes a lot of complications

• Antibiotics --------------------------

• -----------------------------
Subclinical Mastitis

- Presence of bacteria without clinical symptoms
- **Increased somatic cell counts (SCC),**
- Somatic Cells Count: -------------------------------
- Somatic cells: cell bodies

For each clinical mastitis case (Orange cow), there may -------------- sub-clinical cases (green cows)
Somatic Cell Counts (SCC)

- a) SCC does not identify presence of pathogens
- b) 
- c) Increase of .5 in SCC score on herd basis indicates a breakdown in mastitis program
<table>
<thead>
<tr>
<th>Actual SCC Range (x1000)</th>
<th>SCC Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-34</td>
<td>1</td>
</tr>
<tr>
<td>35-70</td>
<td>2</td>
</tr>
<tr>
<td>71-140</td>
<td>3</td>
</tr>
<tr>
<td>140-280</td>
<td>4</td>
</tr>
<tr>
<td>280-550</td>
<td>5</td>
</tr>
</tbody>
</table>

**SCC Scores**

<table>
<thead>
<tr>
<th>0 - 3</th>
<th>Majority cows pathogen free</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 - 4.5</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>5 - 6.5</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>7 - 9</td>
<td>Indicates severe problem, infected cows prevalent</td>
</tr>
</tbody>
</table>
• Milk loss to mastitis
  – a) ------------------------------------------

• EXAMPLE:
  ➢ Score 2 versus 5 = 1.5 lbs X 3 units = 4.5 lbs less milk/day
  ➢ = 1372 lbs less milk/lactation
**Mastitis: clinical detection**

**Strip cup:**

- ideal for detecting abnormal milk
- allows detection of specific infected quarters

**Mastitis: subclinical detection**

**DHIA Fossmatic machine:**

- uses optical density to detect somatic cell concentration
- bulk of cells are PMN leukocytes (indicative of infection)
Mastitis: subclinical detection, cont’d

California Mastitis Test (CMT)

- detergent coagulates cellular DNA
- greater amount of coagulation = greater number of PMN leukocytes
- quick cow-side test - ID specific quarters
Mastitis: prevention & treatment

NMC 5-point mastitis control program:

1. -------------------------- milking equipment
2. ------------------------ after milking
3. ------------------------- cases
4. ------------------------treat
5. ------------------------ chronic cases:
   • some mastitis is incurable (staph aureus)
   • infected cows are potential pool of mastitis organisms
1. Use functionally-adequate milking machines in the correct manner.

POOR MILKING METHODS cause mastitis

2. Dip teats after milking with an effective product.
3. Administer promptly a full series of recommended treatments to all clinical cases.

4. Treat each quarter of every cow at drying off with a specially-formulated, commercially-available, antibiotic preparation.
new mastitis infections most prevalent at calving (early postpartum) and dry-off

• dry treatment is most effective way to prevent new mastitis infections
  • protect udder during dry period
  • cure mastitis from previous lactation
The Routine

- Predip
- Strip
- Dry
- Attach
- Alignment
- Removal
- Postdip

The Secret to Mastitis Control

1. ---------------------on the Teat

2. ---------------------a from Getting into the Udder

3. Fine Tune Milking Practices