Management Practices and Intramammary Infections: New Ideas for an Old Problem

(Recent data from a pan-canadian study)

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1. Subclinical Mastitis
   • Infection development
   • Canada 2007-2008:
     Infection prevalence
     Infection occurrence

2. Management Practices
   • Not frequently used
   • Impact on prevalence of new infections
First Step of Infection

- First line of defense:
  - Teat canal

- Second line of defense:
  - Somatic cells
    - Roles:
      - Eliminate bacteria
      - Detect presence of bacteria

- Quarter and milk = normal
Second Step of Infection

- Bacteria multiply
- Invade the udder tissue
- Bacteria damage the udder tissue
  - Reduction in milk production
- Quarter and milk = normal
Third Step of Infection

- Somatic cells migrate from blood to the udder
- Somatic cells damage the udder tissue
  ➢ Reduction in milk production
- Quarter and milk = normal
Fourth Step of Infection

- Extensive damage to tissue = Blood-milk barrier altered

- Visible changes of milk and quarter (clinical mastitis)
  - Milk clotting
  - Swelling
  - Reddening
  - Watery milk
  - Cow depressed, fever
Subclinical Mastitis / Clinical

**Subclinical Mastitis**
- Length: hours to months
- Evolution: eliminated, stay subclinical or become clinical
- Reduction in milk production
- No visible signs

**Clinical Mastitis**
- ...
- ...
- Visible signs
Subclinical Infection / Clinical Mastitis

Subclinical Mastitis

Clinical Mastitis

Which species of bacteria?

Coagulase negative Staph. 
Strep. agalactiae…

E. coli 
Klebsiella…

Staph. aureus
Incidence - Cost

Clinical

• In 1 year: 26% of cows (CBMRN 2007-2008)

• Cost: $110

• Reduction in milk production and amount of milk discarded (Philpot-Nickerson, 2000)

Subclinical

• 40% of your cows are infected (14% of quarters) (CBMRN 2007-2008)

• Cost: from $180 to $320

• Reduction in milk production (Wilson et al., 1997)
Subclinical Mastitis
CBMRN Results / 2007-2008

Which bacteria cause the infection?

- Streptococcus: 1.5%
- Corynebacterium: 2.2%
- Staph. aureus: 2.4%
- Coagulase negative Staph.: 5.4%
- Others: 0.5%
Coagulase Negative Staph. (CNS)

How many new infections should I expect for each quarter per year?

Occurrence: 0.8 new infections per quarter-year
Subclinical Mastitis

• First steps of infection
• No visible signs
• Frequent
• Costly
• Infection occurrence vary:
  ➢ Species of bacteria
  ➢ Herd

How to control subclinical mastitis?
Mastitis Control Plan

1. Establish goals
2. Environmental management
3. Proper milk procedures
4. Equipment maintenance
5. Record keeping
6. Clinical mastitis during lactation
7. Dry cow management
8. Biosecurity – sell and buy cows
9. Monitoring udder health
10. Periodic review of mastitis program
Lying patterns and intramammary infection

• Background
  – Fresh feed often provided to keep cows standing after milking
  – Theory: Longer cows stand, the more time the teat canal has to close, less chance of infection
  – This theory was yet to be experimentally proven…
Effect of feed delivery on latency to lie down

Delivering feed close to milking time results in the longest post-milking standing times!

DeVries et al. J. Dairy Sci. in press
Association between IMI risk and latency to lie down

Change in the odds of IMI

Average time to laying down after milking (min)
Conclusions

• Post-milking standing times can indeed be managed by providing fresh feed at different times around milking
• Use of such a strategy in tie-stall housed cows may not be a realistic IMI prevention strategy
Clean, Dry and Comfortable Environment

- Keep stalls clean, dry and comfortable using adequate bedding
- Stalls management and CNS infection incidence

Sand bedding:
2.4 less risk of CNS infection

Remove manure piles at least 3 times a day:
1.5 less risk of CNS infection

Add bedding at least 2 times a day:
1.3 less risk of CNS infection
Proper Milk Procedures

Wear clean gloves during milking for limiting transfer of contagious bacteria

Do milkers wear latex gloves (or similar) during milking?

54% wear gloves all the time during milking
1 producer: “Gloves are for camps!”

Are they cleaned regularly during milking?

- 61% No
- 28% Rinsed with water
- 11% Desinfected (udder wash solution, alcoholised towel)
Gloves According to Richard Olde Riekerink

RGM Olde Riekerink, et al., 2008. Comparing bacterial counts on bare hands with gloved hands during milking.

- General recommandation

**USE GLOVES!**

- Hands of milkers are difficult to clean
- Bacteria “stick” less to gloves – True??
Hands Hygiene during Milking
(Olde Riekerink and al., 2008)

Wearing gloves and/or disinfection → Quantity of bacteria?

Bare hands

Desinfected bare hands

Gloves

Desinfected gloves
Hands Hygiene during Milking
(Olde Riekerink and al., 2008)

Statistical analysis

Bacterial load (cfu/mL)

bare hand  disinf. hand  glove  disinf. glove

no strip  strip
Hands Hygiene during Milking
(Olde Riekerink and al., 2008)

Raw data
Hands Hygiene during Milking
*(Olde Riekerink and al., 2008)*

Reduction when compared with bare hands

- Desinfected bare hands: 85%
- Gloves: 75%
- Desinfected gloves: 98%
Biosecurity Principles against Contagious Bacteria

Before buying cows, ask for a milk sample for bacteriological culture

7% milk sample before buying

26% milk sample after buying

50% will not return an infected animal to the seller

“Most diseases are bought and paid for dearly”
Biosecurity Principles against Contagious Bacteria

Sell or segregate persistent infected cows with *Staphylococcus aureus*

Do you take milk samples for bacteriological analysis?

- 25% all cows 1 time/year
- 32% suspected cows only
- 43% never

52% *Staph. aureus* - important for culling decision

65% milk cows infected with *Staph. aureus* last or with a separate milking equipment
In Brief

- Clinical Mastitis
- Subclinical Mastitis

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A New Idea…

Apply management practices known to be efficient since many years

• Good stall management
• Proper milking procedures
• Take milk samples and segregate or cull contagious cows
• And others, like…

www.mastitisnetwork.org
Questions?