Effect of internal teat sealants at dry-off on SCC and mastitis

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Background

- Blanket dry cow therapy - used on 100% of Irish farms
- January 2022 - EU Regulation 2019/6 on preventative use of antimicrobials in groups of animals
- Selective dry cow therapy - treat only cows with infection or at higher risk of infection
- McParland et al. (2019) – teat seal elevates SCC and higher risk of intramammary infection
Objective

Internal Teat Seal *alone* vs *Antibiotic plus* Internal Teat Seal

on SCC, intramammary infection and milk production

on 5 commercial farms
Herd Selection

- 5-commercial spring calving in the Kerry Agribusiness region
- Monthly bulk tank SCC of less than 200,000 cells/ml for 2018 lactation
- Conducted regular whole-herd milk recording
- Mostly Holstein-Friesian, with some Jersey X
Cow Selection & Treatment Assignment

- Cows within herds categorised based on milk recordings from 2018 (average 6.2 recordings)

(70% of cows)

**Low SCC**

- < 200,000 cells/ml
- and
- No clinical mastitis

- **Teat Seal alone**
  - TS

(30% of cows)

**High SCC**

- > 200,000 cells/ml
  - or
  - Clinical mastitis

- **Antibiotic + Teat Seal**
  - LoAB

- **Antibiotic + Teat Seal**
  - HiAB
## Cow Numbers Per Farm

<table>
<thead>
<tr>
<th>Herd</th>
<th>TS</th>
<th>LoAB</th>
<th>HiAB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>73</td>
<td>75</td>
<td>51</td>
<td>198</td>
</tr>
<tr>
<td>2</td>
<td>75</td>
<td>68</td>
<td>64</td>
<td>204</td>
</tr>
<tr>
<td>3</td>
<td>67</td>
<td>72</td>
<td>90</td>
<td>226</td>
</tr>
<tr>
<td>4</td>
<td>42</td>
<td>41</td>
<td>22</td>
<td>105</td>
</tr>
<tr>
<td>5</td>
<td>40</td>
<td>38</td>
<td>24</td>
<td>102</td>
</tr>
<tr>
<td>Total</td>
<td>297</td>
<td>294</td>
<td>251</td>
<td>842</td>
</tr>
</tbody>
</table>
Data Collection

- Quarter samples collected at
  1. Drying-off
  2. Calving
  3. Mid-lactation

  • Analysed for bacteriology and quarter SCC

- SCC obtained from milk recording data from HerdPlus

  • Range 5-8 milk recordings per herd
Data Analysis

- **Effect treatment on SCC**
  - SCC log transform to Somatic Cell Score (SCS)
  - Mixed models - accounting for treatment, parity, days in milk, month of calving, herd, proportion of HO & JE genetics

- **Effect of treatment on IMI**
  - Presence of bacteria present/absent
  - Logistic regression - accounted for same effects
Results
## Test day Somatic Cell Score

<table>
<thead>
<tr>
<th>Somatic Cell Score</th>
<th>All Herds</th>
<th>Herd 1</th>
<th>Herd 2</th>
<th>Herd 3</th>
<th>Herd 4</th>
<th>Herd 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>TS</td>
<td>50,119</td>
<td>47,863</td>
<td>97,724</td>
<td>63,096</td>
<td>39,811</td>
<td>33,113</td>
</tr>
<tr>
<td>LoAB</td>
<td>34,674</td>
<td>33,113</td>
<td>34,674</td>
<td>51,286</td>
<td>33,884</td>
<td>28,840</td>
</tr>
<tr>
<td>HiAB</td>
<td>47,863</td>
<td>43,652</td>
<td>83,176</td>
<td>63,096</td>
<td>43,652</td>
<td>33,113</td>
</tr>
</tbody>
</table>
Percentage of records in SCC ranges

- TS
- LoAB
- HiAB

Herd 1
Herd 2
Herd 3
Herd 4
Herd 5

Percentage of records in SCC ranges:
- <50
- 51-100
- 101-200
- 201-400
- >400

KERRY
CÚAÉAGÁSC
Agriculture and Food Development Authority
### Infection Status & Odds of Infection

<table>
<thead>
<tr>
<th></th>
<th>TS</th>
<th>LoAB</th>
<th>HiAB</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of quarters</strong></td>
<td>966</td>
<td>961</td>
<td>918</td>
</tr>
<tr>
<td><strong>Infected at dry-off</strong></td>
<td>68</td>
<td>73</td>
<td>171</td>
</tr>
<tr>
<td><strong>Infected at calving</strong></td>
<td>63</td>
<td>14</td>
<td>12</td>
</tr>
<tr>
<td><strong>Infected at mid-lactation</strong></td>
<td>65</td>
<td>14</td>
<td>42</td>
</tr>
<tr>
<td><strong>Cured at calving</strong></td>
<td>51</td>
<td>71</td>
<td>165</td>
</tr>
<tr>
<td><strong>Newly infected at calving</strong></td>
<td>46</td>
<td>12</td>
<td>6</td>
</tr>
</tbody>
</table>

- $5.18 > \text{LoAB}$
- $3.98 > \text{LoAB}$
- $6.40 > \text{HiAB}$
- $14.60 > \text{TS}$
- $12.93 > \text{TS}$
- $4.97 > \text{LoAB}$
- $5.40 > \text{HiAB}$
## Total Percentage of Cows Infected

<table>
<thead>
<tr>
<th>Herd</th>
<th>Dry-off</th>
<th>Calving</th>
<th>Mid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>34.4</td>
<td>9.6</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>44.4</td>
<td>21</td>
<td>25.3</td>
</tr>
<tr>
<td>3</td>
<td>9.2</td>
<td>3.4</td>
<td>5.9</td>
</tr>
<tr>
<td>4</td>
<td>25</td>
<td>6.9</td>
<td>9.5</td>
</tr>
<tr>
<td>5</td>
<td>19.8</td>
<td>2.3</td>
<td>5.9</td>
</tr>
</tbody>
</table>
## Bacteria Present - Overall

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Overall %</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>92.1</td>
</tr>
<tr>
<td><em>Streptococcus uberis</em></td>
<td>4.4</td>
</tr>
<tr>
<td>Non hemolytic <em>Staphylococcus aureus</em></td>
<td>2.5</td>
</tr>
<tr>
<td>Non hemolytic <em>Escherichia coli</em></td>
<td>0.6</td>
</tr>
<tr>
<td><em>Streptococcus dysgalactiae</em></td>
<td>0.4</td>
</tr>
</tbody>
</table>
Summary

- Higher risk of new IMI and elevated SCC in cows using ITS vs antibiotic plus ITS
- Large between herd effect on prophylactic efficacy of ITS
- Herd selection - emphasis on herd bulk tank SCC
- Cow selection - emphasis on late lactation SCC
- S. aureus most common pathogen identified
Conclusion

- Internal teat seal only not as successful in herds where a high level of S. _aureus_ was present

- Herd Bulk tank SCC and level of IMI pre dry-off could be factored into the selection of herds suitable for SDCT
Questions