Introduction

Transition period is the crucial time to optimise milk yield, health and fertility in dairy cows (Drackley, 1999).

In fact, calving is quite often forwarded or followed by inflammatory phenomena (Cappa et al., 1989; Trevisi et al., 2001) that not always are associated to clinical symptoms (infections or not).

These inflammatory conditions can be simply diagnosed by some specific blood changes, namely by positive or negative acute phase proteins (APP), and some of these markers seem well related to the performance of lactating cows.

Materials & Methods

Step 2: standardization of partial indices, according to the criteria used to estimate LFI index, cholesterol (lipoproteins), albumin and bilirubin (only at 3rd & 14th DIM) significantly discriminate the 4 groups (figure 2).

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App showed the highest values in LO and INLO groups: in some cases only around calving (haptoglobin, figure 2) in others till 28th DIM (globulin – figure 2 – and ceruloplasmin; haptoglobin, figure 2).

Analysis of repeated measures (PROC MIXED of SAS)
Model: cow, group, DIM, group x DIM

Results

Animals: 178 Holstein dairy cows of 6 commercial herds, during transition period

Individual controls:
- Blood profile and BCS evaluation: -7, 3 (0 for BCS), 14, 28 days from calving
- Milk yield: 7, 14, 28 DIM
- Any health problem and insemination

Statistical evaluation:
- Cows with drug treatments around peripartum were excluded (49)
- The remaining (129: 7 PR & 122 PL) were used to calculate a Liver Function Index (LFI) for each of the 3 parameters, obtained from healthy cows at the same DIM
- Step 1: albumin (Alb-I) and cholesterol (Chol-I) index = 50% V3 + 50% (V28-V3)
- Bilirubin (Bil-I) index = 67% V3 + 33% (V3-V28)

Table 1 – Fertility indices in lower (LO), lower and upper intermediate (INLO) and upper (UP) quartile of LFI.

<table>
<thead>
<tr>
<th>Indices</th>
<th>Groups</th>
<th>LO-LFI</th>
<th>INLO-LFI</th>
<th>INUP-LFI</th>
<th>UP-LFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PFS (%)</td>
<td>34.0</td>
<td>30.0</td>
<td>38.0</td>
<td>44.0</td>
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<tr>
<td>CO²</td>
<td>123.4±66.31</td>
<td>124.9±69.37</td>
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<td>NISC</td>
<td>2.7±1.68</td>
<td>2.2±1.47</td>
<td>2.0±1.43</td>
<td>1.5±1.02</td>
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<td>FSI (%)</td>
<td>70.9</td>
<td>85.0</td>
<td>74.0</td>
<td>61.15</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 – Fertility indices in lower (LO), lower and upper intermediate (INLO, INUP and upper (UP) quartile of LFI.

Figure 1 – Milk Yield in the 1st month of lactation

Figure 2 – BCS and some blood parameters in lower (LO-LFI), lower intermediate (INLO-LFI), upper intermediate (INUP-LFI) and upper (UP-LFI) quartile of LFI.

Conclusions

These data confirm that:
- High milk yield in “healthy” cows did not impair the reproductive function
- Clinical and sub-clinical health problems in the transition period, eliciting an inflammatory-like condition, are the responsible of reduced performances
- A complex index of liver function as LFI seems a promising tool to diagnose inflammatory conditions around calving, to predict poor performances (milk yield & fertility) and to advance appropriate therapies.