Factors affecting fertility in a commercial frozen semen insemination program.

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Introduction, previous studies

<table>
<thead>
<tr>
<th>Reference</th>
<th>Mares</th>
<th>Stallions</th>
<th>Pregnant per season (%)</th>
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<tbody>
<tr>
<td>Müller (1987)</td>
<td>959</td>
<td>341</td>
<td>56</td>
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<tr>
<td>Samper et al. (1991)</td>
<td>177</td>
<td>9</td>
<td>72</td>
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<td>Samper et al. (1994)</td>
<td>108</td>
<td>15</td>
<td>76</td>
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<tr>
<td>Barbacini et al. (1999)</td>
<td>293</td>
<td>55</td>
<td>78</td>
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<td>Loomis (2001)</td>
<td>876</td>
<td>106</td>
<td>76</td>
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<tr>
<td>Samper et al. (2001)</td>
<td>1161</td>
<td>313</td>
<td>49</td>
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<tr>
<td>Vidament (2005)</td>
<td>13604</td>
<td>1488</td>
<td>45.72</td>
</tr>
</tbody>
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Risk Factors?

• Is it possible to identify mares for whom frozen semen should not be recommended?

• Does some factors influence the chance of pregnancy more than others?

Study objective

• To identify and describe factors with significant influence on pregnancy percent per season after AI with frozen thawed stallion semen in a Danish equine practice.

Material and methods

• Breeding records from one commercial breeding center from 1996-2006
• 490 mares with 971 estrus cycles
• 389 mares with confirmed pregnancy result (769 estrus cycles)
• 133 stallions
• 79.6% Standardbreds
• 15.3% Warmbloods
• 5.1 % other breeds

AI Protocol

• Teasing
• Transrectal ultrasound examination 3 X per day
• AI with frozen-thawed semen post ovulation
• No timed inseminations
• Pregnancy check at day 15-19 by transrectal ultrasound
Study design

- Retrospectiv observational accumulated cross-sectional
- Variables in three main categories:
  - Non-pathological factors in the mares
  - Pathological factors in the mares
  - Factors related to AI

Material and methods

Data management
- Data selection and descriptive analysis
- Generation of variables for analysis
- Statistical analysis in SAS
  - Fisher’s Exact Test for preselection
  - Multivariable logistic regression

Results

Descriptive analysis
- Pregnancy percent per season 61.4% and per cycle 39.1% (Pregnancy result could not be confirmed in 20.6 % of the mares)
- Variables significant in final multivariable logistic regression model:
  - Estrus signs (P = 0.032)
  - Bacteriology by endometrial biopsy (P = 0.007)
  - Positive endometrial bacteriology (P = 0.037)
  - Type of straw (P < 0.001)
  - Prostaglandin therapy (P = 0.007)
  - Caslick’s procedure (P = 0.009)
  - Year of AI (P = 0.049)

Results

Per season pregnancy percent significantly lower if signs of estrus were absent or light compared to moderate or severe at last AI (P = 0.032)

Results

Per season pregnancy percent was significantly higher if the mares had no biopsy performed vs. one or more biopsies (P = 0.007)

Results

Per season pregnancy percent significantly lower if positive endometrial bacteriology (P = 0.037)
Results
Pregnancy percent per season significantly lower with single 0.5 ml straw compared to macro straw (2.5 or 5 ml.) or multiple (2 to 8) 0.5 ml. straws (P < 0.001)

Results
Pregnancy percent per season was significantly lower if estrus was induced with prostaglandin (P = 0.007)

Results
Pregnancy percent per season significantly higher if Caslick’s procedure was performed (P = 0.009)

Results
Pregnancy percent per season was significantly higher in 2001-2006 than in 1996-2000 (P = 0.049)

Factors not included in final model
(Fishers’s exact test)

- Breed of mare (P = 0.05)
- Number of cycles inseminated (P < 0.001)
- Accumulation of fluid before insemination (P = 0.05)
- Accumulation of fluid after insemination (P = 0.96)
- Time of year of first insemination (P = 0.25)
- Uterine treatment (P = 0.07)
- Positive endometrial cytology (P = 0.16)
- Twin pregnancy (P = 0.27)
- Uterine cysts (P = 1.00)

Conclusions

- Pregnancy percent per cycle (39.1%) and per season (61.4%).
- Mares with reproductive abnormalities have significantly lower pregnancy percent per season.
  - Positive bacteriology
  - Indication for Caslick’s procedure
  - Estrus induction with prostaglandin
  - Signs of estrus
- Uterine treated mares obtained normal pregnancy percent
- Macro straws and multiple 0.5 ml. straws are superior to single 0.5 ml. straws
- Uterine cysts did not affect pregnancy percent
- Early recorded twin pregnancy did not affect pregnancy percent
- Time of the year of first insemination did not affect pregnancy percent
Take Home Message

• If you diagnose, identify and treat a problem, the pronosis of getting the mare pregnant with frozen semen can be as good.
• Single risk factors for using frozen semen to a mare however can be identified.

Thank you for your attention

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