Aim

To examine the:
• prevalence of dystocia
• causes of dystocia
• outcome of caesarean section
• fertility following caesarean section

in Friesian horses
Materials & Methods

Materials:

• retrospective study
• hospital records of mares referred for dystocia during 2001 – 2006
• follow-up survey by telephone
Materials & Methods

Treatment options:
• assisted vaginal delivery (AVD)
• fetotomy (FT)
• Caesarean Section (CS)

Decision based on
  – is reposition possible?
  – foal - live or dead?
  – is fetotomy possible in < 2-3 cuts?
Materials & Methods

Method: SC
- isoxsuprine/ampicilline/flunixine
- GA
- laparotomy via ventral midline
- uterine closure:
  - (I) continuous haemostatic suture
  - (II) modified Cushing’s
- wound closure:
  - 4 layers
  - muscle/tendon layer: continuous 6-8M vicryl
- intra-operative oxytocin infusion (50 I.U.)
Materials & Methods

Methods: postoperative management

• placenta removal
  – oxytocin infusion
  – gentle traction
• oxytetracyclin tablets i.u.
• oxytocin regime
  (20 I.U. q2h, 3 days)
• penicillin/
gentamycin/flunixin
## Results: prevalence

<table>
<thead>
<tr>
<th>Breed</th>
<th>hospital population n = 409</th>
<th>dystocia cases n = 66</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friesian</td>
<td>35%</td>
<td>57 (86%)</td>
</tr>
<tr>
<td>Dutch Warmblood</td>
<td>33%</td>
<td>5 (7%)</td>
</tr>
<tr>
<td>Standardbred</td>
<td>20%</td>
<td>1 (2%)</td>
</tr>
<tr>
<td>Shetland pony</td>
<td>1%</td>
<td>3 (5%)</td>
</tr>
<tr>
<td>miscellaneous</td>
<td>11%</td>
<td></td>
</tr>
</tbody>
</table>
# Prevalence

<table>
<thead>
<tr>
<th>Breed</th>
<th>AVD n = 5</th>
<th>FT n = 11</th>
<th>CS n = 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friesian</td>
<td>3</td>
<td>9</td>
<td>45</td>
</tr>
<tr>
<td>Dutch Warmblood</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Standardbred</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Shetland pony</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
## Cause of dystocia

<table>
<thead>
<tr>
<th></th>
<th>Friesian dystocia cases</th>
<th>Friesian dystocia cases %</th>
<th>Literature reference</th>
<th>1(^1)</th>
<th>2(^2)</th>
<th>3(^3)</th>
<th>4(^7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>anterior</td>
<td>12</td>
<td>21</td>
<td></td>
<td>56</td>
<td>76</td>
<td>55</td>
<td>68</td>
</tr>
<tr>
<td>posterior</td>
<td>5</td>
<td>9</td>
<td></td>
<td>10</td>
<td>14</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>transverse</td>
<td>11</td>
<td>19</td>
<td></td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>malformation</td>
<td>22</td>
<td>39</td>
<td></td>
<td>10</td>
<td>(7)</td>
<td></td>
<td>(10)</td>
</tr>
<tr>
<td>oversized</td>
<td>0</td>
<td>0</td>
<td></td>
<td>5</td>
<td>(2)</td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>uterine torsion</td>
<td>0</td>
<td>0</td>
<td></td>
<td>(3)</td>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>hydrocephalus</td>
<td>1</td>
<td>2</td>
<td></td>
<td>(5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>unknown</td>
<td>6</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>total</td>
<td>57</td>
<td>100%  n = 57</td>
<td>88%  n = 166</td>
<td>100%  n = 150</td>
<td>91%  n = 96</td>
<td>100%  n = 601</td>
<td></td>
</tr>
</tbody>
</table>
Caesarean Section

45 Friesian CS

- mare survival to hospital discharge 41/45 (91%)
- lit. ref. 81-89%\textsuperscript{1,3,5,8}
- complications:
  - wound dehiscence 5
  - laminitis 3
  - endometritis 3
  - peritonitis 1
  - rectal prolapse 1
  - colic 1
  - uterine haemorrhage 1
  - broad ligament haemorrhage 1
  - vaginal haemorrhage 1
Caesarean Section

45 CS on Friesian mares

- Live foals - 19/45 (42%)
- 5 euthanized - severe malformation
- Survival to hospital discharge - 14/45 (31%)
- Lit. ref. 31%\textsuperscript{1}, 11%\textsuperscript{4}, 4%\textsuperscript{6}, 30%\textsuperscript{8}
## Dystocia duration

<table>
<thead>
<tr>
<th></th>
<th>Friesian CS n = 33 mean ± sd</th>
<th>lit. ref. 1&lt;sup&gt;1&lt;/sup&gt; mean ± sd</th>
<th>lit. ref. 2&lt;sup&gt;5&lt;/sup&gt; mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>live foal at birth</td>
<td>165’ ± 73’</td>
<td>71.7’ ± 34.3’</td>
<td>71’</td>
</tr>
<tr>
<td>dead foal</td>
<td>490’ ± 504’</td>
<td>85.3’ ± 37.4’</td>
<td>282’</td>
</tr>
</tbody>
</table>
Fertility after CS

45 Friesians post CS

- 23/45 re-bred
- mean duration CS to next pregnancy: \(9.2 \pm 8.4 \text{ months (n = 21)}\)
- all re-bred mares produced a live foal (100%)
- lit. ref. 67%\(^1\), 50%\(^4\)
Discussion

• high prevalence of dystocia in Friesian mares
• due to a high % of transverse presentations and malformations (wry nose, torticollis and limb malformation)
Transverse position

- normal development of the foetus in one uterine horn during the 5-7th month development in the corpus uteri

- occasionally development in the second horn instead of the corpus

  - the cranial half of the foetus is hindered in its development —> malformations

- foetal development in both horns instead of corpus

  - elongation of the corpus
  - foetus is farther away from the pelvic inlet
  - difficult manual reposition
Discussion

Causes of malformation

Genetic factors
- Friesian’s are highly inbred
- in ruminants - arthrogryposis is an autosomal recessive condition

Uterine environment\textsuperscript{9}
- increased % transverse presentation in cold-bloods
- no known genetic factor in Belgian draught horse population
- rapid correction of malformed extremities post-partum
Discussion
Discussion

CS in Friesian mares

- mare survival is good
- preservation of reproductive soundness is also good
- despite dystocia of relatively long duration, chance of a live foal is substantial
  - delayed stage II labour in (partial) transverse positions
  - slower placental detachment in Friesians?
References

1. Byron C.R. et al. 2002; EVJ 35 p 82-85
2. Frazer G.S. 1997; EVJ 29 p 111-116
3. Freeman D.E. et al. 1999; EVJ 31 p 203-207
5. Lynch Norton J. et al. 2007; EVJ 39 p 37-41
7. Vandeplassche M. 1987; J. Reprod. Fertil. Suppl. 35 p 547-552
8. Vandeplassche M. 1980; EVJ 12 p 45-49
Afterbirth/placenta
Afterbirth

• Increased prevalence of retentio secundinarum
• In 9/10 cases removal is possible by means of oxytocin infusion and gentle traction (no “pealing”)

• Cause?

Effect of inbreeding on the incidence of retained placenta in Friesian horses. 
M Sevinga, T Vrijenhoek, J W Hesselinks, H W Barkema, A F Groen
Serum calcium and magnesium concentrations and the use of a calcium magnesium-borogluconate solution in the treatment of Friesian mares with retained placenta. 
M Sevinga, H W Barkema, J W Hesselink
Theriogenology 01/2002; 57(2):941-7
Thank you for your attention!