BVD-Virus Type 2 – Outbreak in Germany

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January 2013: Fatal BVDV Outbreak in Germany
Chronology of the BVDV Outbreak in the 1st Dairy Farm (1)

- Oct. 17, 2012: Purchase of 2 heifers (auction)
- Nov. 2012:
  - Drop in milk yield
  - Febrile respiratory disease in cows
  - Diarrhoea in cows
  - Abortions
- Respiratory problems in calves
- Mucosal erosions
- Petechial bleedings, suggilations
Chronology of the BVDV Outbreak in the 1st Farm (2)

- Nov. 07 2012: Testing of 2 aborted fetuses for BVDV -> positiv (Febr. 2013: BVDV identified as type 2c)

- Mortality in this farm: 11%

- Between purchase of the heifers and restriction of the herd:
  - several calves and 2 cows were sold to other producers
BVDV Type 2c Outbreaks in Germany

- At the end: At least 23 Herds in North Rhine Westphalia and Lower Saxony were infected.
- Introduction of BVDV into a number of veal calf operations in the Netherlands.
NO PI animal was bought in!
- Initially often respiratory symptoms with fever (up to 40.0 °C)
- Drop in milk yield
- Profuse, sometimes bloody diarrhoea -> Dehydration, emaciation
- Mucous membrane lesions
- Haemorrhagic diathesis
- Mortality (10%) – 20 to 50% – 80%
# Characteristic of BVDV Type 2 Outbreaks in Germany - Haematologic Findings -

<table>
<thead>
<tr>
<th>Animal</th>
<th>Leukocytes (4 – 10 G/L)</th>
<th>Erythrocytes (5 – 8 T/L)</th>
<th>Thrombocytes (300 – 800 G/L)</th>
<th>Haematocrit (0.28 – 0.36 L/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf 1</td>
<td>1.8</td>
<td>9.0</td>
<td>18</td>
<td>0.44</td>
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<tr>
<td>Heifer</td>
<td>1.2</td>
<td>5.2</td>
<td>22</td>
<td>0.21</td>
</tr>
<tr>
<td>Calf 2</td>
<td>0.9</td>
<td>8.1</td>
<td>297</td>
<td>0.27</td>
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<tr>
<td>Calf 3</td>
<td>0.7</td>
<td>5.9</td>
<td>57</td>
<td>0.18</td>
</tr>
<tr>
<td>Cow</td>
<td>3.8</td>
<td>5.3</td>
<td>271</td>
<td>0.31</td>
</tr>
</tbody>
</table>
Characteristic of BVDV Type 2 Outbreaks in Germany
- Prolonged Virus shedding -

• Observed in all age groups
• Continuous virus shedding for weeks
• No seroconversion in this time

BVDV type 2 - Doll & Holsteg
Example: Prolonged Virus shedding in a 6 Year old Holstein Cow

- Born Sept. 2006
- January 2010: Tested negative for BVDV (blood)
- 4 of her calves tested negative for BVD (ear notch sample)
- April 2013: After falling ill -> BVDV positive
- Remained BVDV PCR positive until euthanized in June 2013 (almost 3 months)
Body weight development in 33 bull calves (fattening unit) after BVDV-2 infection

(Average weight gain: 360 g/d; Normally: 1,000 g/d)
BVDV Type 2 Outbreaks in Germany
- Characteristic features -

• High-titer and long-lasting virus shedding. The genomic load almost equivalent to that in PI animals.
• Evidence of long-term and continuous shedding (>8 weeks).
• High degree of contagiousness: -> Massive herd infections with substantial losses caused by transiently infected individual animals.
• Clinical picture resembles mucosal disease.
• In some cases thrombocytopenia -> haemorrhagic diathesis
• Leukopenia -> immunosupression
• Properties of this virus and the pathogenesis show similarities with classical swine fever.
BVDV Type 2 Outbreaks in Germany
- Predisposing situation -

- High number of seronegative animals / herds as a result of the German BVDV eradication program (removal of PI animals)
- Reduced number of vaccinations since beginning of the eradication program (vaccination was no longer subsidized)
- Insufficient biosecurity measures
Biosecurity Measures
Biosecurity Measures - Reality
Vaccinations against BVDV

- After beginning of BVDV-2 the German outbreaks:
  -> Veterinary authorities ordered vaccination of the affected herds with a live vaccine as an emergency measure.
- In some herds this measure appears to have attenuated the symptoms to some degree, in other herds the losses continued.
- Neighbouring herds were vaccinated by a two-step vaccination (inactivated BVDV-1 vaccine for priming followed by a live attenuated vaccine booster 4 weeks later)
- BVDV type 2 vaccines presently unavailable in Germany
- Cross protection?
Consequences

- Transient BVDV also be an important factor in transmission of BVDV
- Biosecurity measures (including quarantine)
- Vaccinations (with efficient vaccines)
- Impact of new BVDV variants on the German BVDV eradication program
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