HAEMATOLOGICAL PROFILES OF CALVES BELONGING TO HERDS WITH BOVINE NEONATAL PANCYTOPENIA HISTORY IN AND AROUND WALLONIA (BELGIUM).

Ronzoni A.,
Bayrou C., Jolly S., Cassart D., Rao A.-S., Lebrun M.,
Desmecht D., Rollin F., Hanzen C., Théron L.
THE BNP PROJECT

✓ Epidemiology, clinical and anatomo-pathological findings

✓ Detection of SUBCLINICAL calves in BNP herds

✓ Alloantibodies detection by flow cytometry cell sorting

✓ 2013-2014: new tools & genetics
BOVINE NEONATAL PANCYTOPENIA

- Syndrome of the **young calf** severe and often-lethal
- Reported in several European countries since 2006
  \[\Rightarrow\] cases between 2008 and 2010
- Farm Incidence rate between 1% and 5%
- Until now up to \(\approx5000\) cases noticed
  \[\Rightarrow\] Animal health concern in western world
BOVINE NEONATAL PANCYTOPENIA

Neonate-maternal incompatibility

✔ Dams: vaccine-induced alloreactive antibodies

✔ Calf: whether they match with cell surface MHC-I antigens

➢ inherited from the father

➢ mostly expressed on peripheral and bone marrow leukocytes
BOVINE NEONATAL PANCYTOPENIA

- Young calves **under 4w** (range 10-20 days)
- Both **genders** and different **breeds**
- Well grown and no history of previous ill health
- The **clinical** form characterized by...
BOVINE NEONATAL PANCYTOPENIA

External and internal bleedings
BOVINE NEONATAL PANCYTOPENIA

Petechiae and ecchymosis
BOVINE NEONATAL PANCYTOPENIA

Melena or haematochezia
Occasionally hyperthermia
Prostration and sudden death!
BOVINE NEONATAL PANCYTOPENIA

Marked **panleukopenia**

Severe **thrombocytopenia**

Partial or total destruction of the bone marrow

⇒ **panmyelophhtisis**
Questions

- Which are the haematological characteristics of BNP calves versus healthy ones?

- Is there any subclinical case in known BNP farms?
AIM OF THE STUDY

✓ Random sampling and haematological analysis in BNP herds

✓ Verify the hypothesis of SUBCLINICAL BNP CASES

✓ Better epidemiological picture at herd-level
MATERIALS & METHODS

- 100 calves:
  - Blood samples
    - jugular vein
    - EDTA tubes
  - Complete haematological profile
  - Follow up

- 12 different farms:
  - In and around Wallonia (BE)
  - BNP-history

- Between September 2009 and November 2012
RESULTS

CALVES

Breed:
- 44% BBCB
- 39% HF
- 14% crossbred
- 3% BdA

Age (<4w):
- 14.8 ± 4.02 days

Gender:
- 57% F
- 43% M

Colostrum:
- 75% mother
- 25% other dams
RESULTS

DAMS

Parity:
2 ± 2.7 calving

BVDV vaccination:
82% PregSure BVD®
8% Other
RESULTS

HAEMATOLOGY

HAEMATOLOGICAL SUB-POPULATIONS IN CALVES’ COHORT

- 83%
- 12%
- 5%

- NOT-BNP
- CLINICAL BNP
- ???
# RESULTS

## HAEMATOLOGY

<table>
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<tr>
<th></th>
<th>N</th>
<th>WBC (/µl)</th>
<th>RBC (M/µl)</th>
<th>Hb (g/dl)</th>
<th>Ht (%)</th>
<th>Neut (/µl)</th>
<th>Lympho (/µl)</th>
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RESULTS

HAEMATOLOGY

HAEMATOLOGICAL SUB-POPULATIONS IN CALVES’ COHORT

83%
12%
5%

- NOT-BNP
- CLINICAL BNP
- SUBCLINICAL BNP
RESULTS

HAEMATOLOGY

WBC (/µL)

Unpaired T-student
WBC average

NOT BNP*SUBCLINICAL

p<0.01
SIGNIFICANT
DIFFERENCE
RESULTS

HAEMATOLOGY

RBC (millions/µL)

Unpaired T-student
RBC average

NOT BNP*SUBCLINICAL

p>0.05

NON SIGNIFICANT
DIFFERENCE

↓
No clinical signs!
RESULTS

HAEMATOLOGY

Lymphocytes (/µL)

Unpaired T-student lymphocytes average

NOT BNP*SUBCLINICAL

p<0.01

SIGNIFICANT DIFFERENCE

1000

100

10

1

NON BNP
CLIN BNP
SUBCL BNP
RESULTS

HAEMATOLOGY

<table>
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<th>Neutrophiles (/µL)</th>
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<td>UNPAIRED T-STUDENT NEUTROPHILES AVERAGE</td>
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P < 0.01

SIGNIFICANT DIFFERENCE
RESULTS

HAEMATOLOGY

PLATELETS (/µL)

Unpaired T-student PLT average

NOT BNP*SUBCLINICAL

p<0.001

SIGNIFICANT DIFFERENCE
RESULTS

✓ Follow up **SUBCLINICAL** calves:
  
  **4 ➔ healthy**

**NORMAL BLOOD PARAMETERS AFTER 15-20 DAYS**

**1 ➔ CLINICAL**

**DEAD in 72h**

![Graphs showing blood parameters](image)
**DISCUSSION**

✓ Bias of our study:
- **Small number** of calves
- **Only BNP** and **BVDV-vaccined** herds
- **2 different analysers**
  - Cell-Dyn Abbott 3500
  - Beckman Coulter LH750

✓ But...we’ve answered our questions!
- Significant **haematological ≠ NOT-BNP** and **CLINICAL** calves
  - **5%** of **SUBCLINICAL** BNP calves
  - **20%** risk of become **CLINICAL**
CONCLUSION

✓ Better epidemiological picture of BNP
✓ Better management for each CLINICAL calf

⇒ COLOSTRUM management

⇒ HAEMATOLOGICAL profiles of calves with the same father if modified parameters
⇒ preventive blood transfusion
Thank you for your attention!