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The use of reticulo-rumen boluses for early fever detection in young male calves

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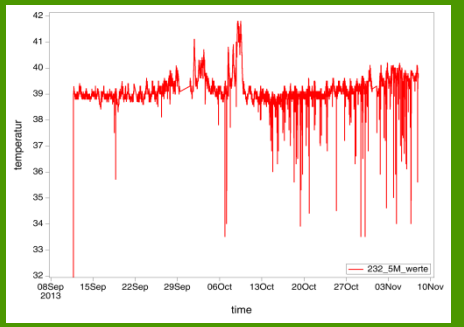


Outline

Introduction:

- Bovine Respiratory Disease

Main part:

- Aim of the study
- Material & Methods
- Results

Conclusion

Introduction
- Background -

- **most relevant calf diseases:**
  - **diarrhea (approximately 50 % of calves affected)**
  - **Bovine respiratory disease (BRD; approximately 25 % of calves affected)**
    - **associated with a reduced growth during further development**
    - **attributable for most of the antimicrobial treatments associated with calf rearing and calf fattening**

Kaske et al. 2010

Introduction
- Bovine respiratory disease – a multifactorial disease-

Environment:
- climate
- draught, air quality
- cleaning & desinfection
- …

Feeding:
- nutrients
- vitamines
- major minerals
- trace elements
- water
- …

Animal:
- stress
- age
- colostrum intake
- body constitution
- breed
- …

Infections:
- viruses
- bacteria
- parasites
- mycoplasma

- **One of the first symptoms of BRD is an elevated body temperature → FEVER**

Introduction
- Bovine Respiratory Disease -

- **for a successful treatment and a full recovery of the animal an early and reliable detection of the first symptoms such as fever is of vital importance**

However:

- **in large herds often less time is available for regular health monitoring of individual animals**

Aim of the study:

Is an automated temperature monitoring feasible to detect fever in young male calves ?

Material & Methods
- Animals and management -

- **duration of trial: 8 weeks**
- **150 pre-weaned male calves**
  - **age at arrival on farm: 16.6 ± 3.3 d**
  - **weight at arrival on farm: 54 kg ± 5 kg**
  - **feeding of milk replacer supplied by automatic calf feeders (ca. 10% of BW); *ad libitum* supply of hay, concentrates and water**
  - **antibiotic metaphylactic treatement offered with milk replacer at arrival (Neomycinsulfat und Sulfadiazin/Trimethoprim)**
- **health monitoring at least twice a day**
  - **in animals with clinical signs of BRD rectal temperature was measured**
- **every 2 weeks rectal temperature was measured in all animals**
- **rectal temperature ≥ 40 °C = rectal hyperthermia (rehyp)**

Material & Methods:
- Monitoring of temperature -

- on day of arrival: all calves received a temperature measuring bolus (Medria, France)
- every 5 minutes reticulo-ruminal temperature was obtained

- data management:
  - mean values over 30 min periods
  - mean values over daytime periods (6:00-10:00, 10:00-14:00, 14:00-18:00, 18:00-00:00, 00:00-06:00)
  - CUSUM (cumulative sum) to identify deviations between values over a period of time and to create an alarm

- reticulo-ruminal temperature ≥ 40 °C = reticulo-ruminal hyperthermia (reruhyp)

Results

- ✓ rectal hyperthermia (≥ 40°C): **31 animals**
- ✓ correlation between rectal and reticulo-ruminal temperature: **R = 0.75**

	Reticulo-ruminal hyperthermia periods (≥ 40°C)		
	5 min	**30 min**	**Daytime period**
No. of calves	**147**	**139**	**99**
Number of reruhyp periods (Mean ± SD)	**424 ± 489**	**64.5 ± 76.1**	**7.1 ± 8.0**
Duration of reruhyp periods (h)	**35 ± 41**	**32 ± 38**	**30 ± 34**

Results

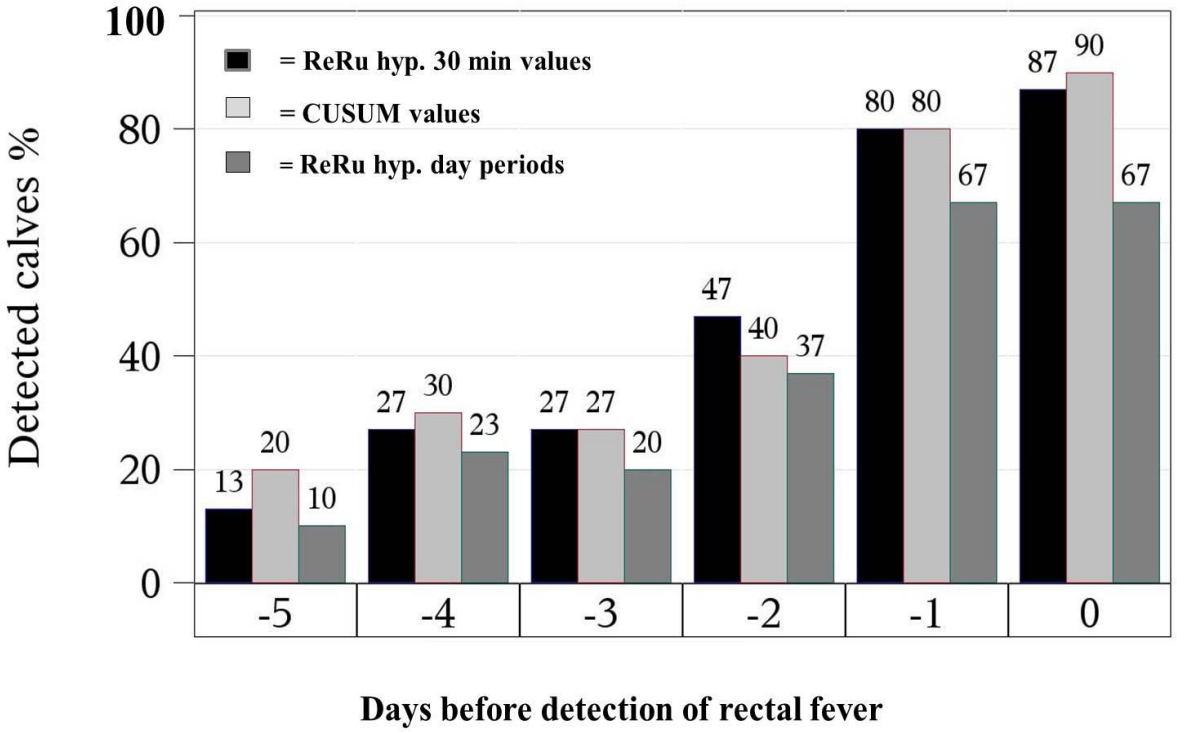
Accuracy values of reruhyp

Time period	Sensitivity %	Specificity %	Positive predictive value %	Negative predictive value %
30 min	77	97	73	98
CUSUM-test	71	98	86	98
Daytime period	61	97	69	97

- ✓ **accuracy values have to be interpreted with caution**
- ➢ **further studies are needed with at least daily measurements of rectal temperature to predict real accuracy values**

rehyp: rectal temperatur ≥ 40 °C
reruhyp: reticulo-ruminal temperature ≥ 40 °C

Results



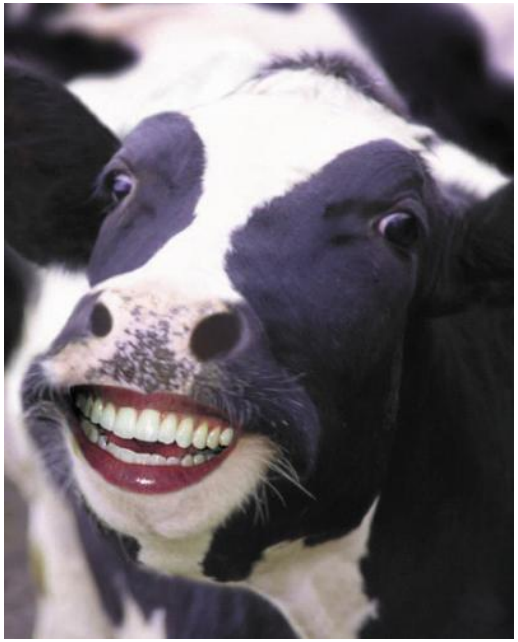
- **before and on day of rehyp almost all calves can be detected by the measurement of bolus temperature**
- **Time interval between first detection of reruhyp and rehyp: 80 ± 70 h**

rehyp: rectal temperatur ≥ 40 °C
reruhyp: reticulo-ruminal temperature ≥ 40 °C

Conclusion

- ✓ **Automatic temperature measuring devices can be applied to pre-weaned calves.**
- ✓ **An early detection of increased body temperature is possible.**
- ✓ **The implementation of an alarm system helps to improve the early detection of an increased body temperature.**
- ✓ **A thorough clinical examination should still be performed in animals which created an alarm to improve the responsible use of antimicrobials.**

Thank you for your attention!



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