Improved detection of bovine respiratory disease in young bulls using rumen temperature boluses

Timsit E., Assié S., Bareille N.

UMR Bio-aggression, Epidemiology and Risk Analysis, ONIRIS, INRA, Nantes, France

Objectives

➢Investigate the **sensitivity of bovine respiratory disease** (BRD) **detection** by **visual appraisal** in comparison to clinical examination combined with assessment of acute phase proteins (APPs).

➢Investigate the **use of rumen temperature boluses** for the **detection of BRD**.

Materials and methods

➢112 young beef cattle were allocated in 3 farms (Farm 1: 40, Farm 2: 36 and Farm 3: 36).

➢Each animal received a rumen bolus containing a temperature sensor at farm entry to measure and record rumen temperature.

➢Visual appraisal was performed twice daily by owners. At the first detection of BRD, clinical examinations were performed by a veterinarian on each animal in the pen.

➢Fibrinogen (Fb) and haptoglobin (Hp) concentrations were determined. Cut-off values for Fb (4.2 g/L Se=57%, Sp=94%) and Hp (0.25g/L Se=76%, Sp=94%) were set using ROC curves.

➢5 heath status were defined from results of clinical examinations and assessment of APPs. (Fig. 1)

➢Rumen hyperthermia was defined as a 1°C increase of the rumen temperature in comparison to the mean rumen temperature of the three days before. (Fig. 2)

Results

➢The sensitivity of BRD detection based on visual appraisal was 6/32 (Se=19%) in farm 1, 9/29 (Se=31%) in farm 2 and 6/27 (Se=22%) in farm 3. (Fig. 3)

➢Among healthy cattle, 2/24 cattle had rumen hyperthermia prior to clinical examination (Tab.1), *i.e.* a specificity of BRD detection by rumen temperature bolus of 92%.

➢Among non healthy cattle, 62/88 cattle had rumen hyperthermia prior to and/or during clinical examination (Tab.1), *i.e.* a sensitivity of 70%.

➢These rumen hyperthermia had been ongoing for 1:48 h to 166:39 h (mean=47:00 h) prior to clinical examination.

Conclusions

➢**Sensitivity of BRD detection** based on **visual appraisal** performed by owners was **very low (Se<31%)** relative to clinical examination combined with assessment of APPs.

➢The monitoring of rumen temperature using **rumen temperature bolus improved BRD detection (Se=70%;Sp=92%)** in comparison to visual appraisal. Furthermore, it allowed an **early detection of BRD** often several days prior to the onset of clinical signs.

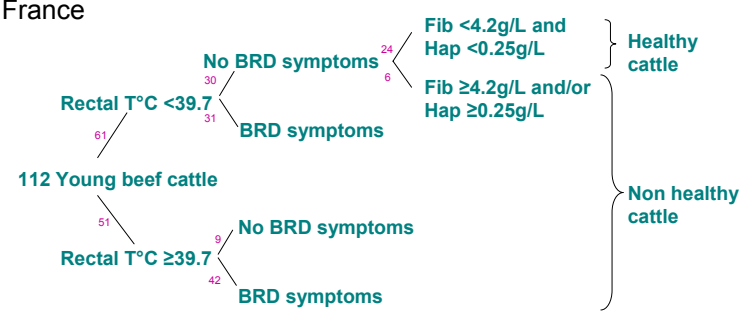

Figure 1: health status defined by clinical examination combined with APPs

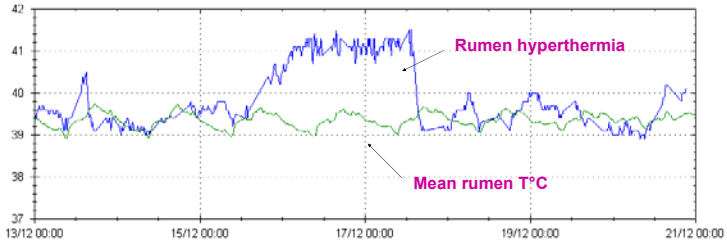

Figure 2: example of a rumen hyperthermia

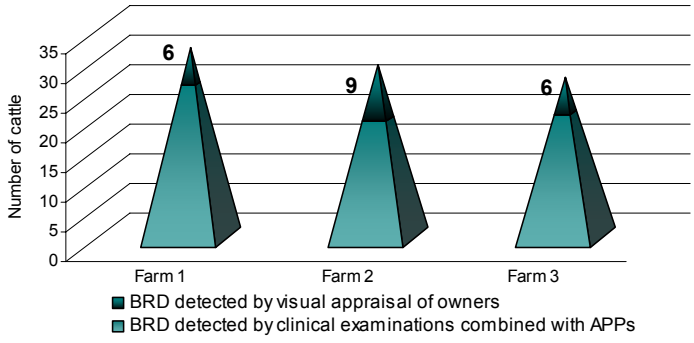

Figure 3: detection of BRD by visual appraisal compared to clinical examination combined with APPs

Table 1: detection of BRD by the use of rumen temperature bolus

		Cattle with rumen hyperthermia		Cattle without rumen hyperthermia
		Prior to clinical examination	prior to and during clinical examination	
Healthy cattle		2	0	22
Non healthy cattle	rectal T°C <39.7	12	4	21
	rectal T°C ≥39.7		46	5