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Chronopart in catheterized commercial sows in conventional herds: Physiological, biochemical and hormonal follow-up in “easy” farrowing and “difficult” farrowing sows

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Introduction

Observational study on enzootic neonatal diarrhea (END) in Brittany lead to a link between END and the processus of parturition (Sialelli et al., 2009, Bories et al., 2010). Pre-partum investigations are mainly limited on experimental sows (Oliviero et al., 2007).

Intensive physiological investigation have been registered in 4 commercial hyperprolific herds (>14 TB) selected according to history of farrowing difficulties, high stillbirth (>1.2/litter), and good records.

Material and methods

Sows (19 P1 and 9 P2) were catheterized at day 109 (Figure 1) and intensively followed before and during farrowing. According to speed of farrowing, sows were classified in three groups: <3hrs (SF for short farrowing), between 3 and 4 hrs (IF for intermediate farrowing) and > 4hrs (LF for Long farrowing). Stillborn and manual assistance were also taken into account.

Finally, sows classified with an “easy” farrowing are sows having a SF or IF without manual assistance and only stillbirth piglets at the end of farrowing. Sows with a “difficult” farrowing are LF and IF with manual intervention and stillbirth during farrowing (Table 1).

| Table 1: data set | Easy farrowing | Difficult farrowing | P* |
|--------------------------|----------------|---------------------|-------|
| Number of sows (and P1) | 14 (9) | 14 (9) | NS |
| Sow's weight (kg) | 226.8 | 228.8 | NS |
| Back fat (mm) | 17.9 | 18.2 | NS |
| Gestation length (d) | 113.9 | 113.9 | NS |
| Total born | 14.1 | 15.3 | NS |
| Live born | 13.8 | 13.9 | NS |
| Farrowing (min) | 173.2 | 297.0 | <0.01 |
| Total litter weight (kg) | 16.78 | 20.11 | <0.05 |
| % piglets >1.6 kg BW | 12 | 24.7 | NS |
| % piglets <1.25 kg BW | 57.4 | 46.7 | <0.01 |

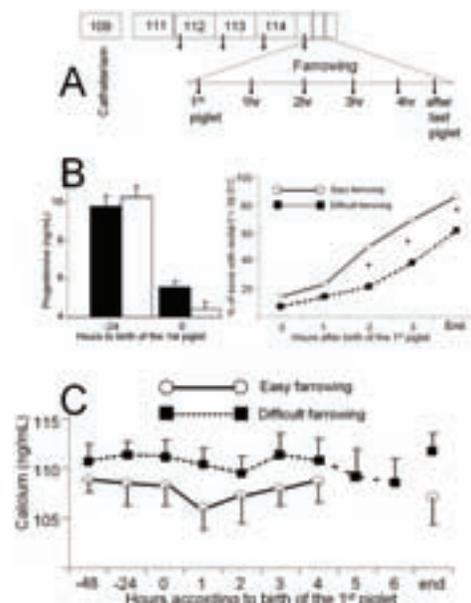
Sequence of sampling is reported on Figure 1A: Sampling procedure in catheterized sows; vertical arrow correspond to a blood sample.

Physiological, biochemical and hormonal investigations: Rectal temperature, hematocrit (Ht) and Hemoglobin (Hb, test Hemo-Cue®) were performed on farm. Plasma progesterone (P4), Estradiol (E2), Glucose (Glu), total magnesium (Mg), total calcium (Ca), Non Esterified Fatty Acid (NEFA), total protein (Prot), lactate (Lact), bicarbonate (HCO3) and creatine phospho-kinase (CK) have been determined using commercial kit.

Results and discussion

The progress of parturition (prolonged fast, uterine and muscular contractions, stress and hyperventilation) creates the conditions to a mobilization of the reserves and to a metabolic acidosis (fast increase of NEFA, lactate and bicarbonate in the beginning of birth, followed by a high level during all parturition). The significant correlation between the levels of lactate 3 hrs after the first piglet and the duration of parturition ($r=0,580$ $p < 0,01$ and $r=0,326$ $p=0,09$) suggests a high risk of weakness in long farrowing.

Figure 1B: Follow-up of progesterone (left) and rectal temperature (right) by % of sows with $t^{\circ} > 39.5^{\circ}C$ according to “easy” and “difficult” farrowing. Figure 1C: Calcium follow-up according to “easy” and “difficult” farrowing



Conclusion

Pre-farrowing high blood progesterone may have consequences on uterus myometre and thereafter on farrowing. Other analysis are in progress (ocytocin, albumin, ...) and will be reported. Understanding of pathophysiology is probably the first step for the control.

References

Bories P. et al. Journ. Rech Porcine 2010; 42: in press
 Oliviero et al., Anim. Reprod. Sci. 2008 ; 105 : 365-377
 Sialelli J-N et al. Journ. Rech Porcine 2009; 41: 167-172