Influence of Partus Induction on the pH Value in the Blood of Newborn Piglets

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With 1 figure

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Summary

Partus induction is an important integrative component of reproduction management in the swine industry. In this context, the question is to what extent the application of uterine contractions may influence the vitality of piglets. The blood pH value is used as a laboratory objective diagnostic parameter of neonatal acidosis. This parameter of the acid–base balance was examined in piglets born spontaneously at the 115th to 116th day of gestation (group 1, n = 57) and after parturition (group 2: combination of 175 µg of cloprostenol and 20 IU of oxytocin, n = 55; group 3: 175 µg of cloprostenol and 35 µg of carbetocin, n = 56). Initial blood samples were taken from each piglet at birth and 2 h later. The results show that the different protocols have no negative influence on the initial pH value and the compensation of neonatal acidosis until the second hour post-natum.

Introduction

Partus induction and synchronization is an important biotechnological method in the management of pig production (Holtz et al., 1983; Leike and Hühn, 1992). Some advantages are the easy monitoring of parturition, a better compensation of the litters and the more effective use of labour time. Additionally, the weaning period and the treatment of the piglets in a farm is synchronized. There exist different regimes of partus induction and termination. The efficiency of these methods when compared with spontaneous parturition is determined by the duration of parturition and the vitality of piglets (Bolcskei et al., 1996; Clark and Bilkei, 2002; Udluft and Bostedt, 2004).

Material and Methods

The study was performed on 168 piglets (98 male, 70 female) of a crossbreed (German Yorkshire × German Landrace) in a piglet rearing farm in Thüringen, Germany. The breeding sows were divided into two groups according to their parity. Overall, six sows were primiparous (P1) and 11 sows were pluriparous (P2). The total number of piglets was sub-divided into the following groups:

Group 1: Five litters (2 P1/3 P2), 57 piglets; spontaneous birth at the 115th or 116th day post-insemination (p.i.); 24 piglets in posterior position.

Group 2: Six litters (2 P1/4 P2), 55 piglets; 21 piglets in posterior position; partus induction was performed with 175 µg of cloprostenol i.m. (PGF Veyx™ forte; Veyx, Schwarzenborn, Germany) at the 114th day p.i. and 24 h later with 20 IU of oxytocin i.m. (Oxytocin™; Veyx).

Group 3: Six litters (2 P1/4 P2), 56 piglets; 27 piglets in posterior position; partus induction was performed with 175 µg of cloprostenol i.m. (PGF Veyx™ forte; Veyx, Germany) at the 114th day p.i. and 24 h later with 35 µg of carbetocin i.m. (Depotocin®; Veyx), a depotoxytocin.

The inclusion criteria for the litters were not to have more than two stillbirths per litter and to exclude an influence of the litter size only litters with 8–12 piglets in total were used.

Blood samples were taken from the vena cava cranialis with injection needles (0.9 mm × 40 mm; Braun, Meisungen, Germany) and blood gas syringes (Pico™ 50; Radiometer, Willich, Germany) just after expulsion of the piglets and 2 h post-natum. The pH value was determined immediately with an ambulatory blood gas analysing machine (ABL 77; Radiometer). A pre-test trial comparing the ambulatory blood gas machine with an approved stationary blood gas analyser (ABL 615; Radiometer) showed a good conformity of values (correlation coefficient = 0.992). After sample collection, body weight and temperature were measured and the piglets were observed for the next 72 h and normally did not fall ill. The inclusion criterion for each piglet was a birth weight > 1200 g and a body temperature just after parturition > 37.9°C, which correspond to the reference values for healthy piglets (Wehrend et al., 2003).

Statistical analyses were carried out using the statistical programme package bMDP/Dynamic Release 7.0 (Dixon 1993). A three-factor-analysis of variance with measuring repetitions of the factor time (directly and 2 h post-natum) was performed in relation to the three influencing factors of partus induction, parity and time. Values of P < 0.05 were considered to be statistically significant.

Results

There was a significant (P < 0.001) relationship between the pH value and the time of blood sampling (Fig. 1). The pH values increased after expulsion to 2 h post-natum. The different protocols of partus induction (P > 0.05) and the parity (P > 0.05) of the sows did not have an influence on the initial pH value and the compensation of neonatal acidosis (Fig. 1).
In conclusion, the results of the study show that the combined induction of parturition with cloprostenol and oxytocin/carbetocin in the dosage used at the 114th day of gestation has no negative influence on the intranatal pH values of piglets.

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References


