CORRELATION BETWEEN WEIGHT OF PLACENTA, TIME OF PLACENTAL DELIVERY AND RATE OF DEAD-BORN IN PIGLETS

Mara Vicelle Ruviaro Christ[1]
Luiz Ernandes Kozicki[2]
Jose Carlos dos Santos Breda[3]
Naréu Simas Carvalho[4]

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ABSTRACT: In order to investigate the correlation between the placenta weight and other piglet intra-delivery parameters, a study of 90 newly-parturient primiparous sows was carried out in a swine farm near Curitiba, Paraná, Brazil. The animals were artificially inseminated with cooled semen produced in the farm. All the animals were readily assisted in the parturition as the obstetric aid was given for the placenta separation, placenta weighing, counting the piglet number and the classification of live, dead-born and mummified piglets. A total of 1,088 piglets and their placentas were studied. The gestation lasted on average 114 days. It was concluded that the weight of pig placenta did not show a correlation with the number of dead-born or the placenta expulsion time.
KEY WORDS: Natimortality rate; Placental delivery; Placenta weight; Swine.

CORRELAÇÃO ENTRE O PESO DE PLACENTA, O TEMPO DE EXPULSÃO PLACENTÁRIA E A TAXA DE NATI-MORTALIDADE EM LEITÕES

RESUMO: O presente experimento objetivou pesquisar a correlação entre o peso da placenta e outros parâmetros reprodutivos em 90 porcas primiparas recém paridas, em uma granja suinícola próxima à Curitiba, Paraná. Os animais eram inseminados artificialmente com sêmen resfriado, produzido na própria granja. Todos os animais eram prontamente assistidos na parturição, executando-se o auxílio obstétrico relativo à separação e às pesagens das placentas, a contagem do número de leitões e a classificação de vivos, natimortos e mumificados. Ao todo foram estudados 1088 leitões e as respectivas placentas. A gestação teve a duração media de 114 dias. Concluiu-se que o peso de placenta de marrãs, não demonstrou correlação com o número de natimortos, bem como com o tempo de expulsão da placenta.
PALAVRAS-CHAVE: Peso de placenta; Suínos; Tempo de expulsão placentária; Taxa de natimortalidade.

CORRELACIÓN ENTRE EL PESO DE LA PLACENTA, TIEMPO DE EXPULSIÓN DE LA PLACENTA Y LA TASA DE MUERTE FETAL EN LECHONES

RESUMEN: Este experimento buscó investigar la correlación entre el peso de la placenta y otros parámetros reproductivos en 90 cerdas primíparas recién paridas en una granja de porcicultura cerca a Curitiba, Paraná. Los animales eran inseminados artificialmente con semen refrigerado, producido en la propia granja. Todos los animales eran prontamente asistidos en el parto, ejecutándose el auxilio obstétrico relativo a la separación y peso de las placentas, recuento del número de lechones y clasificación de los vivos, nacidos muertos y momificados. En su conjunto fueron estudiados 1088 lechones y sus respectivas placentas. El embarazo tuvo la duración media de 114 días. Se concluyó que el peso de la placenta de las cerdas jóvenes no ha demostrado correlación con el número de nacidos muertos, así como con el tiempo de expulsión de la placenta.
PALABRAS CLAVE: Peso de la placenta; Porcinos; Tiempo de expulsión de la placenta; Tasa de muerte fetal.

Introduction

The pig gestation lasts an average of 113 days, thus existing 96% of variation from 110 to 117 days (GRUNERT; BIRGEL,1982).

According to Sobestiansky et al. (1998), the magnitude of the pregnant uterus depends upon the number of fetuses, those distributed in both uterine horns. According to Dial et al. (1992) dead-born piglets represent around one quart of all delivery deaths until the weaning and they are the greatest cause of mortality in the productive cycle of pigs. The percentage of dead-born piglets varies from 4 to 10%, and the veterinarian intervention is suggested, when this rate exceeds 8%. Approximately 70% of the piglets classified as dead-born were still alive at birth, and this indicates that even with the heart still pulsating the piglets already suffered severe anoxia, coming to decrease some minutes after the birth. In accordance with the above mentioned authors the anoxia

[1]Medica Veterinária autônoma, Rodovia BR 376, Km 14, CEP 83010-500, São Jose dos Pinhais - Paraná; vicelle.ch@hotmail.com;
[2]Medico Veterinário, Docente da Pontifícia Universidade Católica do Paraná, Rodovia BR 376, Km 14, CEP 83010-500, São Jose dos Pinhais - Paraná; kozicki.l@pucpr.br;
[3]Médico Veterinário, Mestre em Ciência Animal, Rodovia BR 376, Km 14, CEP 83010-500, São Jose dos Pinhais – Paraná. josecarlosbreda@yahoo.com.br;
[4]Médica Veterinária, Autônoma, Rodovia BR 376, Km 14, CEP 83010-500, São Jose dos Pinhais - Paraná; nareu.carvalho@yahoo.com.br

can be related to the compression or premature rupture of the umbilical cord during the contractions. As the piglets are not yet neurologically mature at birth, the anoxia can be highly compromising. When the period of parturition is enlarged for over 4 hours, or after the birth of 80% of the piglets, the number of dead-born considerably increases, and the natimortality rate is higher for the three last piglets expulsed.

The researchers such as Cypriano et al. (2007) have more recently agreed that longer parturitions, which means over 4 hour run increases the number or dead-born animals. Cypriano et al. (2007) define the duration of parturition as the expulsion interval between the first and the last piglet (in minutes), with the average duration of 211,2 minutes. According to the same authors the high incidence of dead-born is also due to the increase of the litter and the delivering duration that raises the chance of rupture of the umbilical cord and leads to the intrauterine hypoxia of the piglets. According to Van Rens and Van Der Lend (2004), from all dead--born piglets (3-8% of the litter), approximately 755 died during parturition, mainly as a result of asphyxia. Still according to these searchers and Grunert and Birgel (1982), the process of parturition in animals is a stressing event as well for the mother as for the newborn. The piglet in consequence of their movements shall cause the rupture of their own placenta covering, in order to start their way out. It seems that a thick placenta may offer more resistance that prolongs the process of birth (VAN RENS; VAN DER LEND, 2004).
According to observations by Van Rens and Van Der Lend (2004) efficient placentas are generally smaller and with more vascularity than thicker and therefore less efficient placentas. The retention of fetal membranes is considered as a failure in their expulsion. Among the swine species the time duration of placenta and other annexes membranes expulsion after the delivery is of 3 or 4 hours, seldom exceeding this period of time (VALE; GRUNERT; BIRGEL, 2005). However, there is a variation from 21 minutes to 12 hours and a half from the birth of the last piglet. Among the piglets, the elimination of the remaining membranes presents three physiological possibilities: the expulsion immediately after the piglet birth; the concomitant expulsion of several membranes after the birth of the correspondent piglets and the expulsion of all fetal annexes until four hours after the parturition of the last product (GRUNERT; BIRGEL, 1982). Van Rens and Van Der Lend (2004) associated the duration of parturition with the duration increase in the expulsion of the placenta.

The present study had the purpose to correlate the placenta weight with the time of its expulsion and the piglet natimortality rate.

Material and Methods

The present study was conducted with swine hybrid (Landrace x Large White) and hyperprolific females at a piglet production farm, nearly to Curitiba (Paraná) – Brazil. The animals were raised in a cage system and were primiparous. The feeding was given twice a day, and was constituted of commercial pig ration for pregnancy; water was given *ad libitum*. Every female was submitted to artificial insemination with cold semen. They were followed by 90 parturitions, where the obstetric support was provided, the separation of placentas, the weighing and the counting of the piglet number and the classification of living, dead-born and mummified piglets. The placentas were weighed all together after their complete delivery, and by use of a commercial weight scale. In order to verify the natimortality the use of lung test was conducted, where the necropsy was executed and a fragment was extracted and placed in a water recipient. If the piece of lung floated, the newborn was considered dead-born. The time of the placenta expulsion was calculated from the expulsion of the last piglet until the expulsion of all annexes. As for the parameter of fetal mummification, the fetal structure (organogenesis structure) as well as the coloration (dark brown) was observed.

The data from dead-born fetuses/litter, placenta weight/litter and time of placental expulsion/sow were correlated among themselves by Spearman's correlation coefficient at a significance level of 5% (alpha = 0.05). It was performed by use of statistical *Software GraphPad Prism* version 3.00 for Windows, San Diego – California, USA.

Results

From the 90 parturient sows that had attendance during parturition there was birth of 1.088 piglets, 43 (3.95%) were dead-born and 20 piglets (1.83%) were mummified. The average number of piglets/litter was 11.3 ± 2.1 and the number of mummified fetuses / litter was 0.2 ± 0.5. The Spearman's correlation coefficient was applied to the variables placenta weight/litter, the number of dead-born fetuses/ litter (natimortality rate) as well as the elapsed time of placenta expulsion/sow, comparing them with each other.

Table 1: Correlation of dead-born fetuses/litter, placenta weight/litter and time of placenta expulsion/sow in hybrid swine Landrace x Large White, obtained in a swine farm nearly to Curitiba, Paraná. 2008 (n = 90).

	Dead-born fetuses/litter	Placenta weight/litter	Time of placenta expulsion/sow (total) (minutes)
Dead-born fetuses/litter	r = 1.0 (P=0.00)		
Placenta weight/litter	r = 0.3 (P = 0.90)	r = 1.0 (P=0.00)	
Time of placenta expulsion/sow	r = 0.4 (P = 0.30)	r = 0.5 (P = 0.15)	r = 1.0 (P=0.00)
(x ± s)	0.47 ±0.6	3210.2±762.3	164.3±84.0

The Spearman's correlation coefficient did not indicate significant correlation between the compared variables.

Discussion and Conclusion

The average of living piglets verified in the present study (Table 1) was higher than the one described by Sobestiansky et al. (1999), who reported a variation from 9.8 to 10.5 piglets of the litter. This research corroborates reports from Grunert and Birgel (1982), which describe rates equivalent to the ones reached in the present research (11.3).

Data related to the percentage of dead-born piglets per litter verified during the present experiment indicate the number of 0.47 that strongly differs from Cavalcanti (1987);

Kolb and Gürtler (1987); Lisboa (1996); Sobestiansky et al. (1998, 1999) and Jackson (2006) that report percentages of 8, 7, 10, 10, 10 and 6 respectively. Such findings can be justified just because all the parturient pigs were promptly attended during parturition, under the obstetrics assisted by qualified personnel, what guaranteed the excellent rates of living fetuses.

As for the number of mummified fetuses, Sobestiansky et al. (1999) informed that the acceptable rate in a litter may reach 1.5%, but in the present experiment was better, whose percentage was of 0.2%. Reports on the placenta weight and its relation to the natimortality in swine are infrequently (rare) in literature. Authors such as Van Rens and Van Der Lend (2004) state that the placenta weight is related to the birth interval among piglets, favoring the increase of perinatal mortality risk; that means a thicker and heavier placenta shall prolong the process of delivery. In data related to the present research there was no observed statistical correlation between the placenta weight and the dead-born rate (Table 1)**.** Van Rens et al. (2005) suggest that the selection to smaller and more efficient swine placentas collaborated to reduce the fetal mortality and the increase of size of the litter. These researchers also report that efficient placentas are generally smaller and more vascularized than thicker placentas. Still based upon this reasoning, Vianna et al. (2004) state that longer and heavier uterus have a larger potential to accommodate embryos, but at the final stage of the gestation where fetuses and placentas reach the maximum development, some fetuses suffer injuries or even die, due to the reduction of the area of contact between the placenta and the endometrium, or because of the uterine reduced space in relation to the size of the litter.

Data on time of expulsion of the embrionary membranes in swine are quite diverging between the reports of the searchers, varying from 159 minutes according to Van Rens and Van Der Lend (2004) to 750 minutes in accordance to data from Jones (1966); Dial et al. (1992) and Vale, Grunert and Birgel (2005). Our data about this variable (Table 1) sum up to 164 minutes that come close to the observation from Van Rens and Van Der Lend (2004).

When confronting the variables weight of placenta and placentary time of expulsion, as one of the purposes the present study no correlation was observed, although Van Rens and Van Der Lend (2004) refer that litters with thicker and heavier placentas demand more time of placentary expulsion. We concluded that the weight of placenta in swine of this farm did not interfere on the index of piglet natimortality as well as on the time of expulsion of the annexes.

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