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THE EFFECT OF WELL MANAGED EARLY PUERPERIUM ON REPRODUCTION AND MILK PRODUCTION OF HOLSTEIN-FRIESIAN COWS

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Abstract

This work is focused on the management of early puerperium, which has a role in reducing problematic reproduction of cows and preventing their future infertility or sterility.
According to our results help of a veterinarian was needed only in 6 cases out of 592 calvings, the remaining 452 cows calved without human help or with a slight human intervention. It is known, that difficult calving process might have a deleterious impact on postpartum status of the reproduction organs. Difficult calving can influence somatic cell count of the milk as well. Foot, finger, hoof and udder health after parturition also has impact on somatic cell number. Only 9% of the cows had increased body temperature, but it's a good indicator of complete health status of individual as well.
The long-term systematic management of puerperium reduces the possible problems by returning the cows to a further successful reproduction and it is economically beneficial for the farmer.
Key words: Holstein-Friesian cow, puerperium, problematic reproduction, sterility

Material and methods

592 Holstein-Friesian cows from a farm in Uhercice (Agrofert Group, a.s.) in their first and second and following lactations took part in our study, lasting from November 2009 to December 2010. Each cow was included in the study, and the aim of the diagnoses was to collect as many data about the cow's reproduction health and status as possible. The farm management is having a great interest in uterus involution and multilevel heat detection as the keys for the fast and effective return of cows to the reproduction process.

Rectal body temperature of each cow was measured in the morning on days 3th and 5th day after parturition. Each Wednesday a veterinarian investigated the whole population and described the health status in all aspects of each cow. Urine was collected for the further analysis, and its pH, the ketons and proteins were detected by orientation paper strips test as the description of the cows' metabolic profile. We have described the results by numbers for the statistical analyses in the following way: 0 – without a problem, normal; 1 slightly worst state, 2 worst level; 3 and 4 – infection, retention, antibiotics (when antibiotics required, the time animals being back to milk production gets longer). Simultaneously milk was collected for NK-test and determining somatic cell number (SCN), and the number of problematic udder quarters (1- 4) was registered. After immobilizing the cows foot and hoof status was judged and when necessary these were corrected, in some cases by a veterinarian. The scoring system for feet we've used is: 0 – correct foots; 1 – functional correction is necessary; 2 – problem, oedema, functional correction; 3 – oedema, antibiotics.

Vaginally, rectally and or by ultrasound we've examined the reproduction organs of each cow, using the following scoring system: 0 – physiological status; 1 – 1x application of antibiotics – slight smell in vagina; 2 – vaginal tissue smell, non-physiological status, antibiotics, 4 uterus boluses twice; 3 – retention, without decay tissue, antibiotics; 4 – increased temperature, retention, strong decay smell, antibiotics.

There's a central system in Czech Republic for describing the difficulty of partition in cows (called partition course in our analysis). There're three levels: 1 – without help or with slight help of a man; 2 –calving with a help of more persons or with professional help; 3 – parturition with a help of a veterinarian – repositions, Caesarean sections.

At last, information was collected about the calving interval of each cow (from parturition to parturition) and milk production in normal lactation (305 days).

Results and discussion

Analysing parturition difficulty in the investigated stock help of a veterinarian was necessary only in 6 cases out of 592 calvings *(Table I)*. Calving with more human helpers and with help of professional was necessary in 134 cows, and normal physiological parturitions with a slight help or without human intervention took part in 452 cases. Based by our results it's visible, that parturition complications directly correlate with the postpartum status of the reproduction organs in early puerperium, while increase in body temperature wasn't so intensive. Between the groups of cows with reproduction organ problems significant differences ($P \leq 0.01$) were found. Calving interval was not affected by difficult

calving. Difficult parturition is generally in 10,9% the reason for eliminating cows from farms (*Kvapilik et al., 2006*).

Table 1. **The early puerperium analysis based on course of parturition**

Cows n (ks)		Evaluated parameters						
		Temp. 3.d (°C)	Temp. 5.d (°C)	SCN (thnds)	Udder status	Rep. org.	Part. course	Calving interval
6	$\bar{x}$	39.03^{a}	38.93	1593.66	0.33	2.83^{A}	3	374.33
	s_x	0.38	0.58	1157.95	0.47	1.21	0	24.31
134	$\bar{x}$	38.93	38.95^{A}	921.88	0.73	1.54^{B}	2	415.12
	s_x	0.67	0.55	1413.60	1.08	1.19	0	66.16
452	$\bar{x}$	38.77^{a}	38.77^{A}	707.87	0.66	0.35^{AB}	1	403.95
	s_x	0.56	0.53	1203.10	1.06	0.69	0	61.56

a, b, c – (P≤0,05); A, B, C – (P≤0,01)

The decrease of SCN was parallel by the decrease in scores given to the average status of udder health. The cows were divided into groups based on SCN – over 1 million in 1 ml, SCN over 400 thousands in 1 ml and SCN under 400 thousands in 1 ml. It is considered to be excellent when SCN is under 400 thousands per 1 ml, and milk like this can be sold to milk factories: 2/3 of the cows in our study did belong to this category. Importantly, udder health status, calving interval and milk yield was not affected by SCN. Because of that, it's good to bear in mind, that according to a study *(Riha, 2000)* cows with SCN 200 – 400 thousands in 1ml have the highest chance for long producing live (*Table 2*.).

Table 2. **The early puerperium analysis based on SCN**

Cows n (ks)		Evaluated parameters							
		Temp 3.d (°C)	Temp 5.d (°C)	SCN (thnds)	Udder status	Rep. org.	Part. course	Calving interval (days)	Milk prod. (kg)
119	$\bar{x}$	38.81	38.85	2855.42^{AB}	1.66^{AB}	0.9	1.31^{a}	401.75	9192.01
	s_x	0.52	0.56	1486.01	1.33	1.13	0.51	64.78	1398.82
92	$\bar{x}$	38.79	38.79	642.04^{AC}	1.06^{AC}	0.73	1.35^{b}	406.69	9491.18
	s_x	0.59	0.43	184.85	1.17	1.10	0.52	61.01	1888.11
381	$\bar{x}$	38.81	38.80	142.23^{BC}	0.27^{BC}	0.58	1.20^{ab}	406.35	9302.13
	s_x	0.56	0.56	100.66	0.61	0.92	0.40	61.92	1536.16

a, b, c – (P≤0,05); A, B, C – (P≤0,01)

The health status of reproduction organs after parturition is directly affected by parturition difficulty. This is clearly visible in our results, when sorting cows depending on the health status of their reproduction organs based on the course of parturition: starting with the worst organ statuses scores decreased for indicating a better levels, i.e. an easier calving before. This finding is supported statistically by significant differences being (P≤0.01, P≤0.05) between groups for parturition course *(Table 3)*. Owing to the intensive care of early puerperium cows, only in 7 cases of all studied was found a strong infection with decay tissue in the uterus.

Table 3. The early puerperium analysis based on reproduction organs status

		Evaluated parameters							
Cows n (ks)		**Temp. 3.d (°C)**	**Temp. 5.d (°C)**	**SCN (thnds)**	**Udder status**	**Rep. org.**	**Part. course**	**Calving interval**	**Milk prod.**
7	$\bar{x}$	38.93	38.96	1804.28	0	4	2.28^{abC}	412.00	8082.14
	s_x	0.29	0.48	2083.81	0	0	0.69	58.84	2302.07
35	$\bar{x}$	39.18^{A}	39.09^{A}	1050.51	0.85	3	1.88^{DF}	447.00	8703.94
	s_x	0.72	0.53	1182.47	1.31	0	0.32	69.09	1434.36
82	$\bar{x}$	38.97^{B}	38.91^{b}	809.66	0.73	2	1.53^{aDEGH}	401.63	9165.13
	s_x	0.66	0.69	1330.19	1.15	0	0.55	59.53	1370.70
86	$\bar{x}$	38.92^{C}	38.96^{C}	791.45	0.68	1	1.28^{bEGI}	419.13	9196.08
	s_x	0.57	0.62	1312.01	1.10	0	0.47	69.32	1476.55
382	$\bar{x}$	38.71^{ABC}	38.73^{AbC}	704.71	0.63	0	1.09^{CFHI}	401.87	9432.01
	s_x	0.48	0.47	1204.78	1.02	0	0.30	60.32	1588.43

a, b, c – (P≤0,05); A, B, C – (P≤0,01)

The status of reproduction organs is connected with different strong inflammation processes causing increased body temperature. Between the non-problematic and problematic groups of cows there was a statistically significant difference (P≤0,01) in body temperature on the 3th and 5th day after parturition. *Riha (2003)* suggested, that increased milk performance leads to more reproduction problems in a herd. In a previous article *Riha (2000)* found, that higher SCN in the first half of lactation is correlated with higher frequency of endometritis, ovarian cysts and luteal cysts on ovaries.

Increased body temperature is an indicator of a health problem in animals. In our study 53 cows had increased body temperature on the 3th day after calving. The other cows had physiological normal – 37,5 – 39,5 °C - body temperature. On the 5th day after parturition 55 cows had increased temperature. Difference between these groups of cows was statistically significant (P≤0.01) (*Table 4*). An important finding that also there's a correlation with the state of reproduction organs and with parturition difficulties as well.

Table 4. **The early puerperium analysis based on body temperature 3th and 5th day**

Cows n (ks)		Evaluated parameters							
		Temp. 3.d (°C)	**Temp. 5.d (°C)**	**SCN (thnds)**	**Udder status**	**Rep. org.**	**Part. course**	**Calving interval (days)**	**Milk prod. (kg)**
53	$\bar{x}$	40.02^{A}	39.28^{A}	746.30	0.47	1.38^{A}	1.42^{a}	425.25	9401.15
	s_x	0.34	0.61	1272.31	0.83	1.12	0.49	62.19	1537.45
539	$\bar{x}$	38.69^{A}	38.77^{A}	767.16	0.69	0.57^{A}	1.23^{a}	404.55	9301.97
	s_x	0.41	0.51	1258.11	1.08	0.96	0.44	62.21	1575.78
55	$\bar{x}$	39.28^{B}	39.92^{B}	790.11	0.65	1.09^{B}	1.38^{b}	408.88	8835.42
	s_x	0.62	0.32	1231.25	1.18	1.05	0.52	54.29	1518.12
537	$\bar{x}$	38.76^{B}	38.69^{B}	762.75	0.67	0.60^{B}	1.23^{b}	405.56	9358.99
	s_x	0.52	0.42	1262.22	1.05	0.98	0.44	62.72	1570.27

a, b, c – (P≤0,05); A, B, C – (P≤0,01)

Conclusions

We have analysed in a typical lowland farm in Czech Republic in Holstein-Friesian how it is possible to detect fast the reproduction problems and prevent consequent infertility by well-managed systematic control of early puerperium. It's clearly visible, that only systematic help for cows immediately after calving can result in the first heat after 40 days, and the insemination and pregnancy after 60 days after parturition being achievable. Cooperation of veterinarians and farm management, and artificial insemination made by professional fertilizers can lead to increased reproduction and production parameters in a Holstein-Friesian herd. Reproduction problems affect milk performance only some of the parameters of milk production directly.

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