

# Body temperature drop in bitches prior to parturition: A reliable parameter for the prediction of parturition?

B. Geiser, O. Burfeind, W. Heuwieser and S. Arlt,

Clinic for Animal Reproduction, Faculty of Veterinary Medicine, FU Berlin, Germany  
www.tiergyn.de

## Introduction

One of several parameters addressing signs of parturition in dogs is a marked drop in body temperature approximately 24 hours before whelping (1, 2). In literature practitioners and owners are frequently advised to monitor body temperature. The predictive value of a temperature drop in bitches, however, still remains controversial (3,4).

The objective of this study was to determine sensitivity and specificity of a temperature decline in regard to the onset of parturition (5).

## Material and Methods

In this study 16 pregnant bitches of different breeds (bodyweight 3 to 63 kg) were enrolled. A temperature logger (DST micro-T, Star Oddi) was applied into the vagina between day 56 and 61 after estimated ovulation (n = 9) or first mating date (n = 7). The logger was programmed to measure temperature in 10 min intervals.



The temperature loggers were attached to a progesterone free modified Controlled Internal Drug Release device (CIDR-blank) and inserted via a sterile speculum.



Checking the position of the logger using a microchip scanner and transponder inside the CIDR-blank. The dogs were kept in their home environment with no restrictions to their individual daily exercise routine.

The logger was expelled spontaneously from the vagina before delivery of the first puppy. The differences between hourly averages of the temperatures in 24 h, 36 h and 48 h before were calculated. The diagnostic performance of a decrease in vaginal temperature to predict parturition within the next 24 h, 36 h and 48 h was tested using receiver-operating characteristics (ROC) analysis.

## Results

The mean onset of whelping of the bitches occurred  $62.1 \pm 1.8$  days after estimated ovulation date (n = 9) and  $60.6 \pm 1.9$  days after first mating (n = 7).

In the last 24 hours before parturition, mean temperature was lower ( $37.3 \pm 0.3$  °C) than 24 to 48 hours ( $37.6 \pm 0.2$  °C) and 49 to 72 hours ( $37.7 \pm 0.1$  °C) earlier.



Mean vaginal temperature of 16 bitches in the last 120 hours before parturition

Test performance in % (95% CI) of decrease in vaginal temperature measured over a 24 h period as a predictor of parturition within 24 h, 36 h and 48 h (n = 16).

	VT <sup>a</sup> ≥ 0.3°C	VT ≥ 0.3°C	VT ≥ 0.4°C
<b>Parturition within</b>	<b>24 h</b>	<b>36 h</b>	<b>48h</b>
<b>Sensitivity<sup>b</sup></b>	<b>58 (52-63)</b>	<b>53 (49-58)</b>	<b>69 (63-74)</b>
<b>Specificity<sup>c</sup></b>	<b>84 (81-86)</b>	<b>90 (87-92)</b>	<b>88 (84-91)</b>
<b>+ Predictive value<sup>d</sup></b>	<b>63 (57-68)</b>	<b>81 (76-85)</b>	<b>76 (70-81)</b>
<b>- Predictive value<sup>e</sup></b>	<b>80 (77-83)</b>	<b>70 (66-74)</b>	<b>83 (79-86)</b>
<b>AUC<sup>f</sup></b>	<b>0.72* (0.69-0.75)</b>	<b>0.74* (0.72-0.77)</b>	<b>0.80* (0.77-0.83)</b>

VT<sup>a</sup> = vaginal temperature; Sensitivity<sup>b</sup> = proportion of bitches that whelped within 24h, 36h and 48 h and showed a decrease in VT; Specificity<sup>c</sup>: proportion of bitches that did not whelp within 24h, 36h or 48h and did not show a decrease of VT; + Predictive value<sup>d</sup> = proportion of bitches that showed a decrease in VT and whelped within 24h, 36h and 48h; - Predictive value<sup>e</sup> = proportion of bitches that did not show a VT decrease and did not whelp within 24h, 36h and 48h; AUC<sup>f</sup> = Area under the curve; \* P < 0.01

## Conclusion

Although bitches may exhibit a decrease in body temperature around the time of parturition, detecting this decrease does not determine the onset of parturition precisely. Owners and veterinarians must be aware that the temperature decrease may be only 0.3°C or does not occur at all.

(1) England GCW, 2010: Genital surgery in the bitch and queen. In: Noakes DE, Parkinson TJ and England GCW, (eds). Veterinary reproduction and obstetrics, 9 ed. Saunders Elsevier, London, pp. 376-390.

(2) Verstegen-Onclin K and Verstegen J, 2008: Endocrinology of pregnancy in the dog: a review. Theriogenology 70, 291-9.

(3) Luvoni GC and Beccaglia M, 2006: The prediction of parturition date in canine pregnancy. Reprod Domest Anim 41, 27-32.

(4) Veronesi et al. 2002: Correlations among body temperature, plasma progesterone, cortisol and prostaglandin F2alpha of the periparturient bitch. J Vet Med A Physiol Pathol Clin Med 49, 264-268.

(5) Geiser B et al. 2014: Prediction of parturition in bitches utilizing continuous vaginal temperature measurement. Reprod DomestAnim 49, 109-114.