ABSTRACTS

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Validation of a device for continuous measurement of vaginal temperature in bitches

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OBJECTIVE: Measuring body temperature is considered a fundamental element within physical examination in veterinary medicine. The most common method for obtaining body temperature in animals is rectal thermometry (1). For research purposes continuous measurements may be advantageous and new technology permit exploring new methods of body temperature sampling (2, 3). One method of continuous temperature measurement in cows utilizes temperature loggers inserted into the vagina (4-6). Therefore, the objective of this study was to validate the application of temperature loggers to continuously measure vaginal temperature in bitches and to compare values obtained via rectal thermometry.

MATERIAL AND METHODS: The first experiment was performed in vitro, using a water bath, to compare temperature values measured by the loggers (DST micro-T, Star Oddi) with a calibrated liquid-in-glass thermometer as a gold standard. Twenty-six temperature loggers and the calibrated liquid-in-glass thermometer were placed into the same water bath. Every 10 min the temperature of the water bath was increased by 1.0 °C covering a range from 30.0 °C to 45.0 °C. From each of the temperature loggers 144 paired observations were generated and used for analysis. The second experiment consisted of 5 privately owned non-spayed bitches which were gynecologically healthy. To prevent movement in the vagina and potential displacement, temperature loggers were attached to a progesterone free modified Controlled Internal Drug Release device (CIDR-blank) for ewes. A sterile round speculum (Karl Storz, Germany) was inserted into the vagina. The temperature logger was pushed through the speculum using a sterile swab and placed approximately 18 cm deep in vaginal cavity. A transponder (Back Home Transponder, Virbac) was placed under the silicon lining of the CIDR-blank. Utilizing a reading device the transponder could be identified from the outside indicating the presence and position of the temperature logger in the vagina. The loggers were programmed to measure temperatures in 10 min intervals over a 3 day period. Rectal temperatures were measured with a digital thermometer (VT 1831, Microlife) and compared to the vaginal temperature measurements obtained by the logger at the same minute. To retrieve the temperature logger and the connected CIDR-blank, a vaginal endoscopy was performed using carbon dioxide insufflation to distend the vaginal cavity and a rigid endoscope consisting of a telescope and a sheath. The temperature logger attached to the CIDR-blank was pulled by means of flexible biopsy forceps.

RESULTS: In the in vitro experiment the mean difference between the temperature loggers and the gold standard was low (Mean ± SD = 0.1 ± 0.1 °C). A high association was found between the measurements of the temperature loggers and the calibrated liquid-in-glass thermometer (r = 1.0; P = 0.000). During the in vivo experiment, a total of 118 paired observations could be used to compare vaginal with rectal temperature. The vaginal and rectal temperatures were correlated (r = 0.79, P < 0.05). The mean difference between rectal and vaginal temperatures was low (0.0 ± 0.2 °C, rectal temperature: 38.1 ± 0.2 °C, vaginal temperature: 38.1 ± 0.3 °C, P = 0.07). The visual inspection of the vagina via endoscope after removal of the temperature logger did not show any macroscopic signs of inflammation of the mucosa. The mucosa was clear of any focal or disseminated redness, lesions or abnormal discharge. Exfoliative cytology, however, indicated an increase of neutrophil granulocytes.

CONCLUSIONS: We conclude that the utilized temperature loggers provide accurate and reliable data compared to the gold standard. When positioned in the vagina for a period of three days it causes no visual macroscopic side effects on the mucosa in bitches. This method offers an easy and comfortable way of sampling continuous body temperature in bitches with minimal human interference.