Proceedings of the
8th International Symposium
on Canine and Feline Reproduction
ISCFR

June 22-25, 2016
Paris, France

In a joint meeting with the XIX EVSSAR Congress

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Physiological and technical factors affecting the accuracy of parturition date prediction by fetal biparietal diameter measurement using ultrasonography

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Measurement of fetal biparietal diameter to predict parturition date in small animal practice has gained growing interest from veterinary practitioners in recent years. The objectives of this study were to evaluate factors that affect the accuracy of predicting parturition date using fetal biparietal diameter (BPD) measurements substituted into formula for small-sized bitches (1-10 kg) reported by Luvoni and Grioni (2000) [1]. In a group of 95 pregnant bitches consisting of 9 breeds, 138 ultrasound scans were performed to determine if physiological factors and technical factors affected the accuracy of predicting parturition date. Physiological factors observed included maternal age, body weight before mating (BW), litter size (LS) and gestational age (GA). Technical factors of ultrasound measurement were intraobserver and interobserver reproducibility of BPD measurement as well as the number of BPD measurement (1 or >1) in a pregnant bitch. The accuracy of the prediction was recorded as 1, 2, 3 or 4; for example, 1 = within ±1 days of the difference between predicted and actual parturition date. Data were analyzed using SAS® version 9.0 (SAS Institute Inc., Cary, NC, USA). Spearman's rank correlation coefficient was used to test for correlation between physiological factors and the accuracy of prediction. Paired-t test were used to see if there was any significant differences in technical errors of fetal BPD measurement. Mean (±SD) maternal age (year), BW (kg), LS and GA (weeks) were 2.6±2.0, 3.5±1.9, 3.0±1.5 and 8.0±1.0, respectively. Overall, the accuracy of predicting parturition date in our study population was within 1.22±1.37 days. The analysis showed that only maternal age had a positive correlation with the accuracy of parturition prediction (r=0.225, p=0.008). No significant differences were found concerning intraobserver (p=0.542) and interobserver reproducibility (p=0.591) of BPD measurement, indicating that ultrasonographic measurement of fetal BPD is highly reliable. The number of BPD measurement (1 or >1) substituted into the formula had no effect (p=0.521) on the accuracy of predicting parturition date. This suggested that BPD measurement of one fetus is sufficient to substitute into the formula. Multiple regression analysis revealed that BPD (p<0.0001), BW (p<0.0001) and GA (p<0.0001) significantly influenced the number of days before parturition, but not maternal age (p=0.08) and LS (p=0.15). In conclusion, although predicting parturition date using the formula used in this study was highly acceptable (1.22±1.37 days), the effect of maternal age should be taken into consideration.