

1. [Accuracy of a Flash Glucose Monitoring System in Dogs with Diabetic Ketoacidosis](#)

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Accuracy of a Flash Glucose Monitoring System in Dogs with Diabetic Ketoacidosis  
28th ECVIM-CA Congress, 2018  
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A factory-calibrated flash glucose monitoring system (FGMS) (FreeStyle Libre, Abbott, UK) was recently evaluated in stable diabetic dogs. The aims of this retrospective study were to assess the performance of the FGMS in dogs with diabetic ketoacidosis (DKA) and to determine the effect of body condition score (BCS), perfusion, severity of ketosis and acidosis on the accuracy of the device.

FGMS was placed in a clipped and clean area on the dorsal part of the neck of dogs with DKA within 14 hours from the presentation. The interstitial glucose measurements were compared with blood glucose (BG) measurements, obtained by a validated portable glucometer (Optium Xceed, Abbott, UK). Overall accuracy was determined by fulfillment of ISO 15197:2013 criteria, calculating mean absolute difference (MAD), mean absolute relative difference (MARD), median absolute relative difference (mARD), mean relative difference (MRD), percentage of results within  $\pm 15$  mg/dL of the BG value for glucose  $< 100$  mg/dL and within  $\pm 15\%$  of the BG value for glucose  $\geq 100$  mg/dL. Clinical accuracy was also illustrated using Parkes error grid and Bland-Altman plot. Sensor performance during changes in metabolic variables (lactate,  $\beta$ -hydroxybutyrate, pH and bicarbonate) was evaluated using Spearman's rank correlation.

Four hundred eighty-five paired results from 14 diabetic dogs with DKA were available for analysis. Good agreement between interstitial glucose measurements and BG was obtained ( $r=0.86$ ; slope 0.88, intercept=18.37 mg/dL,  $r^2=0.72$ ). Clinical accuracy of FGMS was demonstrated, with 63.9% of results in zone A and 99.8% of results in zones A and B. Overall MARD was 18.9%, mARD was 16.6%, MRD was -4.4%; the percentage of values within 15 mg/dL or  $\pm 15\%$  was 48%. In the low glucose range, BG  $< 100$  mg/dL ( $n=26$ ), MAD was 24.9 mg/dL; in the higher glucose range, BG  $\geq 100$  mg/dL ( $n=459$ ), MARD was 18.4%. Variations of lactate,  $\beta$ -hydroxybutyrate, pH and bicarbonate did not affect sensor performance. A significant interpatient variability in the accuracy of the device was observed (Kruskal-Wallis test,  $p<0.0001$ ); FGMS tends to overestimate the glucose level in dogs with BCS  $\leq 3$  and to underestimate in dogs with BCS  $\geq 7$ .

Despite the ISO 2013 requirements were partially fulfilled, FGMS provides clinically accurate estimates of BG in dogs with DKA. Accuracy of the system was apparently unaffected by metabolic variables, making it suitable not only for stable diabetic dogs, but also for dogs with DKA.

**DISCLOSURES**

No disclosures to report