

ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA DIPARTIMENTO DI SCIENZE MEDICHE VETERINARIE Dottorato di ricerca in Scienze Veterinarie Candidato: Francesca Del Baldo Tutor: Prof. Federico Fracassi Curriculum: Scienze cliniche Ciclo: XXXII-III° anno



VALIDATION OF HUMAN IMMUNOTURBIDIMETRIC ASSAYS FOR THE MEASUREMENT OF GLYCATED HEMOGLOBIN (HBA1C) AND SERUM FRUCTOSAMINE IN DOGS AND COMPARISON OF THE TWO VARIABLES FOR THE ASSESSMENT OF GLYCEMIC CONTROL IN DOGS WITH DIABETES MELLITUS

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OBJECTIVE To evaluate the analytical performances of two assays for serum frucostamine (SF) and glycated hemoglobin (HbA1c) measurement in dogs and to compare the ability of SF and HbA1c to reflect glycemic control (GC) in dogs with diabetes mellitus.

DESIGN Prospective study.

ANIMALS Forty healthy dogs, 23 anemic, normoglycemic non-diabetic dogs and 200 re-evaluations of 46 diabetic dogs.

PROCEDURES Colorimetric and immunoturbidimetric methods were used for SF and HbA1c, respectively. Linearity and precision were determined. The ability of SF and HbA1c to reflect GC were evaluated using a clinical score as a reference method. Correlation among the two variables and the clinical score was studied; cut-off values obtained from the receiver operating characteristic curves were used to identify the percentage of dogs well classified by the two glycated proteins. **RESULTS** The average intra- and inter-assay coefficients of variation were 3.8% and 2.5% respectively for SF, and 1.2% and 1.8% respectively for HbA1c. Excellent linearity was obtained for both assays (R^2 >0.99). SF and HbA1c were significantly correlated with the clinical score (R^2 =-0.40; R^2 =-0.33, respectively) and they correctly identified GC in 50% and 44% of cases, respectively.

CLINICAL PERFORMANCES OF FLASH GLUCOSE MONITORING SYSTEM IN DIABETIC DOGS F. Del Baldo, C. Canton, S. Testa, S. Golinelli, F. Fracassi

Flash glucose monitoring system (FGMS, FreeStyle Libre®) was recently validated for use in diabetic dogs (DD). It continuously measures the interstitial glucose concentrations for up to 14 days. The aim of this study was to evaluate the clinical usefulness of FGMS in monitoring DD.









CONCLUSIONS AND CLINICAL RELEVANCE The SF and HbA1c assays were precise and linear and are suitable for routine use in veterinary medicine; however, they perform poorly in classifying GC in diabetic dogs.

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Twenty DD on insulin treatment were prospectively enrolled in the study. The FGMS was placed on the neck for up to 14 days. During the 1st-7th-14th days, blood glucose curves (BGCs) have been performed simultaneously in the hospital with FGMS and a validated portable blood glucose meter (PBGM) (Optium Xceed, Abbott®). During the 5th-6th and 12th-13th days the owners performed a BGC using the FGMS at home. The BGCs performed with PBGM and FGMS in hospital and those performed with FGMS at home and in hospital were compared. Each BGCs has been evaluated as optimal considering: 1) 50% of the values between 90-250 mg/dL or 2) glucose nadir between 90-180 mg/dL. The glucose nadirs obtained from the data downloaded by the software (DDS), the FGMS scans and the PBGM were compared. Moreover, the glucose day-time (GDTNs) and night-time nadirs (GNTNs) were compared.

The evaluation of the BGCs performed in hospital with FGMS and PBGM, led to the same decision on insulin adjustment in 77% and 80% of cases considering the percentage of values in the range 90-250 mg/dL and the glucose nadir, respectively.

The evaluation of the BGCs performed at home and the following day in the hospital with the FGMS, led to the same decision of insulin adjustment in 68% and 64% of cases considering the percentage of values in the range 90-250 mg/dL and the glucose nadir, respectively.



SURVIVAL ESTIMATES AND OUTCOME PREDICTORS IN DOGS WITH NEWLY DIAGNOSED DIABETES MELLITUS A. Tardo, F. Del Baldo, M.Pietra, R. Chiocchetti, F. Fracassi

Diabetes mellitus (DM) is one of the most common endocrine disorders in dogs, but prognostic factors are still largely unknown. The aim of this retrospective, single centre, case series study was to determine overall survival time and identify the prognostic value of several clinical and clinicopathological parameters in dogs with newly diagnosed DM. Cases of DM were identified within the electronic medical records from one referral centre. Sixty-eight dogs with DM were included. The median survival time was 964 days (range 22-3140). Cox proportional hazards models were used to analyse variables associated with survival. In multivariable model analysis, survival time was significantly shorter for dogs with higher haematocrit (HR 1.06, 95% CI 1.00-1.13) and higher serum phosphate concentrations (HR 1.21, 95% CI 1.04-1.42). Serum phosphate concentrations were above the reference range in 24/65 (37 per cent) of dogs. Serum fructosamine, blood glycated haemoglobin concentrations, the presence of ketoacidosis or pancreatitis were not associated with survival time.





The glucose nadirs were identified in 81% of cases by the DDS and in 65% and 35% of cases using FGMS scans and PBGM, respectively. The medians of GNTNs were significantly higher than the GDTNs.



The hypoglycemic episodes obtained from the DDS were 39% more than those immediately showed on the display of the FGMS.

In conclusion, adjustments in insulin dose based on BGCs obtained with FGMS and with PBGM are similar. The FGMS detects the nadirs and the hypoglycemic episodes more frequently than PBGM and it allows the assessment of glucose variations also during different consecutive days. Therefore, FGMS is a potentially valuable tool in the monitoring of canine diabetes mellitus.







