

ESVE-P-12**Use of tandem mass spectrometry (LC-MS/MS) for the measurement of thyroid hormones in dogs with spontaneous hypothyroidism**

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In human medicine liquid chromatography tandem mass spectrometry (LC-MS/MS) is actually considered the "gold standard" for measurement of many hormones concentration and it is widely used in clinical practice; its diagnostic performance has never been investigated in dogs with hypothyroidism (DWH).

The aim of this study was to determine whether serum concentrations of fT_4 , fT_3 , rT_3 , $3.3-T_2$, $3.5-T_2$, measured with LC-MS/MS, were able to differentiate DWH (n=13) from dogs with non-thyroidal illness (DNTI) (n=12), septic dogs (SD) (n=12) and healthy dogs (HD) (n=12).

Hypothyroidism was diagnosed based on consistent clinical signs, laboratory findings, total T_4 (TT_4) and cTSH concentrations below and above the reference interval (RI), respectively; in dogs with normal cTSH, a rhTSH stimulation test was performed to confirm the diagnosis. In DNTI, hypothyroidism was excluded upon a negative result of a rhTSH stimulation test. SD were diagnosed based on alteration of temperature, cardiac and respiratory frequency, differential leukocyte count and C-reactive protein concentration above RI. HD were considered healthy upon history and physical examination. Hormones evaluation were performed with LC-MS/MS on surplus serum stored at -80°C . TT_4 and cTSH were measured using a validated immunoassay (Immulite[®]).

Non-significant differences considering signalment, age and body weight were found between groups.

Median TT_4 and fT_4 serum concentrations were significantly higher ($p<0.001$) in HD compared to DNTI, DWH and SD. Median fT_3 serum concentration was significantly lower in DWH and DNTI compared to SD ($p<0.001$ and $p=0.0091$, respectively) and HD ($p<0.001$ and $p=0.0024$, respectively). Median rT_3 serum concentration was significantly lower in DWH compared to SD ($p=0.0141$) and HD ($p=0.0128$). Median $3.3-T_2$ serum concentration was significantly higher in DWH compared to DNTI ($p=0.0038$) and HD ($p=0.0447$). There were non-significant differences regarding median $3.5-T_2$ serum concentrations among the dogs of the four groups.

Using the ROC curve analysis to differentiate DWH from DNTI+SD an AUC of 0.86 ($p=0.003$), 0.76 ($p=0.009$) and 0.75 ($p=0.012$) was obtained for fT_3 , fT_4 and TT_4 , respectively. Values of $fT_3 < 0.61\text{pmol/L}$ better discriminated hypothyroidism with 69% sensitivity (95%CI: 39-91%), 83% specificity (95%CI: 63-95%) and accuracy of 0.86 (95% CI: 0.74-0.98).

Although serum fT_3 and fT_4 (LC-MS/MS) have shown better performances than the serum TT_4 (Immulite[®]) in identifying DWH, the overlap between DWH and DNTI+SD was unfortunately relevant also for the thyroid hormones measurements with LC-MS/MS. Despite the introduction of new analytical methods, the use of dynamic tests (e.g. rhTSH stimulation test) remains the better method to discriminate DWH from DNTI.

Disclosures

No disclosures to report.

ESVE-P-13**Accuracy of a flash glucose monitoring system in dogs with diabetic ketoacidosis**

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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 ± 15 mg/dL of the BG value for glucose < 100 mg/dL and within $\pm 15\%$ of the BG value for glucose ≥ 100 mg/dL. Clinical accuracy was also illustrated using Parkes error grid and Bland-Altman plot. Sensor performance during changes in metabolic variables (lactate, β -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, β -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.