

Indirect detection of passive immune transfer in puppies

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Introduction

Deficit of passive immune transfer has been characterized in puppies by a blood concentration of immunoglobulins G (IgG) below 2.3 ng/ml at the age of two days [1]. Nevertheless, since IgG assay is usually performed by ELISA, IgG concentration is of difficult access in practice. The objective of this study was to evaluate the diagnostic value of parameters that can be easily measured and provide a rapid result to allow the identification of puppies in deficit of passive immune transfer.

Materials and methods

A total of 62 purebred puppies born from 21 bitches within one breeding kennel were weighed at birth (D0) and at two days of age (D2). They were allowed to freely suckle. Growth rate D0-D2 was calculated as (Weight Day 2 – Weight Day 0)/Weight Day 0 x 100. On jugular blood collected at Day2, were assayed: IgG (Dog ELISA Quantitation set, Bethyl Lab, Montgomery, USA), gamma glutamyl transferase (GGT), Alkaline Phosphatase (PAL) and total proteins (enzymatic automated assay, Vitros 350). Optical density was measured on serum and urine (refractometer Atago T2-NE, Atago, Tokyo, Japan). Glucose concentrations were assayed in a drop of blood obtained by pricking the marginal ear vein using disposable test strips and a portable device (Freestyle Optium, Abbott, Illinois, USA). Linear regression was tested between blood IgG concentration and the seven other parameters listed above. For parameters found significantly associated with IgG concentration, ROC (Receiver Operating Characteristics) curves and Youden indexes were used for evaluation of their diagnostic value (for passive immune transfer detection). Differences were considered significant when $p < 0.05$.

Results

Were found significantly correlated with blood IgG concentration at Day2: blood PAL concentration ($r=0.482$), blood GGT ($r=0.687$), urine specific gravity ($r=0.403$) and growth rate over the first two days ($r=0.595$). No significant correlation appeared with total protein concentration, serum optic density, nor with glycemia. PAL, GGT activities, specific urinary density and growth rate were significantly lower for puppies in deficit of passive immune transfer (blood IgG < 2.3 g/l) compared with puppies having reached a sufficient transfer. Nevertheless, only GGT activities and growth rate over the first two days were found of good diagnostic values. GGT activity, with a threshold at 62 U/l, exhibited a 87.5% sensitivity and 80.0% specificity, with a Youden index of 0.7. The threshold for growth rate was -9.1%, associated with a 89% sensitivity and 71.4% specificity (Youden 0.6) for detection of passive immune transfer.

Conclusion

Puppies in deficit of passive immune transfer can thus be identified in practice by GGT activity evaluation and by simple weighing of puppies. These easy and low-cost tools allow to identify those puppies at higher risk of neonatal mortality and thus requiring specific care.

[1] Mila et al 2014 Prev Vet Med 116:209-213.



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