Original Article

Canine and Feline Haematology Analysis: Comparative Performance of Technicon H*1 and AVL MS8 VET Analysers

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Abstract. The performance of a prototype AVL MS8 VET impedance haematology analyser was compared with that of a Technicon H*1 flow cytometry haematology analyser using blood from dogs and cats. Analysis was performed with the AVL MS8 VET on the day of blood collection and with the Technicon H*1 on the following day. Differences were noted in feline leukocyte and platelet counts and in canine and feline mean cell volume and mean cell haemoglobin concentration between analyses. The results indicate that the AVL MS8 VET is a reliable analyser for blood samples from dogs but may not be for those from cats. Attention is drawn to the importance of considering the type of analyser, calibration of the analyser, time of analysis after blood collection (effect of postal delay) and the effect of anticoagulants.

Keywords: Cat; Dog; Impedence analysis; Flow cytometric analysis; Pseudoleucocytosis; Pseudothrombocytopenia; Macrocytosis; Postal transportation

Introduction

There is increasing awareness of the value of in-house clinical haematology and biochemistry analysis by veterinary practitioners. Patient care and clinical diagnosis may be improved with rapid sample analysis.

A variety of automated haematology analysers is now available for the rapid analysis of small volumes of blood. Many are specifically designed to analyse human blood samples and although they provide accurate and reproducible results from human blood (Brittin et al. 1969; Pinkerton et al. 1970) they often fail to provide accurate data for non-human specimens (Kimball et al. 1992). In addition, manufacturers and distributors are frequently unable to provide information on the performance of these machines with blood from other species.

The AVL MS8 VET uses the principle of impedance measurement and enhances it with ‘time slicing’ technology to create cell deformation profiles, and permit differentiation of overlapping red cell and platelet populations. As each cell traverses the detector aperture, multiple measurements are taken, and this improves cell identification and measurement. The AVL MS8 VET is fully automated and provides a complete blood count, together with a three-part leucocyte differential count. Distribution histograms are available for erythrocytes, leucocytes and platelets. Indicators for eosinophils and other blood constituents endow the analyser with a high level of screening efficiency. The analyser features five ‘banks’ of blood sample types, which contain predetermined threshold and lyse settings for the relevant cell types. Selection of the appropriate ‘bank’ then allows the analysis of blood from different animal species, or calibration with controls.

The Technicon H*1 utilises the principle of automated cytochemistry coupled with flow cytometry to perform a complete blood cell count and differential counts of leucocytes. It has been fully evaluated using rodent and canine blood (Andrews and Mifsud unpublished data; Davies and Fisher 1991) and provides precise and accurate results of complete blood counts over the extended analytical range required for analysis.
of samples from laboratory animals (Kimball et al. 1992). Leucocyte analysis is performed simultaneously in two channels. In one channel the cells are characterised by a combination of cell size and myeloperoxidase activity, and in the other channel by resistance to acid lysis (of basophils) and nuclear lobularity. Sizing of erythrocytes and platelets is carried out by integration of scattered laser light. This analyser provides comprehensive displays of the complete blood count, differential leucocyte data and variations in morphology.

This paper compares the results of analysis of canine and feline blood samples using a prototype AVL MS8 VET operated in a veterinary practice with those obtained following analysis of aliquots of the same samples 24 h later using a Technicon H*1 employed in a routine toxicology laboratory.

Materials and Methods

The AVL MS8 VET (Melet-Schoesing Laboratories, Cergy, Pontoise, France) was assembled and operated at the West Bar Veterinary Hospital, Banbury, in accordance with the manufacturers’ instructions. Quality assurance and calibration were performed at the advised levels using Dade Control Blood Plus (Baxter Healthcare Ltd, Thetford, Norfolk, UK).

The Technicon H*1 (Bayer Diagnostics Ltd, Basingstoke, UK) with veterinary software version 2.0.0015 has been in use within the Toxicology Department of Glaxo Research and Development Ltd (GRD), Ware, Hertfordshire for some years. Standardisation and quality control was carried out using stabilised human blood (Calchex and Paratech, Alpha Laboratories, Eastleigh, Hampshire, UK). When analysing cat samples, threshold values for erythrocyte volume and haemoglobin distribution were adjusted to very high and very low settings so that ‘flagging’ of extreme values would not occur.

Blood was collected from clinical cases at West Bar Veterinary Hospital and analysed on the same day with the AVL MS8 VET. A total of 67 dogs and 41 cats were sampled by jugular puncture using either a 23 or 21 gauge needle and 5 ml syringe. A few samples from dogs over 30 kg were collected from the cephalic vein.

Blood was transferred to 1.3 ml tubes containing tripotassium ethylenediaminetetra-acetic acid (EDTA) (Sarstedt Ltd, Leicester, UK) and gently mixed for several seconds. A replicate of each blood sample was also sent within 4 h of collection by first class postage to GRD for analysis on the following day. Immediately before analysis in either machine, samples were again thoroughly mixed.

The following were obtained from a single analysis by each analyser: haemoglobin concentration, erythrocyte count, leucocyte count, mean cell volume (MCV), mean cell haemoglobin concentration (MCHC), platelet count and mean platelet volume (MPV; dogs only). Differential leucocyte counts were not performed.