

Analytic Errors in Hematology Results

Blood samples from a 14-year-old dog with marked leukocytosis with atypical cells were submitted to a diagnostic laboratory. Chronic T-cell lymphocytic leukemia (CLL) was diagnosed via blood smear evaluation and flow cytometric optic phenotyping. RBC count was higher by flow cytometry (RBC-O) than by electric impedance (RBC-I), which resulted in an $\approx 37\%$ analytic error. RBC-I correlated well with the manual count. Overestimation of RBC-O may have been caused by incorrect classification of leukemic cells or fragments as reticulocytes, or *pseudoreticulocytosis*. The automated relative reticulocyte

count was 35.3% as compared with a manual count of $<1\%$.

Regarding packed cell volume, there was a 5% difference between manual packed cell volume and hematology analyzer hematocrit. RBCs appeared trapped in the buffy coat, which caused a pink hue in the separation area. Pseudoreticulocytosis, although not completely understood, must be considered when assessing the regenerative nature of anemia in canine CLL cases. However, hemoglobin concentration was not affected by cell-related artifacts and may be the best way to assess CLL-related anemia in dogs.

Commentary

Analytic errors in hematology testing might be detected by quality-control procedures performed by the laboratory technologist and/or analyzer software. This study highlighted the importance of carefully reviewing reported results and

performing bedside tests to complement the CBC. Centrifugation of blood in microhematocrit tubes is helpful to confirm packed cell volume/total solids and to inspect the appearance of patient buffy coat and plasma color. Manual blood smear inspection allows verification of platelet number as well as detection of band neutrophils, platelet clumps, intracellular parasites, autoagglutination, toxic change, and changes in RBC conformation; thus, manual blood smear inspection greatly increases the diagnostic utility of a CBC. Without close inspection of hematology results, errors such as those in this report might be overlooked, which could delay diagnosis and proper treatment.—*Julie Walker, DVM, DACVECC*

Source

Novacco M, Martini V, Grande C, Comazzi S. Analytic errors in Sysmex-generated hematology results in blood from a dog with chronic lymphocytic leukemia. *Vet Clin Pathol*. 2015;44(3):337-341.

Evaluating Otitis Externa

Otitis externa is among the most common skin diseases of dogs. In this study, investigators compared 2 methods for evaluating histologic changes in the external ear canal. Normal ear tissue ($n = 53$ ears) was harvested from cadaver dogs, and affected tissue was harvested from dogs undergoing surgery for end-stage ear disease ($n = 20$ ears). Tissue was routinely processed and stained with hematoxylin and eosin.

For subjective scoring, the entire ear specimen was examined; the dermis,

epidermis, and appendages were considered. For objective scoring, photomicrographs were taken of 3 randomly selected fields with a $10\times$ objective lens. A free software program called ImageJ was used to measure the thickness of the epidermis, dermis, and area and diameter of the lumen of ceruminous and sebaceous glands. Subjective and ImageJ measurements correlated for epidermal hyperplasia, ceruminous gland dilation, and hyperplasia and tissue inflammation.

Commentary

This article described a new use for ImageJ, an image-processing program used extensively in research. Clinicians do not generally obtain biopsies to evaluate otitis severity or treatment response but to evaluate patients based on subjective evaluation of gross

changes. The primary value in using ImageJ for otitis evaluation would be in clinical treatment trials. Most otitis evaluation is done through subjective means. Although subjective measurements showed good correlation to severity of ear disease, objective measurement offers additional benefits such as allowing for independent review. Validating an objective otitis measurement tool will hopefully raise the bar in clinical trials and result in more rigorous product evaluation.—*William Oldenhoff, DVM, DACVD*

Source

Zur G, Lement E. Use of ImageJ software for histomorphometric evaluation of normal and severely affected canine ears. *Can J Vet Res*. 2015;79(4):316-322.