

Potential Biomarkers of Systemic Inflammatory Response

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In the Literature

Rejec A, Butinar J, Gawor J. Evaluation of complete blood count indices (NLR, PLR, MPV/PLT, and PLCRi) in healthy dogs, dogs with periodontitis, and dogs with oropharyngeal tumors as potential biomarkers of systemic inflammatory response. *J Vet Dent.* 2017;34(4):231-240.

FROM THE PAGE ...

Periodontal disease and oral neoplastic conditions can exhibit both local and systemic effects. A systemic inflammatory response can be elicited by dissemination of bacterial metabolic products in the case of periodontal disease or by secretion of proinflammatory and anti-inflammatory cytokines/chemokines by tumors, thus attracting leukocytes.

This retrospective study aimed to identify potential systemic inflammatory markers within the parameters of the different cell types measured on a CBC. In humans, the neutrophil:lymphocyte ratio (NLR), platelet:lymphocyte ratio (PLR), mean platelet volume:platelet ratio (MPV/PLT), and platelet large cell ratio index (PLCRi) have been identified as biomarkers of systemic inflammatory response and potentially as prognostic/diagnostic biomarkers in both inflammatory and neoplastic conditions, including those of the head and neck region.

Neutrophils are the first leukocytes to circulate in response to systemic inflammation, and lymphopenia has been accepted as a negative prognostic indicator in humans with some types of cancer. A high NLR, another negative biomarker in human cancer patients, demonstrates an enhanced neutrophil response and relative lymphopenia.

Platelets play a role in biologic progression and metastatic spread of tumors; PLR, MPV/PLT, and PLCRi are all biomarkers of platelet activation. The potential value of these indices in companion animals has yet to be determined.

Three populations of dogs were evaluated in this study: healthy dogs, dogs with periodontal disease, and dogs with oral tumors. The results ultimately were not supportive of systemic inflammatory response assessment by CBC indices in dogs with periodontal disease. However, 2 indices (ie, NLR and PLCRi) were associated with oral neoplastic conditions and could potentially be used as biomarkers of systemic inflammatory response if given further investigation.

... TO YOUR PATIENTS

Key pearls to put into practice:

- 1** Periodontal disease and oral tumors can elicit both local and systemic inflammatory responses.
- 2** Understanding how CBC parameters in conjunction with other diagnostics may indicate systemic inflammation can be useful in developing a list of differential diagnoses.
- 3** The conclusions of this study are limited by the retrospective design. Prospective studies are needed before these results can be clinically applied. Further studies could support the use of CBC evaluation as a cost-effective tool for therapeutic decision-making and identification of prognostic biomarkers.