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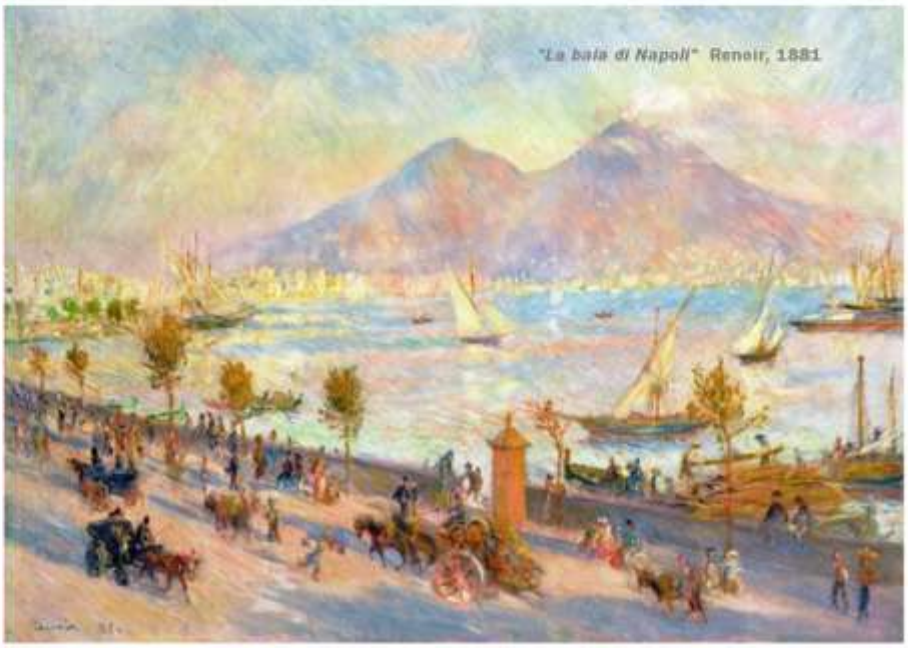

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ERYTHROCYTE AND LEUKOCYTE MODIFICATIONS IN CANINE SYSTEMIC INFLAMMATORY RESPONSE SYNDROME

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Systemic Inflammatory Response Syndrome (SIRS) is the manifestation of the systemic response to an infectious or non-infectious disease with a massive release of inflammatory mediators. Criteria for SIRS diagnosis in dogs have been previously reported [1]. The aim of this study was to evaluate the association between hematological modifications in canine SIRS and the severity of patient's condition and outcome.
This retrospective study included 3 groups of dogs: 90 with SIRS, 50 healthy, and 50 with chronic disease admitted to the Veterinary Teaching Hospital. A SIRS grading was obtained based on how many criteria were fulfilled. Another clinical score (APPLE FAST)[2] was applied on 50 of 90 dogs of the SIRS group. Survival rate has been assessed after T7 and T15 days from admission. Dogs with a positive cytology or culture were recorded as septic. Dogs hospitalized due to hemolytic or hemorrhagic disorders were excluded. Presence of anemia and nRBCs (nucleated RBC), neutrophil/lymphocyte ratio (NLR), SIRS grading and APPLE FAST were compared to outcome (t-test, chi-square test) and between groups (ANOVA test).
The following dogs with SIRS were sub-grouped using the SIRS score: 47.8% in 2/4, 31.1% in 3/4, and 21.1% in 4/4. Fifty-one dogs (56.5%) died within T15. SIRS group was divided into septic (n=32; 35.5%) and non-septic dogs (n=58; 64.4%). APPLE FAST scores > 25 ($p=0.03$) and SIRS grading >2 ($p=0.001$) were associated with poor outcome. No statistically significant differences were found between hematological alterations and SIRS grading or APPLE FAST score. In the SIRS group, anemia was present in 51 dogs (56.6%) and it was not associated with outcome. Mild (55%), microcytic (55%), and normochromic (92%) anemia was the most represented. Among 51 anemic dogs in the SIRS group, 84% showed non-regenerative anemia, based on the reticulocyte count. Dogs with SIRS showed lower values of RBC, HCT and HGB compared to the other two groups ($p<0.0001$). Twenty-two over 90 dogs (24.4%) showed circulating nRBCs. The nRBC count was significantly higher in SIRS group compared to healthy dogs ($p=0.0007$). In SIRS group, the occurrence of circulating nRBCs was associated with poor outcome ($p=0.005$). NLR was significantly higher in SIRS group compared to control groups ($p=0.0001$) and not associated with outcome. NLR was significantly lower in septic dogs ($p=0.02$).
Dogs with SIRS showed a significant reduction of RBC, HCT and HGB compared to healthy and chronic dogs. A mild non-regenerative anemia was the most frequent type of anemia. This type of anemia is typical of chronic disease, but in SIRS might be a common feature due to concurrent or acute decompensation of a chronic state. To our knowledge, this is the first study showing that dogs with SIRS had a higher NLR, suggesting its usefulness as acute inflammatory marker. APPLE FAST score and SIRS grading may help the clinician as prognostic tools for critically ill dogs. During SIRS, presence of nRBCs in peripheral blood could occur due to the damage of the blood-bone marrow barrier with the release of immature erythroid cells and could be considered a negative prognostic factor for canine SIRS patients.

[1] Hauptman. Evaluation of the sensitivity and specificity of diagnostic criteria for sepsis in dogs, Vet Surg,26:393–7, 1997. [2] Hayes, The acute patient physiologic and laboratory evaluation (APPLE) score: a severity of illness stratification system for hospitalized dogs, JVIM, 24(5):1034–47.