C-Reactive Protein Testing in Dogs

Like humans, the major acute phase protein (APP) in dogs is C-reactive protein (CRP). In normal animals, CRP is expressed at negligible levels. After stimulation during the acute phase response, 100-1000 fold increases in this protein are commonly observed. CRP, like other APP, forms the cornerstone of the innate immune response. This protein is produced on the track to inflammation in response to a variety of stimuli including neoplasia, trauma, infection, and stress. In other species including humans, these markers have been well shown to have prognostic value as well as a key test in a routine wellness exam.

Recently, our laboratory was involved in a collaboration with a local veterinary specialty practice to examine the application of CRP testing. This practice sees a variety of clinical presentations — both acute and chronic. CRP levels were contrasted to total white blood counts. A large sample size of clinically normal and abnormal dogs of various ages and breeds were examined. Whereas the mean total WBC count only increased 1.7 fold in the clinically abnormal groups and often did not exceed normal reference intervals, a 21 fold mean increase in CRP was observed across all clinical presentations. As negligible levels are present in normal animals, the magnitude of increase in CRP levels makes for an enviable prognostic marker. Examples of this dichotomy in diagnostic tests results included the following:

- Forelimb sarcoma – total WBC count was $10.4 \times 10^6/\text{ul}$ and CRP was $125.6\text{mg/L}$ (normal 0-20)
- Severe skin infection – total WBC was $21.1 \times 10^6/\text{ul}$ and CRP was $419.4\text{mg/L}$
- Multiple fractures/tramua – total WBC was $16.4 \times 10^6/\text{ul}$ and CRP was $200.8\text{mg/L}$
- Cardiomyopathy – total WBC was $16.3 \times 10^6/\text{ul}$ and CRP was $220.1\text{mg/L}$

In addition to CRP, haptoglobin (HP) levels were also examined in these samples. The mean HP increase in the clinically abnormal group was 7.1 fold. Increases were observed in cases with neoplasia, severe infection, surgery related complications, joint disease, and cardiomyopathy.

CRP levels in dogs have been examined in several excellent publications. A brief review follows:

- Whereas a single analysis of CRP levels does not predict case outcome, serial measurements indicating the presence of continued high levels of this biomarkers are correlative with a negative outcome (Journal of Veterinary Emergency and Critical Care 19:450-458, 2009).