Evaluation of C-reactive Protein Concentration in Dogs Serum with Periodontitis and Correlation between IndicatedMarker and Selected Dental Indicators

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Abstract

Periodontal disease is the most common oral disease in carnivores with multifactorial etiology. According to modern opinion, periodontitis is caused by the interaction between bacterial microflora of the periodontal pocket and host defense mechanisms. There are also environmental factors that influence the tendency of periodontal disease. Since the 1970s, inflammatory response to plaque bacteria has been studied. As a result of the pathogenic effect of the bacteria on the periodontal tissues, a specific immune response occurs, which involves the activation of the body's defense processes and the generation of cytotoxic mechanisms, destructively affecting the tissues of the periodontium. Periodontal infections are usually mixed, most often involving anaerobes such as Treponema denticola and Porphyromonas gingivalis. The microaerophile Actinobacillus actinomycetemcomitans causes a rare form known as localized juvenile periodontitis. Periodontitis (per-e-o-don-TIE-tis), also called gum disease, is a serious gum infection that damages the soft tissue and, without treatment, can destroy the bone that supports your teeth. Periodontitis can cause teeth to loosen or lead to tooth loss.

Periodontitis is common but largely preventable. It's usually the result of poor oral hygiene. Brushing at least twice a day, flossing daily and getting regular dental checkups can greatly improve your chances of successful treatment for periodontitis and can also reduce your chance of developing it.

Signs and symptoms of periodontitis can include:

1. Swollen or puffy gums.
2. Bright red, dusky red or purplish gums.
3. Gums that feel tender when touched.
4. Gums that bleed easily.
5. Pink-tinged toothbrush after brushing.
6. Spitting out blood when brushing or flossing your teeth.
7. Bad breath.
8. Pus between your teeth and gums.

Stages of Periodontal Disease

- Gingivitis. This is the mildest form of periodontal disease. The gum becomes irritated and swollen (inflamed).
- Periodontitis. Infection and inflammation spread to the bone supporting the teeth.
- Advanced periodontitis. As periodontitis advances, pockets deepen even more and can fill with pus.

Surgical treatments

If you have advanced periodontitis, treatment may require dental surgery, such as: Flap surgery (pocket reduction surgery). Your periodontist makes tiny incisions in your gum so that a section of gum tissue can be lifted back, exposing the roots for more effective scaling and root planing.

In the course of periodontal disease, it can be distinguished two periods: gingivitis and periodontitis. Gingivitis is the first stage of periodontal disease in which inflammatory lesions involving the gingiva are reversible. Periodontitis, on the other hand, is next stage of the inflammatory process resulting from the lack of gingivitis treatment. During periodontitis, there are three stages: early periodontitis, moderate periodontitis and severe periodontitis.

The aim of the study was to evaluate the severity of inflammation in periodontal disease based on the microbiological analysis of the periodontal pocket, the number of white blood cells (WBC), and the C-reactive protein concentration (CRP).

The dental examination and taking swabs for microbiological examinations were performed in dogs under general anesthesia, before oral cavity cleansing (as part of the treatment of periodontal disease). Blood was collected from all animals to perform blood morphological and biochemical tests. The morphological study included the determination of white blood cell counts (WBC), red blood cells (RBC), platelets (PLT) and hemoglobin (HGB) and hematocrit (Hct) levels. The biochemical study included the determination of glucose, total protein, creatinine and urea as well as alanine aminotransferase (ALT) and aspartic 87 acid aminotransferase (AST). Based on the results of the biochemical study, patients were qualified for the further study. In all animals, there were evaluated: periodontal pocket depth (PPD) and indicators such as calculus index (CI) periodontal index

Note:

(PI), and radiological index of periodontal disease.

The level of C-reactive protein was measured in blood serum by Canine CReactive Protein Assay (ELISA) sandwich assay (Demeditec Diagnostics GmbH, Kiel-Wellsee, Germany). The test was carried out according to the recommendations of the manufacturer. Statistical analysis was performed using the Excel spreadsheet (mean, standard deviation) and statistical package STATISTICA 10.0. Statistical significance was calculated using the Rang U Mann-Whitney test. The relationship between the selected variables was calculated by Spearman's method (Spearman rank correlation).

Conclusions:

Concentration of CRP tends to increase as the local inflammation progresses in the course of periodontal disease. The relationship between CRP and clinical periodontal disease index (reflecting the loss of soft tissue in periodontal disease) shows the basis for recognizing C-reactive protein as an additional indicator of periodontal disease.