Acute phase proteins in patients with chronic periapical granuloma before and after surgical treatment


Alpha-1-antitrypsin, alpha-2-macroglobulin, C-reactive protein, haptoglobin and complement C3 component concentrations and oxidase activity of ceruloplasmin were studied in sera of 36 patients with chronic periapical granuloma before and after surgical treatment. Mean serum concentrations of the investigated proteins were slightly elevated at diagnosis, with the exception of haptoglobin. Alpha-1-antitrypsin and ceruloplasmin levels decreased significantly 7 days after apicectomy, the 4 other proteins were unchanged at this sampling. Each investigated protein decreased significantly 3 months after apicectomy. This is the first longitudinal study of "acute-phase proteins" in chronic periapical granuloma.

Periapical granuloma represents a localized tissue injury with well-defined signs of chronic inflammation. The periapical lesion is initiated by bacterial infection. Recently immunological reactions have been suggested as a possible mechanism in the mediation of periapical inflammation (12, 13, 16).

Immune reactions, however, are not restricted to the periapical tissues. Antigens in the root canal and in the periapical area can induce systemic immunological reactions (2, 7, 10, 14). Other investigators reported on changes in plasma proteins related to the "acute-phase-reaction" in patients with various stomatologic inflammatory diseases (1, 5, 15). In a previous longitudinal study we investigated the effect of surgical treatment on serum immunoglobulin concentrations and hemolytic activity of the complement system in periapical granuloma patients (11).

We report here on changes in serum concentrations of alpha-1-antitrypsyn (AAT), alpha-2-macroglobulin (AMG), C-reactive protein (CRP), haptoglobin (HPT), third component of complement system (C3) and ceruloplasmin (CER)-dependent oxidase activity in patients with chronic periapical granuloma. Measurements were carried out before, at 7 days and at 3 months after removal of the granuloma.

Thirty-six patients (14 male and 22 female with an average age of 28.1 and 25.2 years, respectively) referred to the Stomatologic Clinic because of chronic periapical granuloma were enrolled in the study. Patients had the following symptoms: previous and present pain and response to percussion. Apart from their dental disorder they were healthy. The lesions were at least 3 mm in diameter on a periapical X-ray film. All teeth were endodontically treated. The root canals were filled with AH 26 and were condensed with gutta-percha. Teeth were apicectomized because of the extreme curvature in the apical third of the canal which had not allowed complete instrumentation and filling procedures, or because the resolution of a large chronic lesion did not occur rapidly enough following canal therapy (3, 8). We followed the operative technique suggested by Barnes (3).

Sera were obtained from blood drawn from an antecubital vein with the informed consent of the patients. Samples were taken before any treatment and at 7 days and 3 months after surgical removal of the granuloma.

AAT, AMG, CRP, HPT and C3 de terminations were carried out by rate nephelometry in the Beckman Immunochemistry System, -ICS-II (Beckman Instruments Inc., Fullerton, CA). All dilutions and solution for nephelometry were prepared by the use of a Beckman dilutor and dispenser. Antisera, calibration mixtures, buffer and solutions of Beckman Inc. were used. Reference values were also given by Beckman Inc. Instructions provided by the manufacturer (4).

Ceruloplasmin oxidase activity, which is related to its concentration was measured by a manual kinetic method according to Boyett (6). Briefly, 50 μL serum was incubated with 950 μL of o-dianisine substrate (2.04 μmol/1-o-dianisine, Fluka, in 0.1 mol/L sodium acetate buffer, pH 5.0) at 30°C for 5 min. Changes on optical density with time were measured at 435 nm. Results are expressed in International Units/μmol amount of consumed substrate per min.

The levels of statistical significance were estimated by Student's t-test. The standard deviations were checked with the F-test.

The results are shown in Table 1. A slight increase in AAT and CRP serum concentrations as well as in CER-related oxidase activity before surgery was observed suggesting an "acute-phase" response in chronic periapical granuloma patients. Mean AMG and C3 concentrations were also close to the upper limit of the normal range. Mean serum HPT concentration was within the nor-
mal range. The moderate elevation of the levels of the investigated proteins may reflect to the limited extension of the inflammation. 7 days after apicectomy AAT and CER decreased significantly, while mean levels of AMG, CRP, HPT and C3 did not change at this sampling. Three months after apicectomy there was a significant decrease in serum levels of each investigated protein when comparing mean values obtained at this time with those calculated before treatment. The magnitude of the decrease was most apparent in case of CRP (41%).

Serum concentrations of 6 marker proteins in 36 patients with chronic periapical granuloma have been evaluated and related to treatment in a longitudinal study. The investigated proteins respond non-specifically but very sensitively to any tissue injury of the host.

Acknowledgments

We thank Mrs Ildiko Kéri-Fülop for statistical analysis. All measurements were performed in the laboratories of the Pediatric Clinic of the Medical University of Debrecen. Authors are indebted for the skilful technical assistance.

References


Table 1. Serum levels of “acute-phase proteins” in chronic periapical granuloma patients related to surgical treatment

<table>
<thead>
<tr>
<th>Protein</th>
<th>Reference values*</th>
<th>Before apicectomy (number of patients)</th>
<th>7 days after apicectomy (number of patients)</th>
<th>3 months after apicectomy (number of patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>mean ± SD range</td>
<td>mean ± SD range</td>
<td>mean ± SD range</td>
</tr>
<tr>
<td>AAT</td>
<td>1.08–2.90</td>
<td>3.02 ± 1.01ab</td>
<td>2.26 ± 1.00ab</td>
<td>2.13 ± 0.73b</td>
</tr>
<tr>
<td>AMG</td>
<td>1.04–2.80</td>
<td>2.80 ± 1.01b</td>
<td>1.78 ± 1.13</td>
<td>1.81 ± 0.70b</td>
</tr>
<tr>
<td>CRP</td>
<td>5.00</td>
<td>6.58 ± 4.15a</td>
<td>32.70–1.38</td>
<td>6.10–1.03</td>
</tr>
<tr>
<td>HPT</td>
<td>0.50–2.20</td>
<td>0.99 ± 0.26a</td>
<td>0.89 ± 0.39</td>
<td>0.68 ± 0.37b</td>
</tr>
<tr>
<td>C3</td>
<td>0.83–1.77</td>
<td>1.65 ± 0.39a</td>
<td>2.85–0.95</td>
<td>2.65–0.95</td>
</tr>
<tr>
<td>CER</td>
<td>80–140</td>
<td>184 ± 27a</td>
<td>143 ± 45a</td>
<td>192–98</td>
</tr>
</tbody>
</table>

*according to literature data (6, 9, 17, 18) and to our measurement
a = values significantly different (P < 0.05) before apicectomy than value obtained 7 days after apicectomy
b = values significantly different (P < 0.05) before apicectomy than value obtained 3 months after apicectomy
This document is a scanned copy of a printed document. No warranty is given about the accuracy of the copy. Users should refer to the original published version of the material.
学霸图书馆
www.xuebalib.com

本文献由“学霸图书馆-文献云下载”收集自网络，仅供学习交流使用。

学霸图书馆（www.xuebalib.com）是一个“整合众多图书馆数据库资源，提供一站式文献检索和下载服务”的24小时在线不限IP图书馆。

图书馆致力于便利、促进学习与科研，提供最强文献下载服务。

图书馆导航：

图书馆首页 文献云下载 图书馆入口 外文数据库大全 疑难文献辅助工具