



# Changes In Biochemical Indicators During the Development of Alveolitis

Sh.I. Samadova

Bukhara State Medical Institute

ABSTRACT

Alveolitis is the most common post-extraction complication [1–4]. The main symptoms of alveolitis appear 1–3 days after surgery [5, 6] and are pain of varying intensity in the area of the socket of the extracted tooth, as well as irradiation of pain to neighboring teeth, ear, and temporal region, in some cases - in the neck, eye and frontal area, loss of a blood clot, bad breath, increased temperature to subfebrile values, inflammation of the marginal edge of the gums, exposure of a fragment of the alveolar bone, a grayish coating on the walls of the socket, phenomena of regional lymph nodes -nit.

Keywords:

Alveolitis

Alveolitis is the most common post-extraction complication [1–4]. The main symptoms of alveolitis appear 1–3 days after surgery [5, 6] and are pain of varying intensity in the area of the socket of the extracted tooth, as well as irradiation of pain to neighboring teeth, ear, and temporal region, in some cases - in the neck, eye and frontal area, loss of a blood clot, bad breath, increased temperature to subfebrile values, inflammation of the marginal edge of the gums, exposure of a fragment of the alveolar bone, a grayish coating on the walls of the socket, phenomena of regional lymph nodes -nit.

The result of this is the activation of immunoinflammatory processes occurring in the alveolar socket with the involvement of pro- and anti-inflammatory cytokines, adhesion factors, etc. In the lesions there is an accumulation of activated T lymphocytes and macrophages, which leads to inflammation ciation of the synthesis of mediators that enhance inflammation (1,2,3,4,5,). After the first cytokine response, a cascade of reactions is activated, leading to predominantly increased synthesis of tumor necrosis factor alpha (TNF- $\alpha$ ) and proinflammatory cytokines, which leads to a pathological immunoinflammatory reaction

(6,7,8,9,10). An important role in the implementation of immune-mediated stages of inflammation is played by adhesion molecules, the main function of which is to maintain intercellular interactions, migrate cells to the site of inflammation, and initiate an immune response. There are 3 main families of adhesive molecules: selectins, integrins, immunoglobulins (11,12,13). Selectins are expressed on the membranes of leukocytes (L-selectins), platelets (P-selectins) and endothelial cells (P- and E-selectins). Integrins are expressed on the membranes of leukocytes, endothelial cells and ensure adhesion of leukocytes to endothelial cells and extracellular matrix proteins - fibronectin, collagen, laminin, vitronectin. The expression of cell adhesion molecules is induced by proinflammatory cytokines (in particular, IL 1, 6, 8, TNF  $\alpha$ , IFN  $\gamma$ ), free radicals, lipopolysaccharides, leukotrienes, histamine, thrombin, complement components and many other factors (14,15).

With the help of adhesion molecules (integrin (sVCAM-1) and selectins (P-, E-, L-), leukocytes migrate to the site of inflammation and an inflammatory infiltrate is formed: adhesion (sticking) to the vascular endothelium in the site

of inflammation; penetration through the epithelium; movement towards the site of inflammation under the influence of chemotaxis.

**Цель настоящего исследования:** изучить содержание растворимых молекул клеточной адгезии, опосредующих начальный и заключительный этап миграции лейкоцитов в очаг воспаления (sP-селектина и sVCAM-1), а также некоторых ранее не исследованных факторов, связанных с их уровнем, в сыворотке крови больных с альвеолитом.

**Material and research methods.** 48 patients aged from 20 to 55 years were examined, with an average age of  $35.6 \pm 3.0$  (M $\pm$ o). The diagnosis was made on the basis of a comprehensive examination, which included studying the dental status and immunological testing of all patients with clinical detection of alveolitis.

Determination of the content of soluble adhesion molecules sP-selectin and sVCAM-1 in blood serum and the concentration of neopterin was carried out by enzyme-linked immunosorbent assay (ELISA) using test systems "BioKhimMak" (Russia). In parallel, the cytokine status was studied, which included an assessment of the TNF-a content on the COBAS immunoenzyme analyzer from ROSH using test kits from the same company.

Data analysis was performed using the application package "STATISTICA v. 6.0" for Windows XP Descriptive statistics of the trait included the arithmetic mean (M), minimum and maximum values, median (Me) and interquartile range [Q25-Q75]. When comparing the results obtained, the Mann-Whitney test was used due to the inconsistency of the analyzed data with the law of normal distribution. Relationships between characteristics were studied using Spearman correlation analysis (R). Differences were considered statistically significant at  $p < 0.05$ .

**Research results and discussion.** In clinical and laboratory blood tests in the examined patients with alveolitis, the following remained: accelerated ESR  $13 \pm 6.13$  mm/hour, leukocytosis  $8.93 \pm 1.21$  thousand, CRP  $15.02 \pm 7.87$  mg/hour l. rod shift  $9.89 \pm 2.38\%$ . Analysis of the research results presented in Table 1

indicated an increase in the concentration of soluble adhesion molecules sP-selectin and sVCAM-1, neopterin and TNF in the blood serum of patients with alveolitis.

The interaction of selectins with their oligosaccharide ligands is not very strong (low affinity) and is easily destroyed by the bloodstream (reversible adhesion). Selectins attract leukocytes to the vascular wall and hold them for a while, release them and reattach them, which creates the effect of rolling along the vascular wall. Activation of integrins is accompanied by expression on the surface of endothelial cells under the influence of TNF of adhesion molecules of the immunoglobulin superfamily.

All this ensures a strong connection of leukocytes with the vascular wall, spreading them on the surface of the endothelium (irreversible adhesion), as a result of which they penetrate through the widened spaces between the endothelial cells of capillaries and venules (emigration of leukocytes). In this case, neutrophils and monocytes squeeze between the endothelial cells in an amoeba-like manner, releasing pseudopodia and secreting collagenase and elastase, which leads to the formation of holes in the basement membrane. Thus, the role of macrophages is mainly to neutralize cells in which viruses, some bacteria and fungi parasitize, as well as to cleanse the site of inflammation from dead cells, including neutrophils, and the formation of anti-inflammatory mediators that destroy (arylsulfatase, histaminase, kininase and etc.) or neutralizing (heparin, chondroitin sulfate, proteinase inhibitors, antiphospholipases, antioxidants, polyamines, lipoxins, IL-10, histamine through H2 receptors) inflammatory mediators.

Thus, the adhesion molecules selectins, integrins, neopterin and TNF are modern markers of inflammation of the mucous membranes in alveolitis and can serve as criteria for predicting the severity and course of the disease.

## Literature

1. Баранов А. А., Потапов А. С., Цимбалова Е. Г. Современные

- технологии диагностики и лечения воспалительных заболеваний кишечника у детей. *Вестн. РАМН.* 2011; 6: 36-41.
2. Козлов И.Г., Горлина Н.К., Чередеев А.Н. Рецепторы контактного взаимодействия. *Иммунология.*, 1995, 6, 14-25.
  3. Новиков В. В., Караулов А. В., Барышников А. Ю. Растворимые формы мембранных антигенов клеток иммунной системы. *Иммунология.* 2007; 4: 249-253.
  4. Пинегин Б. В., Маянский А. Н. Нейтрофилы: структура и функция. *Иммунология.* 2007; 6: 374-382.
  5. Маянский Д. Н. Лекции по клинической патологии. М.: ГЭОТАР-Медиа. 2008. С. 15-78.
  6. G., Rosc D. Value of E-selectin and L-selectin determination in children and youth with inflammatory bowel disease. *Med. Wieku. Rozwoj.* 2007; 11 (4): 413-418.
  7. Adamska I., Czerwionka-Szaflarska M., Kulwas A., Mierzwa G., Bala G., Rosc D. Adhesion molecules of immunoglobulin super family in children and youth with inflammatory bowel disease. *Pol. Merkur. Lecarski.* 2009; 26 (152): 101-104.
  8. Маянская И. В., Шабунина Е. И., Ашкинази В. И., Толкачева Н. И., Потехин П. П. Лейкоцитмодулирующая активность сыворотки крови у детей с хроническими воспалительными заболеваниями органов пищеварения. *Вопр. диагн. в педиатрии.* 2009; 1: 28-32.