MICROBIOLOGICAL STUDY OF BACTERIAL PLAQUE IN PATIENTS WITH RHEUMATOID POLYARTHRITIS

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Abstract

In the last decade, scientists have brought forward an increasing number of evidence which suggests an association between oral infections caused by viruses, the bacteria responsible for producing dental plaque and periodontal disease and systemic diseases like atherosclerosis, vascular diseases, cerebrovascular diseases, prematurity, small weight at birth, pulmonary diseases, autoimmune diseases. In the case of periodontal diseases, opportunistic and transmissible microorganisms are an important infection risk for the entire body. The present study shows the influence which periodontal disease can have on treating patients with rheumatoid polyarthritis.

Key words: rheumatoid polyarthritis, periodontal disease, microorganisms

INTRODUCTION

Rheumatoid polyarthritis is a chronic arthropathy with a progressive, destructive and deforming character accompanied by multiple systemic manifestations and ranking as the most frequent inflammatory rheumatism, with a prevalence of 1% of the general population and at least 200.000 sick in Romania. The national incidence of the disease is of 0,5 cases in 1000 citizens for women and 0,2 cases in 1000 citizens for men (Popescu E., Ionescu R., 2002; Lemmey A.B., 2012).

It can also be described as an autoimmune disease of the conjunctive tissue, characterized by a chronic, erosive and proliferative synovitis, with polyarticular localization. If left untreated, it leads to articular deformities, mobility reduction and ankylosis through the irreversible destruction of articulations. It can also lead to an irreversible progressive physical disability which in turn can permanently destroy articulations and lead to functional deficit and a drop in life expectancy (Popescu E., Ionescu R., 2002; Lemmey A.B 2012, Berthelot JM, Le Goff Bâ, 2010).

Periodontal disease represents a chronic inflammatory affliction caused by microbial flora in the oral cavity, which determines the destruction of conjunctive tissue and the bone which sustains the tooth in the dento-alveolar space. The disease's clinical spectrum contains the chronic form (progressing slowly, characterized by bone loss greater than 3 mm in people over 35) and the aggressive form (rapidly progressing, defined by more than 50% bone loss which is radiologically visible in at

least two different teeth in people under the age of 35). Periodontal disease can be classified as localized and generalized. These differ in debut age and speed of evolution, but have a series of pathogenic mechanisms and histopathological characteristics in common. Severe periodontal disease, which can have tooth loss as a consequence, can be found in 10-15% of the adult population. The evolution is often progressive and irreversible, the disease being associated with disability, a decrease in quality of life and high care costs (Dumitriu H.T., Dumitriu S., Dumitriu A.S., 2009).

Due to its irreversible evolution as well as the morpho-functional dissabilities it presents with, periodontal disease represents a public health issue. At the present time it is considered that the main etiological factor of periodontal disease is the dental biofilm represented by bacterial plaque. Epidemiological data shows that there is a tight connection between the levels of subgingival bacterial plaque and the prevalence and severity of PD. Recent optical, bacteriological and electronic microscopic studies have demonstrated the presence and invasion of a large number of gram-negative anaerobic bacteria at subgingival and supragingival level (El-Gabalawy, Hani S, 2009, Kim J., Amar S., 2006, Georgiou T.O., Marshall R.I., Bartold P.M., 2004).

MATERIAL AND METHOD

The present study was undertaken on a lot of 54 patients which presented with PD and lasted two years . Of these, 20 patients presented with associated diseases such as diabetes mellitus, cardiovascular problems (arterial hypertension, ischemic cardiopathy). In these patients, bacterial plaque was harvested which was then microbiologically examined.

In the interval between harvesting samples and the exam itself, which has varied from a few minutes to a few hours, two major objectives were followed:

a) Maintaining the initial microbiological status for as long as possible with surviving bacteria and inhibiting contaminated microbial multiplication on the nutrients in the pathological sample.
b) Preventing the spread of bacteria to the staff and overall community (Junie M. 2004, Brooks G.F., et al., 2004).

The best method for maintaining viability was replacing the nutritive environment immediately after harvesting, preventing pH variations, oxidation and autolysis. The samples were not transported on dry tampon and were not refrigerated because it would have invalidated them. From the resulting samples, microbial suspensions were undertaken which were colored as gram and methyl blue and were examined in an immersion

microscope. The correct coloring is important as any deviation can lead to erroneous interpretations.

Fig. 1. Amis culture environment with charcoal

The tests from gingival secretions contained rare polimorphonuclear elements and Gram-positive and negative bacteria, at both intra and extra-cellular level. In the other cases the microbial load of the associated flora can mask the presence of specific germs or can lead to confusion (Brooks G.F., et al., 2004)

Undertaking the test: the microbial material is arranged in a thin layer on the surface of a microscopic blade marked with the indicative of the examined product from the registry and was undergone in three stages:

a) Layout of the pathological sample from the transport tampon, where a small muco or fibro purulent floccon was placed on the center of the blade through radial and concentric movements of the ansa and was spread in a thin layer. Inevitably, along with thinner portions there were thicker portions present without being an impediment. To-from movements of the tampon were avoided on the same surface because they dilacerate the exudate, fragmenting it and mixing it in the contamination material.
b) Drying of the test in hot air, over a gas bulb, presenting advantages to spontaneous drying at room temperature. In the areas where the drying was uneven, the hyperconcentration of salts affects the phagocytes, which leads to examination difficulties.
c) Fixing the test for a bacterioscopy is usually done through heat. The blade was passed through a gas bulb's flame for a few seconds (Junie M. 2004).

RESULTS AND DISCUSSIONS

From the total number of patients with polyarthritis at the endo-oral examination, 90% had suffered from periodontal disease, two thirds of them

having marginal chronic profound periodontitis with grade II and III dental mobility, and a third having chronic gingivitis in simple or ulcerative form. In all patients with periodontal diseases there was tartar present. 8% of patients were totally toothless, either with a replacement prosthesis already in place or not, and 2% had absolutely no oral health issues whatsoever.

After the microbiological examination of the bacterial plaque in patients with rheumatoid polyarthritis, the following aspects were discovered: the cocci have appeared as dark blue, the inflammatory cells and the desquamating cells had blue nuances, with a darker nucleus and lighter cytoplasm.; the malpighian cells appear with a less individualized perimeter than in the Gram coloring.

a) The harvested **streptococcus** are taken at 37 degrees celsius with 5% goats blood added, with the samples examined after 24 hours:

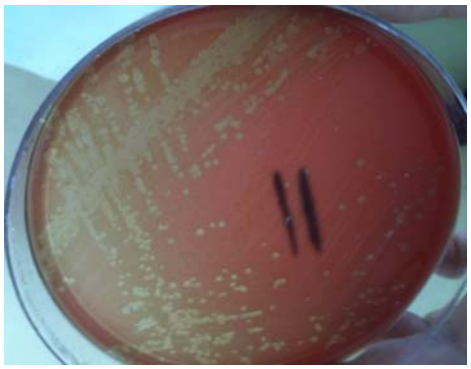

Fig. 2. Pure streptococcus culture with 5% blood

b) The **staphylococcus** developed easily in 24-48 hours in their environment, used to 24 hour colonies on a solid environment and are creamy, round, with a diameter of 2-3 mm, perfect edges, smooth surface and a specific shining. S. aureus and S hemolyticus produce an area of circular hemolysis around the colony.

Fig. 3. Primary culture from gingival secretions with 5% blood

c) The isolated **neisseria** were saprophytic species: saccharolytic species (N. mucosa, N. sicca, N. subflava with subflava, flava and perflava) grew as opaque, yellow colonies.

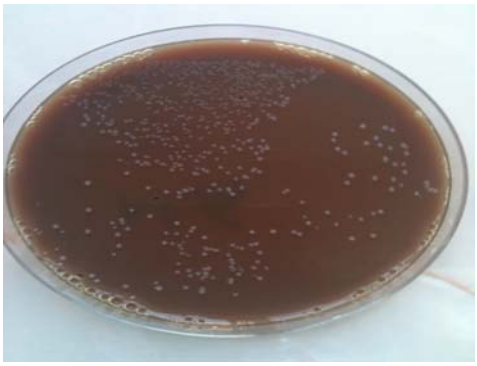

Fig. 4 Primary Neisseria sp. Culture + 1% hemoglobin and 1% nutritive supplement IsoVtalex, VITOX.

CONCLUSIONS

From the total number of patients with polyarthritis at the endo-oral examination, 90% had suffered from periodontal disease.

From the total number of polyarthritis patients, the microbiological examination of their bacterial plaques revealed the following:

- The cultures which multiplied and developed most were of Streptococcus mutans, Streptococcus mitis, Streptococcus sangius and Streptococcus salivarius in all cases, Staphylococcus sleiferi, Staphylococcus lugdunensis, Staphylococcus xylosus, and Staphylococcus scriuri in all cases and Neisseria sicca and Neisseria mucosa in only 30% of cases.

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