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Periodontal Status of Patients with Rheumatoid Polyarthritis

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ABSTRACT. In the last years, scientists have redefined the existing connection between a patient's oral health state and their terrain, showing the considerable importance that functionally integrating dento-maxillary equipment has in achieving proper organic balance. Modern dental medicine gives great importance to the potential of dento-maxillary equipment infections to influence systemic evolution and vice-versa, the influence that some systemic diseases have on dento-maxillary equipment, with the sole purpose of eliminating specific infections or some facilitating factors which lead to conditions related to dento-maxillary equipment. The purpose of this paper is to show the relationship between DME pathology (especially marginal periodontitis) and rheumatoid polyarthritis through the facilitating factors of periodontal disease as well as through the systemic inflammatory response which it has on the human body.

KEYWORDS*: rheumatoid polyarthritis, periodontal disease, microorganisms, rheumatoid factor, RCP*

INTRODUCTION

Rheumatoid polyarthritis is a systemic inflammatory disease, with unknown etiology and autoimmune pathology, characterized through an arthropathy with deforming and destructive evolution in the limbs as well as multiple systemic manifestations (Ionescu, 2006). It is the most frequent rheumatic inflammatory disease, representing approximately 10% of all rheumatic diseases. The incidence of the disease is of 1.7% in women and 0.7% in men, and overall it is tied to 1% of Romania's population (Ionescu, 2006).

Periodontal disease represents the total number of afflictions of the marginal periodontal. This entails a variety of phenotypes; definition of signs and symptoms, thus constituting the periodontal syndrome. The most frequent phenotypes are gingivitis, which includes color, volume, temperature and exudate modifications as well as bleeding, and chronic marginal periodontitis which includes periodontal bags, attachment losses, bleeding and bone loss which is radiologically detectable (Pihlstrom BL et al, 2005). The clinical spectrum of periodontal disease contains the chronic form (slowly progressive, characterized by a >3 mm bone loss in people over 35) and aggressive periodontal disease (rapidly destructive, defined by a >50% bone loss, radiologically visible in at least 2 different teeth, in people under 35). Periodontal disease can be classified in two types: localized and generalized. These differ in aspects like age of debut and rapidity 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, is found in 10-15% of the adult population. The evolution is most often progressive and irreversible, the disease being associated with disability, a decrease in the quality of life and high care costs. Therapeutic efforts are directed towards eliminating the suspected infection, leading to the reverse of inflammatory signs, tissue repair and restoration of esthetics and functionality. The results of the periodontal therapy can be stable over a long period of time, but the signs of the disease can reappear, unpredictably, in different locations and with different severity (Dumitriu H.T, et al, 2009).

MATERIAL AND METHOD

This study was undertaken on a number of 54 patients with rheumatoid polyarthritis in different stages of the disease between April 2012 and March 2013. The patients were recruited from the Rheumatology section of the "St. John the New" County Hospital in Suceava, Romania.

Criteria for inclusion in the study group:

- Patients older than 18 years
- Patients who signed the informed consent form

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- Patients who can participate in the study determined periods

Exclusion criteria:

- Uncooperative patients

- Patients who can not participate in study determined periods.

During the visits, data was obtained regarding the medical and dental history of the patients, along with an objective clinical examination of marginal periodontitis with the purpose of evaluating periodontal status; bacterial plaque was also analyzed in order to microbiologically assess the dental biofilm; venous blood was also collected in order to evaluate the degree of activity of inflammatory conditions.

Objective clinical examination was done through inspecting and feeling the marginal periodontal both superficially and profoundly and was undertaken with the help of periodontal and exploratory probes. During the examination, the aspect of the interdental papilla was observed, along with the free gingival margin and the fixed gum: color modifications, volume or texture modifications and the attachment level to the tooth were analyzed. The gingival bleeding index, degree of gingival retraction and degree of pathological mobility were both noted. (Dumitriu H.T, et al, 2009).

Microbiological examination of the bacterial plaque was done through lifting it from the level of the inferior frontal teeth and superior molars, or from the level of the teeth present on the arcade. In the interval between lifting the samples and their microbiological exam, which varied from a few minutes to hours, two major objectives were followed:

a) Maintaining the initial microbiological condition of the sample for as long as possible, bacterial survival, as well as inhibiting contaminated microbe multiplication from nutrients in the pathological solution.

b) Preventing the spread of bacteria to the staff and in the open.

The best method for maintaining the viability of the sample was storing it in a nutritive environment immediately after lifting it, thus preventing pH variation and oxidation.

Criteria for exclusion of evidence:

- Samples exposed to extreme temperatures (chilled or over 29ºC);

- Samples older than 24 hours in the transport environment;

- Samples taken on dry or contaminated;

- Samples transported in plastic bags without a CO2 pill and a wet atmosphere;

- Samples without ID (no name, registration number sender) (Pejcic A, et al, 2011).

Smears were created from the obtained samples which were colored Gram and methyl blue and were examined in an immersion microscope.

Evaluating the degree of activity of inflammatory conditions was undertaken through collecting blood samples and evaluating the systemic levels of the Rheumatoid Factor, Reactive Protein C and ESR. Sample collection was made within the "Sinevo" medical analysis laboratory.

Rheumatoid factors are a heterogenic group of autoantibodies regarding antigenic determinants of the Fc region of IgG molecules, which form IgG-anti-IgG complexes in the bloodstream or in the synovial fluid. Usually, they are IgM type antibodies, but they can also be IgG or IgA (Dati F, 2005, labcorp.com, 2010). The serum level of the rheumatoid factor is elevated in over 70% of the cases of rheumatoid polyarthritis, having an important role in producing extra-articular manifestations. For the correct handling of samples, the instructions given by the manufacturer were respected and the latex-immunoturbidimetric method was used. Values of reference - <14 UI/mL (Synevo, 2010). Detecting rheumatoid factor represents one of the ACR's criteria for diagnosing rheumatoid polyarthritis. Larger values are more specific for diagnosing rheumatoid polyarthritis (Lothar T. 1998).

Reactive Protein C is an unglycosylated protein with a pentameric structure which migrates electrophoretically near the gamma zone. It is an acute phase reactant which grows fast, but non-specifically, as a response to tissue lesions or inflammation, being a more sensitive and prompt indicator than the ESR (labcorp.com, 2010). RPC analysis is recommended in order to evaluate the degree of activity of inflammatory diseases in the differential diagnosis of rheumatoid polyarthritis and lupus or Crohn's disease and ulcerative colitis, monitoring antibiotic treatment in bacterial infections, etc. The samples were taken and analyzed according to the manufacturer through the latex-immunoturbidimetric method (Synevo, 2010).

Values of reference are <0,5mg/dL3, and the detection limit is 0.0425 mg/dL (4.05 nmol/L). RPC increases represent a non-specific response to inflammations and infections (labcorp.com, 2010).

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The ESR represents the rate at which erythrocytes sediment in anticoagulated blood within an hour. The higher the sedimentation speed, the higher the ESR value is, this being an acute phase response indicator. An increase in ESR levels appears at least 24 hours after the initiation of an inflammatory response, and after the acute phase response is finished it drops, with a half life of 96-144 hours. In comparison with the RPC and the serum amyloid A, the ESR is high in situations in which an increase in immunoglobulin concentrations, immune complexes and other proteins is present (Thomas L, 1998). A screening test is indicated if inflammatory reactions, diseases, autoimmune conditions or plasma dyscrasia are suspected, as well as in monitoring the evolution and treatment of temporal arteritis, rheumatic polymyalgia, rheumatoid arthritis, acute articular rheumatism, systemic lupus erythematous, Hodgkin's disease, tuberculosis or bacterial endocarditis (Wallach J, 1996).

The ESR is not a diagnostic test for any disease and should not be used for screening asymptomatic patients (Fischbach F, 2010).

The samples were taken and analyzed as per the manufacturer's instructions and were undertaken through the capillary microphotometric method, which measures the aggregation capacity of erythrocytes (first phase of sedimentation) in the presence of agglomerines, at 37 degrees Celsius. Reference values (Synevo, 2010) are of under 15 mm/h in men under 50 and 20 mm/h in men over 50 and 25 mm/h in women under 50 and 30 mm/h in women over 50 respectively.

An increased ESR appears in collagen diseases. It is the most useful test in diagnosing and monitoring temporal arteritis, rheumatoid arthritis and rheumatic polymyalgia, as well as infections, pneumonias, syphilis, tuberculosis, subacute bacterial endocarditis and inflammatory diseases such as acute pelvic pain, gout, arthritis, nephritis or nephrosis. Neoplastic diseases, an increase in seric immunoglobulins, multiple myeloma, Waldenstrom macroglobulinemia, acute intoxications with heavy metals, tissue or cell destruction, acute infarctions, post-surgical conditions, hypothyroidism, hyperthyroidism, acute anemia or chronic diseases if medicine such as oral contraceptives, dextrans, anticonvulsives, aspirine, cephalotins, cyclosporine A, dexamethasone, etretinate, fluvastatin, hydralazine, indometacin, isotretinoin, lomefloxacin, metisergid, misoprostol, ofloxacin, procainemid, quinine, propafenone, sulfamethoxazole or zolpidem are used are also on the list. A normal ESR level does not exclude an organic non-inflammatory disease or organ neoplasia or disfunction, while a moderately increased ESR always needs to be investigated. (Gabriel S, 2001; Pejcic A 2011)

RESULTS AND DISCUSSIONS

1. Characteristics of the study group

Of the 54 patients studied, a majority was made up of women (45) and the age of patients diagnosed with RA and BP was over 40 years (Fig. 1)

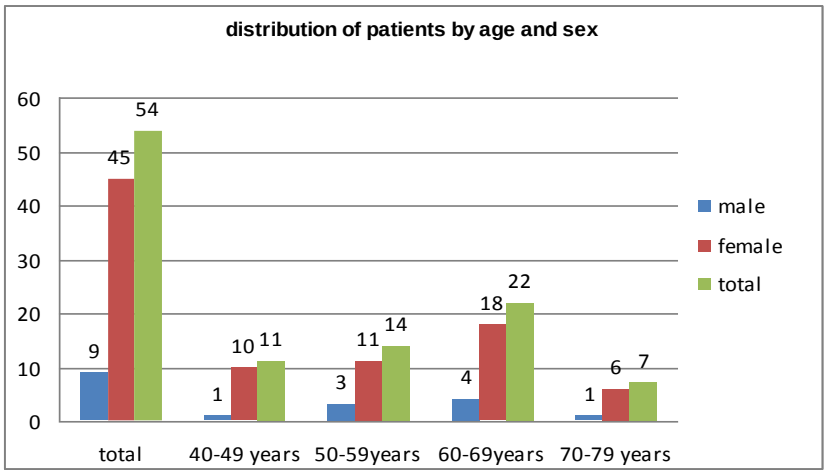

Fig. 1. Study group structure, by age and sex

2. Types of affections of the marginal periodontal. Following objective examination of the marginal periodontal, this study group produced the following results, presented in Fig. 2.1

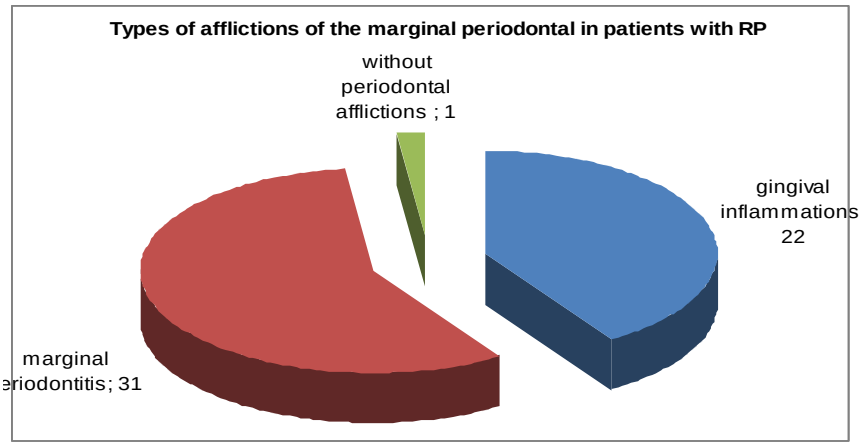

Fig 2.1 Types of afflictions of the marginal periodontal in patients with RP

These afflictions of the marginal periodontal were splint into gingival inflammations, of which 6 patients with simple chronic gingivitis (11,11%), 9 patients with hyperplasic gingivitis (16,67%), 6 patients with ulcero-necrotic gingivitis (11,11%), 9 patients with profound generalized Periodontitis (16,67%), 14 patients with profound localized Periodontitis (25,92%), 6 patients with superficial generalized Periodontitis (11,11%), 2 patients with superficial localized Periodontitis (5,55%), 1 patients without periodontal afflictions (1,86%) . The graphic spread of these percentage points is shown in Fig. 2.2.

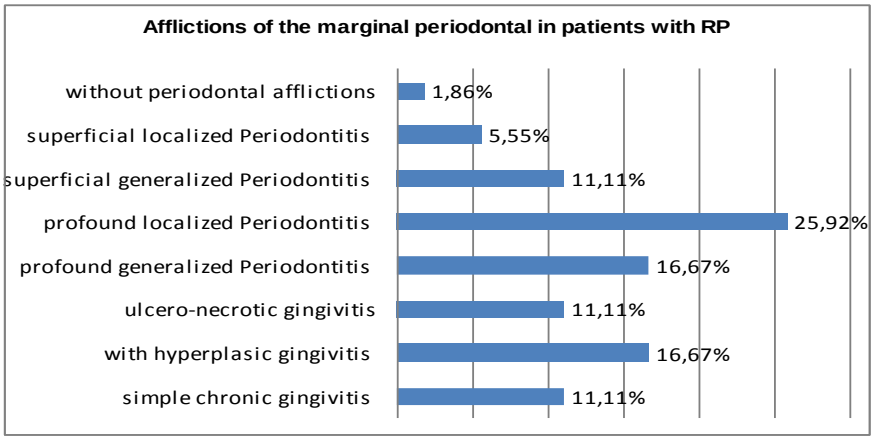

Fig. 2.2 Afflictions of the marginal periodontal in patients with RP

Classified by demographic characteristics, periodontal afflictions were graphically represented in Fig 2.3

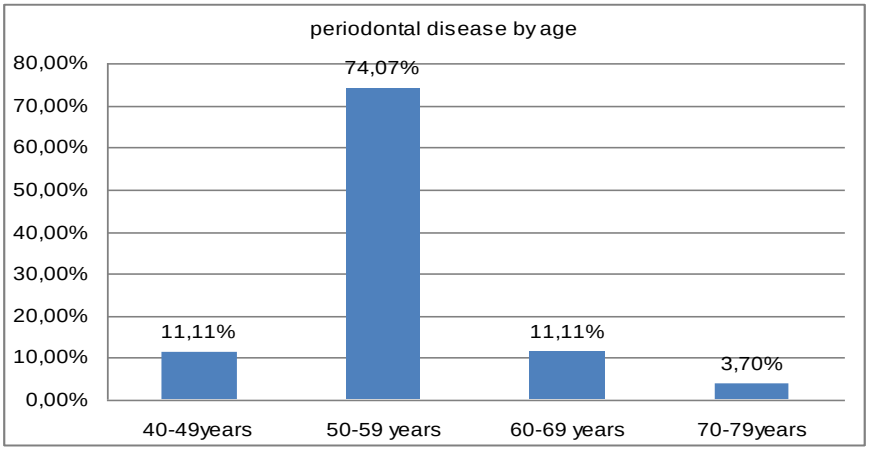

Fig. 2.3Distribution of periodontal disease by age

3. Types of microorganisms found in the bacterial plaque in patients with rheumatoid polyarthritis. Following the microbiological examination, the following situations were encountered:

- The most encountered species were Streptococcus with the mutans, mitis, salivarius and saiguis types and Staphylococcus with the sleiferi, lugdunensis, xylosus and sciuri types, along with Neisseria sicca and mucossa
- Each gingival biofilm had different types of Streptococcus, Staphylococcus and Neisseria
- Neisseria was encountered in only 14,28% of cases
- In each of the samples, Streptococcus and Staphylococcus were present.

4. Examining laboratory samples. Following the interpretation of the laboratory samples, it has been observed that 42,85% of patients had the Rheumatoid Factor at very high levels (more than 100 UI/mL), 47,63% had the rheumatoid factor slightly increased or within 100 UI/mL and 9,52% had the rheumatoid factor within normal limits; 38,09% of patients had a high RPC level and 33,33% had an increased or slightly increased ESR. In 90,47% of cases all three markers were high and in 9,52% of cases only two markers were encountered, either RF and RPC or RPC and ESR. The graphical representation of these values is presented in Fig. 3.

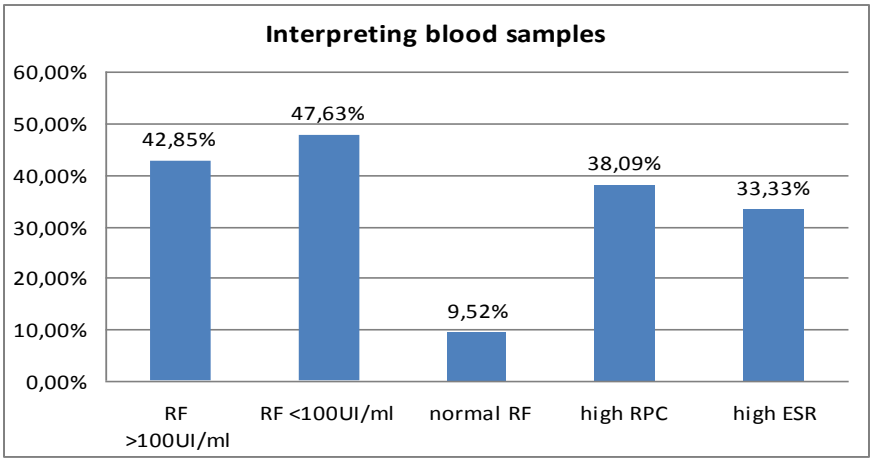

Fig. 3 Interpreting blood samples

5. Comorbidities. Within the total number of patients in the studied lot, some presented added comorbidities to rheumatoid arthritis. 28,57% of patients suffered from type II diabetes mellitus, 61,90% had HTA type cardiovascular afflictions in stages II or III or cardiac insufficiency and 9,52% of patients suffered from

hepatic steatosis, osteoporosis, osteopenia, glaucoma, gonarthrosis or coxarthrosis. Patient history also helped in determining the stage of the disease and the treatment to be implemented. The graphical representation of this data is presented in Fig. 4.1 and 4.2.

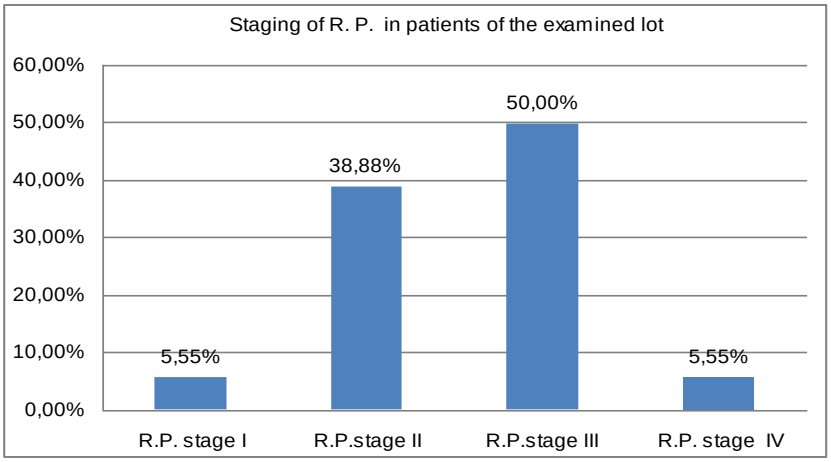

Fig. 4.1 Staging of Rheumatoid Polyarthritis in patients of the examined lot

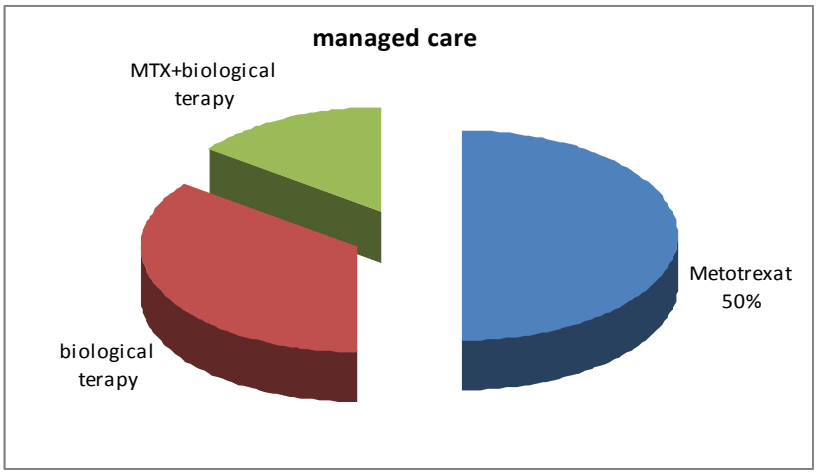

Fig 4.2 Treatment of patients with Rheumatoid Polyarthritis in the studied lot

CONCLUSIONS

Following the analysis of all the data resulting from the laboratory, the following conclusions were reached:

-From the total number of patients with polyarthritis which were evaluated, 98,14% of these suffered from a periodontal affliction

-During the microbiological examination of the bacterial plaque, different species of Streptococcus, Staphylococcus and Neisseria were seeded, which directly influence periodontal disease

-The high values of RPC in 38,09% of patients with or without an increased RF can be explained through the non-specific systemic response of the organism to the persistent infection with gram-negative microorganisms, establishing a correlation to the number of periodontal infection sites

-The existence of periodontal infection sites can influence the response of patients with rheumatoid polyarthritis, thus explaining the increased values of RF, RPC and ESR

-The toxicity of the treatment for rheumatoid polyarthritis can be an influential factor for the appearance of gingival inflammations, with 16,67% of patients also suffering from hyperplasic gingivitis.

As a general conclusion, both rheumatoid polyarthritis and periodontal disease influence each other directly. Untreated periodontal disease contributes to maintaining the systemic inflammatory syndrome which characterizes rheumatoid polyarthritis, and this can produce modifications at the level of the marginal periodontal through both maintaining the systemic inflammatory response and the toxicity of the treatment followed by the patient.

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