PERIODONTAL HEALTH STATUS EVALUATION USING CPITN SCORE, IN A GROUP OF PATIENTS WITH RHEUMATOID ARTHRITIS

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Abstract

Introduction. The relationship between periodontal disease (PD) and rheumatoid arthritis (RA) is currently only partially known, both being chronic multifactorial diseases that may share common pathogenic mechanisms and etiological factors. In a previous meta-analysis we concluded that patients with RA are more commonly affected by PD and develop more severe forms of the disease, compared to the general population.

Objectives. The current study aimed to assess the degree of periodontal damage and oral hygiene on a group of patients diagnosed with RA.

Methods. The study was conducted on a group of 30 patients, 6 sextants being assessed in each patient (180 potentially evaluable sextants). Establishing the degree of periodontal damage and oral hygiene was achieved by determining the Community Periodontal Index of Treatment Needs (CPITN) and Oral Hygiene Index (IHB, also known as OHI).

Results. The mean CPITN score/sextant was 1.92. After clinical examination we found 10 edentulous sextants that could not be evaluated. As a result of the distribution of the scores on all the 170 evaluable sextants, we obtained: CPITN 0 – 11.1%, CPITN 1 – 23.6%, CPITN 2 – 32.4%, CPITN 3 – 27.6%, CPITN 4 – 5.3%. After analyzing the oral hygiene index the mean value we found was 16. Distribution of IHB intervals was: IHB 0-12 (40%), IHB 13-24 (53.3%), IHB 25-36 (6.6%).

Discussion and conclusions. Comparing our results to data from the literature, in our group of patients with RA the only CPITN index criteria significantly increased, compared to the healthy population, were gingival bleeding on probing and the number of periodontal pockets with 4-5.5 mm depth.

Keywords: periodontal disease, rheumatoid arthritis, CPITN, IHB

INTRODUCTION

Periodontal disease (PD) is a progressive chronic inflammatory disease, initially affecting the superficial marginal periodontal tissue (gums and supraalveolar ligaments) and subsequently the deep marginal periodontal tissue (root cementum and alveolar bone). The main role in the etiology of PD is awarded to the bacterial plaque, due to the incorporation of periodontal pathogenic agents into its structure. These periodontal pathogenic agents are classified into bacterial groups, which colonize in a specific order, causing the onset and development of marginal periodontal destruction. The determining factor is joined by local predisposing factors, such as tartar, dental cavities, vicious habits, occlusion disorders and general factors: heredity, nutritional deficiencies, systemic disorders, steroid treatments, chemotherapy and antiepileptic drugs etc. In order to clinically objectify the degree of periodontal damage, the following two criteria are generally used: loss of the epithelial insertion (loss of attachment – LOA ≥ 5 mm) at two or more sites and the presence of one or more periodontal pockets with a depth ≥ 4 mm. Long-term effects of periodontal problems are associated with a high prevalence of coronary impairment, independent of the general cardiovascular risk factors. (1-9)

The relationship between PD and rheumatoid arthritis (RA) is currently only partially known, both...
being chronic multifactorial diseases that may share
common pathogenic mechanisms and etiological
factors. PD may be among the risk factors for acute
myocardial infarction, peripheral vascular disease
and stroke through atherosclerosis. Thus it is impor-
tant to know if PD is indeed more prevalent among
patients with RA.

In a meta-analysis presented in a previous issue
of the Romanian Journal of Reumathology, by the
same group of authors, relating to the correlation be-
tween PD and RA, we concluded that PD and RA are
two chronic inflammatory diseases that can rein-
force each other. This association is asserted by epi-
demiological studies (showing a higher prevalence
of periodontal disease in patients with RA and vice
versa) and clinical data. Also it was found that an
improvement in joint disease follows after treatment
of periodontal damage. One of the mechanisms that
may explain this association, is represented by the
periodontal pathogenic microorganisms that can
contribute to increased joint aggression with com-
plex, partially elucidated mechanisms. (10)

OBJECTIVES

The study aimed to assess the degree of peri-
odontal damage and oral hygiene in a group of pa-
tients diagnosed with RA and to identify demo-
graphic, socio-economic and clinical factors
associated with PD.

MATERIAL AND METHOD

The study was conducted on a group of 30 pa-
tients with RA hospitalized in the Internal Medicine
and Rheumatology Clinic of the Dr. Ion Cantacuzino
Hospital, Bucharest between March 2013 – January
2014.

Inclusion criteria for the study group were: (a)
patients previously diagnosed with RA by the 1987
ACR classification criteria; (b) patients with at least
two hospitalizations during this period, in order for
the laboratory tests to be conducted and for a brief
periodontal examination to be performed.

In order to establish the extent of the periodontal
damage and the degree of oral hygiene in patients
with RA, the following indices were determined: the
Community Periodontal Index of Treatment Needs
(CPITN) and the Oral Health Index (IHB).

CPITN belongs to the indices concerning peri-
odontal inflammation and consists in assessing the
overall aspect of the gums, the presence of bacterial
plaque and tartar, the bleeding of the gingiva during
probing, the depth of the periodontal pockets. The
periodontal clinical exam is performed on each of
the three sextants of each arch.

**TABLE 1. CPITN score value – after Croitoru Al. (11)**

<table>
<thead>
<tr>
<th>Sextant codes</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Clinically healthy marginal periodontal tissue, on examination</td>
</tr>
<tr>
<td>1</td>
<td>Gingival bleeding on probing</td>
</tr>
<tr>
<td>2</td>
<td>Supra- and subgingival tartar</td>
</tr>
<tr>
<td>3</td>
<td>Periodontal pockets with moderate depth (4-5.5 mm)</td>
</tr>
<tr>
<td>4</td>
<td>Periodontal pockets deeper than 6 mm</td>
</tr>
</tbody>
</table>

IHB belongs to the indices assessing the degree
of oral hygiene and the extent of periodontal damage
and comprises of two components: the plaque index
and the tartar index.

**TABLE 2. Plaque and tartar index values for each dental surface – after Croitoru Al. (11)**

<table>
<thead>
<tr>
<th>Plaque index</th>
<th>Tartar index</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Absence of plaque</td>
</tr>
<tr>
<td>1</td>
<td>Supragingival plaque, in the cervical segment</td>
</tr>
<tr>
<td>2</td>
<td>Supragingival plaque, in the mid segment</td>
</tr>
<tr>
<td>3</td>
<td>Supragingival plaque, in the occlusal/incisal segment</td>
</tr>
<tr>
<td>0</td>
<td>Absence of tartar</td>
</tr>
<tr>
<td>1</td>
<td>Supragingival tartar, in the cervical segment</td>
</tr>
<tr>
<td>2</td>
<td>Supragingival tartar, in the mid segment</td>
</tr>
<tr>
<td>3</td>
<td>Supragingival tartar, in the occlusal/incisal segment</td>
</tr>
</tbody>
</table>

The values of plaque and tartar indices are calcu-
lated by adding the values found (Table 2) after ex-
amining six areas: the buccal surfaces of the right
maxillary central incisor and left mandibular central
incisor, the buccal surfaces of the first maxillary mo-
lars and the oral surfaces of the first mandibular
molars.

RESULTS

The study group included 23 (76.6%) females. From
the distribution by age at the moment of ad-
mission, it can be asserverated that the most affected
by PD were the patients aged 40-59. Regarding age
at the first hospitalization in the study, data are pre-
SENT in Table 3.

**TABLE 3. The distribution of patients in the study group by age in number of cases and percentages**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>2</td>
<td>6.6%</td>
</tr>
<tr>
<td>30-39</td>
<td>4</td>
<td>13.3%</td>
</tr>
<tr>
<td>40-49</td>
<td>10</td>
<td>33.3%</td>
</tr>
<tr>
<td>50-59</td>
<td>12</td>
<td>40%</td>
</tr>
<tr>
<td>60-70</td>
<td>2</td>
<td>6.6%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>30</td>
<td>100%</td>
</tr>
</tbody>
</table>
Depending on the age at the onset of RA, allocation by age is shown in Table 4.

**TABLE 4.** The distribution of patients in the study group by age at the clinical onset of RA

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>4</td>
<td>13.3%</td>
</tr>
<tr>
<td>30-39</td>
<td>7</td>
<td>23.3%</td>
</tr>
<tr>
<td>40-49</td>
<td>16</td>
<td>53.3%</td>
</tr>
<tr>
<td>50-59</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>30</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Regarding income, the patients were distributed as follows: (a) people with average income prevailed – 17 cases (56.6%); (b) 9 people had low-income, representing 30% of the group. Amongst these the majority was represented by housewives or retired people from rural areas; (c) only 4 people had high incomes, representing 13.3% of the group. There was a majority of patients from rural areas, with 19 cases (63.3%), compared to 11 patients from urban areas.

**ESTABLISHING THE DEGREE OF PERIODONTAL DAMAGE AND ORAL HYGIENE**

After analyzing the CPITN values, the mean value of the index per sextant was 1.92.

As the study group included 30 patients and there were potentially 6 evaluable sextants in each patient, we aimed to analyze a maximum of 180 sextants. After clinical examination we identified 10 edentulous sextants that could not be evaluated. The distribution of the remaining 170 sextants on codes was performed as displayed in Table 5.

**TABLE 5.** Sextant distribution according to code value

<table>
<thead>
<tr>
<th>Sextant code</th>
<th>Number of sextants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>19</td>
<td>11.1%</td>
</tr>
<tr>
<td>1</td>
<td>40</td>
<td>23.6%</td>
</tr>
<tr>
<td>2</td>
<td>55</td>
<td>32.4%</td>
</tr>
<tr>
<td>3</td>
<td>47</td>
<td>27.6%</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>5.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>170</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

The mean oral hygiene index (IHB) was 16, range 31.

Patients with RA were distributed in ranges of values (Table 6).

**TABLE 6.** Distribution of patients according to IHB

<table>
<thead>
<tr>
<th>Value interval</th>
<th>Number of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-12</td>
<td>12</td>
<td>40%</td>
</tr>
<tr>
<td>13-24</td>
<td>16</td>
<td>53.3%</td>
</tr>
<tr>
<td>25-36</td>
<td>2</td>
<td>6.6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
DISCUSSIONS AND CONCLUSIONS

PD is a pathological complex that brings together multiple forms of periodontal marginal changes, so there is no general consensus on the criteria used for evaluation. In other words, there is a marked heterogeneity of criteria for diagnosis and staging that makes comparisons difficult. In this study, we analyzed the degree of periodontal damage and oral hygiene on a group of patients with established RA, using the CPITN index.

CPITN index is widely used, but each group of authors performed statistical reporting differently. We managed to find a few studies reporting the CPITN index for the total number of sextants, in the general population. Following the comparisons, in the group of patients with RA studied by us, the only components of CPITN index significantly increased, as compared to the general population, are bleeding on probing and the number of periodontal pockets with moderate depth (4-5.5 mm).

Limitations of our study are the small number of patients, at the limit of a uniformly arranged group (30 subjects) and the lack of a control group of age- and gender-matched healthy persons.

In a review presented in a previous issue of the Romanian Journal of Reumathology by our group, analyzing the correlation between PD and RA, epidemiological data and the main mechanisms through which the two diseases influence each other were widely described. The conclusion was that patients with RA are more frequently affected by PD and develop more severe forms of disease. These results are confirmed by the present study. (10)

In our study group, patients aged under 60 years (28 cases, 93.3%) prevailed, with most patients being aged between 40-59 years (22 cases, 73.3%). This is not surprising, RA being a disease with a major impact on the employed, active population. We noticed a large number of patients with onset of rheumatic disease at a young age. A total of 11 patients, accounting for 36.6% of the group, were diagnosed before the age of 40.

Distribution of the patients in the study group according to income showed, as expected, the predominance of low and middle-income people. This fact reflects the general distribution of the population in the hospital. Is is widely known that the standard of living has direct implications on the quality of health.

After analyzing the values of CPITN index, a mean code of 1.92 per sextant was found. Regarding the benchmarking of the values obtained in the current study in relation to CPITN code values in the general population, referrals to articles from the literature were performed.

A study conducted in 2014 in Poland, by Konopka et al aimed to evaluate periodontal health, using CPITN score, among the population aged 65-74 years in five cities and four towns. The group included 807 patients, of whom 31.3% were excluded. The exclusion criteria consisted of total edentulism or presence of a single tooth/sextant. Thus, among patients with enough teeth, a total of 3324 sextants were recorded. CPI codes distribution for the sextans was: 0-1.7%, 1-13.7%, 2-24.2%, 3-31.7% 4-28.7%.

Relating our results to those of Konopka et al, significant differences can be noticed. In our study group, the percentage of sextants with CPITN code 0 was 11.1%, compared with 1.7% in the Polish study. Regarding the distribution of value 1 of the CPITN code, notice can be taken over the RA group rate (23.6%) that almost doubles the Polish group.
These differences may be due both to age and income. In the present study, the sextants with CPITN code 0 were seen mainly in young patients, with high-income, from urban areas, concerned with the proper use of various means of oral hygiene and who can regularly carry out dentist appointments, both financially and in terms of the accessibility of health services. The difference between the two groups in terms of age can be taken into account: the study in Poland consisted of elderly patients, thus the degree of PD may be correlated with associated pathology (other than RA), with motor disabilities that make it difficult to travel to dental offices and maintain oral hygiene through brushing or flossing. In our study group, most patients were younger than 60 years, only 2 were within the age range 60-70 years. CPITN code 2 distribution/sextant was 24.2% in the Polish study, versus 32.4% in the group of 30 patients from the present study. Regarding the distribution of CPITN score 4/sextant, the difference between the two studies is important: 28.7% in the group in Poland, compared with 5.3% in our group of patients with RA. This difference may be attributed to younger age in our study group, which included patients of various ages, with the majority under 60 years, while the Polish group was composed exclusively of patients over 65 years. Periodontal pockets deeper than 6mm (CPITN 4) can be explained by the presence of associated general diseases, and also by periodontal structural changes. These changes happen pathologically but also physiologically due to age, through changes in the qualitative and quantitative properties of saliva that determine decreased immunological defense capacity promoting gingival PD occurrence.

According to the literature, the prevalence of edentulism is higher in RA: RA patients have an average 20 missing teeth, compared with 16 missing teeth in patients without RA. In the study group only 10 edentulous sextants were identified. The low number of edentulous sextants can be explained by the age of the patients and by the small size of the lot. Edentulous sextants were found mainly in people with low income, where the possibility of a conservative treatment can not be considered, thus extraction representing, in most cases, the most accessible method of treatment.

In conclusion, we found a low level of oral hygiene and a high prevalence of PD in patients with RA, which may be due to several factors. Older age, rural residence, poor education and low income are definitely influencing oral hygiene. Also, the young age at the onset of RA, the chronic course of the disease and the impairing of physical function may increase difficulty in maintaining a rigorous oral hygiene. Therefore, buildup of plaque and tartar are favored, making the patient with RA more prone to PD. On the other hand, chronic infection associated to PD may increase susceptibility to RA, making the relationship between the two diseases even more complex. We believe that the present study is a starting point for further studies, with a larger number of patients and an appropriately selected control group.
REFERENCES