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Status of marginal periodontal tissues in patients after myocardial infarction in Poland

Stan tkanek przyzębia brzeżnego u pacjentów po zawale serca w Polsce

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Key words

periodontitis, prevalence, myocardial infarction, cardiovascular diseases, risk factors

Summary

Introduction. Periodontitis is associated with numerous risk factors. Many studies have proven the existing relationship between periodontitis and cardiovascular diseases.
Aim. The aim of the study was to assess the state of periodontium in patients after myocardial infarction (MI), as compared to the general population.
Material and methods. The study group consisted of 152 patients after MI. The control group consisted of 160 individuals. Periodontal status was assessed using the classification by Page and Eke. The interview included: gender, age, education, income level and tobacco smoking.
Results. In the study group, periodontitis occurred more frequently than in the control group (84.1 vs 73.1%), including advanced periodontitis (49.7 vs 27.5%) and edentulism (11.3 vs 2.5%). In the study group, correlation was observed between prevalence of periodontitis and gender as well as age.
Conclusions. The periodontal status of patients after MI is clearly worse than that of the general population and not really well-correlated with risk factors.

Introduction

The current classification of periodontitis in Poland is based on the guidelines of the American Academy of Periodontology (AAP) (1). Many authors currently consider the criteria proposed by Page and Eke as the golden standard for epidemiological purposes. This system distinguishes four diagnoses: severe periodontitis, moderate periodontitis, mild periodontitis and no periodontitis or healthy periodontium (2). Special attention is paid to interproximal surfaces as the most critical in the development of periodontitis.

Prevalence of periodontitis in the general population increases with age (3, 4). It is also associated with male gender, low education level, low socioeconomic status and tobacco smoking (5).

Epidemiological studies indicate that patients with periodontitis have an increased risk of myocardial infarction (MI) (6). Until present, no epidemiological studies have been carried out in Poland in patients after MI, using the classification by Page and Eke.

Aim

The aim of the study was to assess the state of periodontium in myocardial infarction (MI), as compared to the general Polish population.

Material and methods

The study included patients (152 individuals: 35 females, 117 males, average age 55.1 years (± 8.0)) with MI hospitalized at the 1st Department and Clinic of Cardiology, Medical University of Warsaw (MUW). The inclusion criteria were: MI history and age below 70 years. All individuals participating in the study granted their consent by signing a declaration approved by the Bioethics Commission at MUW (Opinion No KB-145/2011). Patients diagnosed with cancer, rheumatic disease, autoimmune disease, chronic liver disease, chronic renal disease, stages 4 and 5, and stroke history were excluded. The study control group consisted of individuals aged under 70 years, randomly chosen from the general population (160 individuals: 97 females, 63 males, 55.2 ± 10.0 years).

The periodontal status of each patient was categorized on the basis of the definition by Page and Eke (2).

The prevalence of selected risk factors for periodontal diseases was determined, including:

- education (primary, secondary and higher),
- socioeconomic status (income per family member),
- smoking (current, in the past, never).

Results

Prevalence of periodontitis was significantly higher among patients after MI (84.1 vs 73.1%, p = 0.0005) (tab. 1, fig. 1). The difference was even more pronounced when only severe periodontitis was considered (49.7 vs 27.5%, p < 0.0001). Also edentulism occurred more frequent among patients with MI history (11.3 vs 2.5%, p = 0.0048).

In the group of patients after MI, the occurrence of periodontitis decreased with age (p = 0.0277), this drop, however, resulted from greater tooth loss in the elderly (p = 0.0011). No correlation was observed between the occurrence of periodontitis and the level of education among the patients after MI (tab. 2).

Periodontitis was diagnosed more frequently in males (87.9 vs 71.4%, p = 0.0193). No association between smoking and periodontitis was observed. While, in the control group, individuals with higher income rarely suffered from periodontitis, the cardiac group demonstrated a reversed tendency (non-significant in either of the groups).

Discussion

To the best of the authors' knowledge, this is the first epidemiological study in Poland designed to compare the periodontal status of patients suffering from MI with healthy subjects in line with the Page and Eke criteria. It indicates wide prevalence of periodontitis among Polish adults, and the problem is significantly worse among patients after MI. Mild periodontitis was observed in 4.6% of the MI patients, moderate periodontitis in 29.8%, and severe periodontitis in 49.7% (5.6, 40.0 and 27.5% in the control group, respectively).

Włosowicz et al. (8), using the classification of periodontal diseases by the AAP, observed mild periodontitis in 29% and severe periodontitis in 41% of the individuals after MI.

Bochniak et al. (9) also analyzed a group of patients hospitalized due to MI and a group of patients with coronary heart disease (CHD) and observed worse status of periodontal tissues in the patients after MI (CPI0 – 3.5%, CPI1 – 2.3%, CPI2 – 5.7%, CPI3 – 23.3%, CPI4 – 65.1% in the MI patients, 4.8%, 6.0%, 9.5%, 41.7%, 38.1% in the CHD patients, respectively). Górski et al. (7) examined 199 patients after MI, aged 40-65 years, using the CPI classification. The authors did not observe any individuals with healthy periodontium (CPI0), and the prevalence of the other CPI codes was: CPI1 – 2%, CPI2 – 13.4%, CPI3 – 38.6%, CPI4 – 46%.

Sosińska (10) also examined a group of age similar as in this study group, hospitalized due to MI, who de-

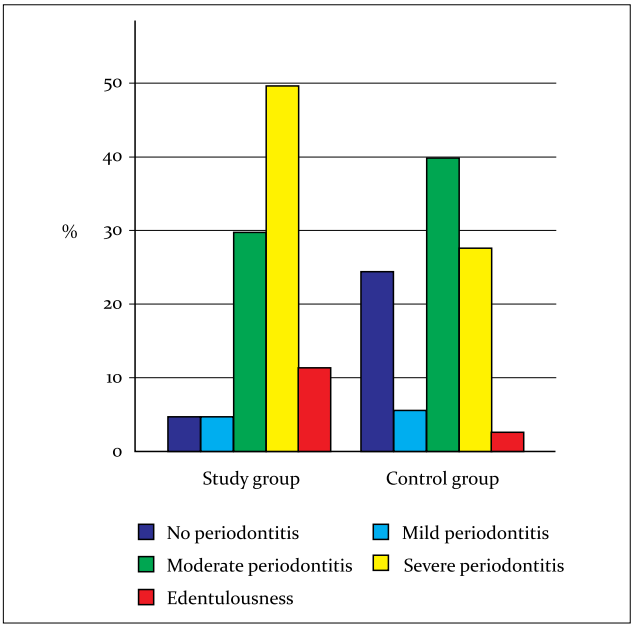

Fig. 1. The periodontal health of the study group and the control group, according to the Page and Eke classification.

Table 1. Comparison of periodontal state of patients after MI (N = 151) and the general population (N = 160).

Page and Eke classification	No periodontitis	Mild periodontitis	Moderate periodontitis	Severe periodontitis	Edentulousness	Comparison (χ^2 test)
MI	7 (4.6%)	7 (4.6%)	45 (29.8%)	75 (49.7%)	17 (11.3%)	p = 0.0005
Control group	39 (24.4%)	9 (5.6%)	64 (40.0%)	44 (27.5%)	4 (2.5%)	

Table 2. Prevalence of periodontitis, according to risk factors.

	MI				Control group			
	No. of patients	**No. of patients with periodontitis**	**% of periodontitis ± SE**	**Comparison (χ^2 test for trend)**	**No. of patients**	**No. of patients with periodontitis**	**% of periodontitis ± SE**	**Comparison (χ^2 test for trend)**
In general	151	127	84.1 ± 3.0%	–	160	117	73.1 ± 3.5%	p = 0.0267
Age group					Age group			
Up to 44 y	18	16	88.9 ± 7.4%	p = 0.0277	45	30	66.7 ± 7.0%	p = 0.3336
45-54 y	43	42	97.7 ± 2.3%		32	26	81.2 ± 6.9%	
55-64 y	75	58	77.3 ± 4.8%		30	20	66.7 ± 8.6%	
Over 65 y	14	11	78.6 ± 11.0%		52	41	78.8 ± 5.7%	
Education					Education			
Primary	53	45	84.9 ± 4.9%	p = 0.9579	11	9	81.8 ± 11.6%	p = 0.0560
Secondary	69	58	84.1 ± 4.4%		66	53	80.3 ± 4.9%	
University	28	24	85.7 ± 6.6%		83	55	66.3 ± 5.2%	
Gender					Gender			
Female	35	25	71.4 ± 7.6%	p = 0.0193	97	66	68.0 ± 4.7%	p = 0.0719
Male	116	102	87.9 ± 3.0%		63	51	81.0 ± 5.0%	
Smoking					Smoking			
Never	28	25	89.3 ± 5.8%	p = 0.4594	94	72	76.6 ± 4.4%	p = 0.1376
Past smoker	26	22	84.6 ± 7.1%		37	27	73.0 ± 7.3%	
Current smoker	96	80	83.3 ± 3.8%		29	18	62.1 ± 9.0%	
Income					Income			
Low*	46	37	80.4 ± 5.8%	p = 0.0665	20	15	75.0 ± 9.7%	p = 0.0759
Medium**	57	48	84.2 ± 4.8%		42	37	88.1 ± 5.0%	
High***	47	44	93.6 ± 3.6%		98	65	66.3 ± 4.8%	

*< 800 PLN (< 200 EUR); **800-1500 PLN (200-360 EUR); ***> 1500 PLN (> 360 EUR)

monstrated the following CPI values: CPI0, CPI1 – 0, CPI2 – 2.28%, CPI3 – 39.39% and CPI4 – 58.33%. A big merit of Sosińska's study is that it used definitions of moderate and severe periodontitis, according to Page and Eke, which concerned respectively 48 patients (36.36%) and 71 patients (53.78%).

In our study, dentition status significantly deteriorated with age in both groups, whereas in the control group it was manifested with increased prevalence of periodontitis and, in the cardiac group, with increased prevalence of edentulism. However, edentulism in our study was not as widespread among patients after MI as in the studies conducted by other authors. Włosowicz (8) reported ER at 30%, Górski et al. (7) at 21.6%, and Sosińska (10) at 17.50%.

This paper is the only study conducted in Poland which compared the condition of periodontal tissues of patients after MI with the general population. An additional merit of this work lies in determining the status of the periodontal tissues using the classification by Page and Eke. Until present, only one study in Poland used this classification (4), including randomly selected inhabitants of Wroclaw aged 35-44. Periodontitis was observed in 23.1% of individuals, and severe periodontitis in 1.6%. Our findings indicate a far worse situation in people aged 45-68, especially patients after MI.

Many studies indicate that prevalence of periodontitis in different populations is significantly higher in males and is associated with age. In the NHANES 2009-2010 study in the U.S.A., severe periodontitis was observed in 12.6% of

males, as compared to 4.5% of females (5). This correlation was also observed in the presented study.

Smoking and income did not appear to show significant correlation with the prevalence of periodontitis in any of the groups. Perhaps it resulted from using only a qualitative scale for these parameters.

Conclusions

The study confirmed poor health status of periodontium in patients after MI. The severity of periodontitis and prevalence of edentoulessness are higher in this group, as compared to the general population.

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