

The evaluation of dentition status in HIV-infected patients

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Abstract

Purpose: The aim of the study was the evaluation of dentition status in patients infected with HIV.

Material and methods: We examined 30 HIV+ patients, aged 20-46 and 30 non-infected subjects as the control group. Oral hygiene and dentition status were estimated. Oral hygiene status using simplified OHI – plague index according to Green and Vermilion. Dentition status was analysed using decay intensity index (DMF) as well as teeth loss index according to Rogowiec. The results were analysed in dependence on HIV infection with regard to infection time.

Results: The results point to a high intensity of decay in HIV+ patients (23.66). There was a positive correlation between infection time and decay intensity and teeth loss evaluated using Rogowiec index. Unsatisfactory oral hygiene status (OHI \geq 1) was observed in 53.33% of infected patients. There is a relation between infection time and oral hygiene status. OHI – plague index increased in patients with infection time longer than 5 years up to 2.99 (patients with shorter than 5 years infection time – 1.17 and the control group – 0.57).

Conclusions:

1. There is a positive correlation between HIV infection and dentition status and oral hygiene.
2. Infection time influences index values: decay intensity, teeth missing, and oral hygiene.
3. HIV+ subjects are patients of high necessity of therapy and because of their basic disease they should come within broadened health education and prophylactic activities.

Key words: HIV infection, dentition status, oral hygiene status.

Introduction

The report of joint program of the United Nations concerning HIV/AIDS and the World Health Organization, published in October 2000, has indicated rapid increase in the number of HIV infection in the Eastern Europe. Although Russia is the most affected by HIV infection, Poland also reveals increase in number of infected subjects from year to year [1]. According to the report of the National Department of Hygiene, only in December 2002, 54 Polish subjects were infected with HIV.

The infection spreads mainly by blood-derivative means, more rarely by sexual way and sporadically by other ways of transmission. Among all HIV-infected in Poland, 70% are drug-addicts who use intravenous narcotics [2,3].

Increasing number of AIDS patients and HIV-infected subjects increases the possibility of contact between infected people and medical care staff. A dentist is a first contact physician who can contribute to early diagnosis of the infection on the basis of case history and oral changes. Oral diseases in sero-positive patients belong to the group of changes characteristic for HIV infection diagnosis. Some of them, e.g. parodontal disease is connected with HIV and ulcerative gingivitis is strongly connected with HIV. On the basis of the observation, in 1992, the World Health Organization has divided disease processes of the oral cavity occurring in the course of HIV infection into 3 groups [3]: Group I – changes strongly connected with HIV, Group II – changes occurring more rarely but connected with HIV, Group III – changes probably occurring in HIV.

The aim of the study was the evaluation of dentition status in patients with HIV. Few studies concerning oral status of HIV-infected patients have been published, which is the reason for the present study. A positive aspect of our examination is the inspiration for discussion among dentists on their cooperation with sero-positive patients.

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Table 1. Dental decay intensity expressed with the mean DMF in examined groups.

Examined group	Number of subjects	D	M	F	DMF
Infected (1)	30	12.93	9.10	1.63	23.66
Non-infected (2)	30	6.07	3.40	5.57	15.04
Statistical analysis – p<0.05 for groups		1 and 2	1 and 2	1 and 2	1 and 2

Table 2. The mean value of DMF and its components with regard to time of infection.

Examined group	Number of subjects	D	M	F	DMF
Infected <5 years (I)	16	15.06	5.69	1.69	22.44
Infected >5 years (II)	14	10.50	13.00	1.57	25.07
Non-infected (III)	30	6.07	3.40	5.57	15.04
Statistical analysis – p<0.05 for groups		1 and 3	1 and 2	1 and 3	2 and 3
			2 and 3	2 and 3	

Material and methods

We carried out the examination in the group of 30 HIV+ patients, 11 women and 19 men, 20-46 years of age. The control group consisted of 30 subjects; respectively chosen as far as sex and age were concerned. Oral examination was conducted at artificial light using diagnostic dental equipment. Oral hygiene and dentitions were evaluated. Oral hygiene status was presented using a simplified Oral Hygiene Index (OHI – plaque) according to Green and Vermilion [4-6]. Dentition status analysis was performed using intensity decay index (DMF – Decayed, Missing, Filled) together with the analysis of particular components of mean DMF [1,7] as well as tooth loss index according to Rogowicz [8].

The results were analyzed regarding HIV infection taking into account time of infection. Time between the moment of potential infection and the examination was considered as infection time. Thus, the patients were divided into 3 groups: group I – patients whose infection time did not exceed 5 years, group II – patients with more than 5 years of infection time, and group III – healthy subjects.

The results were analyzed statistically using Statistica.

Results

The results point to 100% of dental decay occurrence in both examined groups.

The intensity of dental caries, expressed with the mean DMF, is significantly higher in infected patients (DMF=23.66) than in the control group (DMF=15.04). Considering particular components of DMF number in the group of HIV-positive patients we should notice a high number of teeth with active

Table 3. Missing teeth according to Rogowicz in the examined groups.

Examined group	Number of subjects	Molars/ /premolars	Canines	Incisors
Infected (1)	30	5.50	0.60	1.37
Non-infected (2)	30	2.83	0.20	0.43
Statistical analysis – p<0.05 for groups		–	–	–

Table 4. Missing teeth according to Rogowicz in examined groups depending on infection time.

Examined group	Number of subjects	Molars/ /premolars	Canines	Incisors
Infected <5 years (I)	16	3.94	0.44	0.56
Infected >5 years (II)	14	7.29	0.79	2.29
Non-infected (III)	30	2.83	0.20	0.43
Statistical analysis – p<0.05 for groups		1 and 2	1 and 3	1 and 2
		2 and 3		2 and 3

decay/caries process (D=12.93), which exceeds remaining components, i.e. the number of extracted teeth (M=9.10) and the number of filled teeth (F=1.63). Adverse relations could be seen in the control group in which 5.57 of filled teeth, 6.07 teeth with decay/caries, and 3.40 extracted teeth were observed per a person. Statistically significant differences between the examined groups and the controls concern the mean number of DMF index and its components. The result of comparison of filled teeth mean number is particularly unfavorable as the component was several times lower than in the controls. *Tab. 1* presents the data described above.

Dentition status with regard to infection time is presented in *Tab. 2*. Comparing data we can notice that decay intensity, expressed with DMF index, is higher by 2.63 in group II than in group I and by 10.03 than in the controls (group III). We analyzed the structure of particular compounds of mean DMF and observed a correlation between the time of infection, the number of teeth with active decay process (D) and the number of teeth extracted (M). At an early period of infection, the values of D index are high (15.06), approximately 3 times higher than these of M index (5.69). Afterwards, there are changes in these relations, i.e. the number of teeth with active decay process decreases to 10.50 while the number of extracted teeth and the compound increase (M=13.00). The mean number of filled teeth (F) remains stable in both infected groups, group I – 1.69 and group II – 1.57.

Tab. 3 shows mean values of missing teeth index according to Rogowicz [8]. There are generally higher values in HIV-infected patients as compared to non-infected subjects; it concerns all tooth groups. The highest loss was observed in the lateral part (molars and premolars) in sero-positive patients who lost mean 5.50 of teeth, i.e. by 2.67 more teeth than in the controls. The anterior part also reveals higher tooth

Table 5. Oral hygiene status in examined population.

Examined group	Number of subjects	OHI pl X	OHI pl						
			<1			≥1			
			n	%	x	n	%	x	
Infected	<5 years	14	1.17	8	57.14	0.46	6	42.86	1.69
	>5 years	16	2.99	6	37.50	0.50	10	62.50	2.23
	Total	30	2.14	14	46.67	0.43	16	53.33	2.03
Non-infected	Total	30	0.57	22	73.33	0.37	8	26.67	1.12

loss in infected patients and in the part of incisors it reaches the value of 1.37, canine teeth – 0.60 while in non-infected subjects the values were three times lower and were 0.43 and 0.20, respectively.

Tab. 4. presents the analysis of missing teeth depending on infection time. The highest number of missing teeth was observed in patients infected for more than 5 years. The mean number of extracted molar and premolar teeth reached 7.29 while missing teeth index in the lateral part in the rest of patients was approximately two times lower and in group I was 3.94 and in group III – 2.83. After a period of time, infected patients showed the increase in missing front teeth index. Subjects infected for less than 5 years (group I) missed mean 0.56 of incisors while group II had 2.29 incisor extracted. A similar relation could be seen as far as canines were concerned; group I showed 0.44 of missing teeth and 0.79 in group II. Statistical analysis revealed significantly higher tooth loss in subjects with a long duration of infection than in patients infected for less than 5 years and in non-infected. It concerned missing teeth both in the anterior and lateral parts.

Tab. 5. presents oral hygiene status in examined population. It shows that 53.33% of patients with HIV had unsatisfactory status of oral hygiene (the value of OHI index ≥ 1) while 26.67% of the control group revealed high values of this index. The observation was confirmed by mean OHI-plaque index, which equaled 2.14 in infected patients and several times exceeded that of the controls (0.57).

Data presented in Tab. 5. point to the relationship between infection time and oral hygiene status. OHI-plaque index in patients infected for less than 5 years was 1.17 and increased together with duration time of infection up to 2.99 in patients infected for more than 5 years. The percentage of patients with shorter infection time with poor oral hygiene was 42.86% and increased to 62.50% in patients with longer infection time.

Discussion

HIV-positive subjects made a small percentage of people inhabiting Podlasie province. However, as the number of subjects infected increases, their dentitions and dental treatment needs become a problem, which has to be solved. It should be noticed that 76.7% of examined HIV+ patients are addicted to narcotics. A high percentage of addicted in the examined group makes us compare our results and those of Szymaniak et al. [6], who evaluated drug-addicts dentition status. In their studies, DMF index was 18.8 while our studies revealed 23.66 in HIV+ patients and was higher by 4.86. A higher mean number of

DMF in infected patients occurs as a result of more teeth with active decay process and extracted teeth with similar number of filled teeth. The analysis of our results shows a high intensity of decay in HIV+ patients, which is confirmed by some authors [9,10] and denied by others [11].

As far as drug-addicts are concerned, it seems that the degree of their dentition damage is proportional to addiction time [7]. This opinion is confirmed by our studies concerning HIV-positive patients. After a period of time, DMF index increases and its particular compounds are changed. A high number of teeth with active decay process in patients with a short infection time ($P=15.06$) decreases in patients with longer infection time ($P=10.50$). The number of extracted teeth increases from 5.69 in group I to 13.0 in group II. The number of filled teeth does not change. Such a structure of DMF compounds suggests that HIV+ patients, despite high decay intensity, in the first period of infection did not undergo conservative treatment and extractions are the only effect of visits at the dentist's.

Baqui et al. [9] evaluated relation between tooth decay advancement and the level of HIV+ patient viral load. Their results showed that from 42.9% to 69.2% of HIV-positive patients were characterized by a high intensity of decay ($DMF > 20$) and a percentage of patients with high DMF index increased with the increase in viral load.

As far as missing teeth index is concerned, its higher values are generally observed in HIV+ patients. The analysis shows that despite young age of infected people, tooth loss concerned anatomical tooth groups. A high index of missed teeth in the anterior part in HIV+ patients, which in case of both incisor and canine teeth is three times higher than in the controls, attracts attention. The results are confirmed by Szymaniak et al. [6] studies concerning missing teeth in drug-addicts.

Our studies confirmed the opinion that the degree of dentition damage is proportional to HIV infection time. While analyzing the results we observed statistically significant smaller teeth loss in patients with shorter infection time with reference to all groups of teeth. However, we could not find any reports on the relation between particular teeth group loss and infection time.

Oral hygiene reflects dentition status to a certain extend. Our results show the relation between high intensity of decay and poor status of the oral cavity in HIV+ patients. We also observed a correlation between infection time and OHI-plaque and DMF index values. Both worse oral hygiene and dentition status characterized HIV-positive patients with long period of infection as compared to those with shorter time of infection and non-infected subjects. However, there are no reports con-

cerning oral hygiene status in HIV-positive patients. Thus, the comparison is not possible.

As most HIV+ patients are those addicted to narcotics, it can be assumed that intensity of illness process in the oral cavity occurs due to social and psychic disintegration and desistance of oral hygiene [12,13]. During taking drugs, the hierarchy of values and needs changes. After discontinuance, there occurs fear of dental treatment and lack of acceptance by the dentist. It causes postponing visits which leads to marked destruction in dentition.

In conclusions: 1) there is a positive correlation between HIV infection and dentition status and oral hygiene, 2) infection time influences index values: decay intensity, teeth missing, and oral hygiene, 3) HIV+ subjects are patients of high necessity of therapy and because of their basic disease they should come within broadened health education and prophylactic activities.

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