Domagoj Vražić[1], Zoran Miovski[2], Maja Strozzi[2], Ivan Puhar[1], Ana Badovinac[1], Darko Božić[1], Darije Plančak[1]

Povezanost parodontne bolesti s angiografski dokazanom koronarnom arterijskom bolesti

Periodontal Disease and its Association with Angiographically Verified Coronary Artery Disease

[1] Zavod za parodontologiju Stomatološkog fakulteta Sveučilišta u Zagrebu i Klinički zavod za parodontologiju Kliničkog bolničkog centra Zagreb, Hrvatska
Department of Periodontology, School of Dental Medicine, and Clinical Department of Periodontology, Clinical Hospital Center Zagreb, Croatia
[2] Klinika za bolesti srca i krvnih žila Kliničkog bolničkog centra Zagreb, Hrvatska
Department for Cardiovascular Diseases, University Hospital Centre Zagreb, Croatia

Sažetak

Uvod: Svrha ovog istraživanja bila je ispitati povezanost agresivnoga i kroničnog parodontitisa s težinom koronarne arterijske bolesti potvrđene koronarnom angiografijom. **Materijal i metode:** Ispitanici su bili hospitalizirani bolesnici Kliničkoga bolničkog centra Zagreb kojima je zbog boli u prsima obavljena koronarna angiografija. Temeljiti klinički pregled sastojao se od bilježenja parodontoloških indeksa te kliničkih i socijalno-demografskih parametara. Ispitanici su bili podijeljeni u dvije skupine: ispitivanu – u njoj su sudjelovali bolesnici s akutnim koronarnim sindromom (ACS-om) i stabilnom koronarnom arterijskom bolesti (CAD-om) i kontrolnu – s ispitanicima bez značajne koronarne arterijske bolesti. Podatci su analizirani Kruskal-Wallisovim i Pearsonovim hi-kvadrat testom. **Rezultati:** Od 106 ispitanika njih 66 (62,3 %) hospitalizirani su zbog ACS-a, a 22 (20,7 %) zbog stabilnoga CAD-a. Samo 18 sudionika u ispitivanju (17,0 %) nije imalo značajni CAD. Od ukupnoga broja bolesnika – 106, samo njih 26 (24,5 %) nikad nisu bili pušači (p < 0,05). Kronični parodontitis najčešći je nalaz u obje ispitivane skupine – 68,2 posto u skupini s ACS-om i 54,5 posto u onoj sa stabilnim CAD-om, a najviše zdravih pacijenta bez parodontitisa (72,6 %) bilo je u kontrolnoj skupini (p < 0,001). Skupina sa stabilnim CAD-om imala je najvišu srednju vrijednost dubine sondiranja (PD) 3,92 ± 1,16, recesije gingive (GR) 1,34 ± 0,78, razine kliničkog pričvrstka (CAL) 4,60 ± 1,41 i krvarenja pri sondiranju (BOP) 45,98 ± 26,19. U skupini s ACS-om PD je bio 3,77 ± 0,91, GR 1,11 ± 0,66, CAL 4,32 ± 1,08 i BOP 41,30 ± 22,09, a u kontrolnoj skupini izmjeren je PD 3,27 ± 0,97, GR 0,69 ± 0,37, CAL 3,62 ± 1,04 i BOP 26,39 ± 13,92 (p < 0,05). **Zaključak:** Parodontitis je povezan s angiografski potvrđenom koronarnom arterijskom bolesti. Kod bolesnika s ACS-om i stabilnim CAD-om zabilježeni su tjelesna neaktivnost, loša oralna higijena i parodontna upala.

Uvod

Parodontitis je kronična upalna bolest uzrokovana mikroorganizmima i rezultira destrukcijom potpornih struktura zuba. Budući da se radi o multifaktorijalnoj bolesti, dijeli određene rizične čimbenike s drugim bolestima, kao što su, primjerice, one kardiovaskularne (CVD) (1, 2) i dijabetes (3, 4) te ostale sistemske bolesti poput kronične opstruktivne plućne bolesti, reumatoidnog artritisa i metaboličkog sindroma (5). S obzirom na to da od parodontitisa pati više od 47 posto odraslih osoba (6), može se reći da je to učestala bolest. To se može reći i za koronarnu arterijsku bolest (CAD) jer je najčešći oblik bolesti srca, a istodobno je vodeći uzrok smrti u svijetu. Procjenjuje se da je u 2008. godini od kardiovaskularnih bolesti (CVD) umrlo 17,3 milijuna ljudi, što je 30 posto svih smrtnih slučajeva u svijetu, a od toga broja (17,3 mi-

Introduction

Periodontitis is a chronic inflammatory disease which is induced by microorganisms and results in destruction of tooth supporting structures. Being a multifactorial disease, it shares certain risk factors with other systemic diseases, such as cardiovascular diseases (CVD) (1, 2), diabetes (3, 4) and other systemic diseases such as chronic obstructive pulmonary disease, rheumatoid arthritis and metabolic syndrome (5). Affecting more than 47% of the population (6), it can be said that it is a common disease. Coronary artery disease (CAD) is the most common type of heart disease as well and it is the leading cause of death globally, with an estimated 17.3 million people who died from CVD in 2008 representing 30% of all global deaths, of which an estimated 7.3 million were due to coronary heart disease (CHD) (7).

lijuna) oko 7,3 milijuna bolovalo je od koronarne bolesti srca (CHD) (7). Mogući utjecaj parodontitisa na koronarnu arterijsku bolest jest prodor bakterija i njihovih produkata iz usne šupljine u krvotok (8, 9). Posljedica je aktivacija upalne reakcije domaćina koja pridonosi nastanku ateroma, njegova sazrijevanja i konačno oslobađanja, što rezultira nastankom krvnog ugruška (tromba) koji vodi prema CHD-u. Zajednički rizični čimbenici poput dijabetesa, pušenja, genetike, stresa, depresije, fizičke neaktivnosti i pretilosti otežavaju potvrdu povezanosti parodontitisa i CHD-a (10, 11), no dosadašnja istraživanja pokazala su da je bez obzira na zajedničke rizične čimbenike ta povezanost moguća (12 – 14). Štoviše, nedavne metaanalize potvrdile su parodontitis kao čimbenik rizika u slučaju CHD-a, ili marker neovisan o tradicionalnim rizičnim čimbenicima za CAD, s relativnim rizicima u rasponu od 1,24 do 1,35 (15).

Svrha ovog istraživanja bila je ispitati povezanost parodontitisa – kroničnog i agresivnog, s težinom koronarne arterijske bolesti potvrđene koronarnom angiografijom pri hospitalizaciji bolesnika.

Materijali i postupci

Ispitanici uključeni u istraživanje bili su hospitalizirani bolesnici Kliničkoga bolničkog centra Zagreb. Koronarna angiografija obavljena je svima koji su se prije toga požalili na bol u prsima, a korišten je transfemoralni ili transradijalni pristup. Zatim je provedeno detaljno kliničko mjerenje koje je uključivalo indeks tjelesne mase (BMI), tjelesnu aktivnost, pušački status, stupanj obrazovanja i broj vlastitih zuba, te sljedeće parodontološke indekse: indeks plaka (PI), krvarenje pri sondiranju (BOP), dubinu sondiranja parodontnih džepova (PD), recesiju gingive (GR) i razinu kliničkoga pričvrstka (CAL). Parodontološke indekse izmjerio je specijalist parodontologije koristeći se stomatološkim zrcalom i standardnom parodontološkom sondom (PCP-15, Hu-Friedy, Chicago, IL, SAD) koji je bio na treningu i kalibraciji mjerenja. U istraživanje su uključeni samo oni ispitanici koji su bili podvrgnuti koronarnoj angiografiji i imali su najmanje 20 zuba u usnoj šupljini. Svi su trebali ispuniti hrvatsku verziju SF-36 upitnika o zdravlju radi procjene opće kvalitete života (16, 17). Na temelju rezultata koronarne angiografije pregledani ispitanici podijeljeni su u dvije skupine: u prvoj su bili bolesnici s akutnim koronarnim sindromom (ACS), dakle, s nestabilnom anginom pektoris, perzistentnom ST elevacijom infarkta miokarda i bez perzistentne ST elevacije infarkta miokarda, a u drugu ispitivanu skupinu uvršteni su bolesnici sa stabilnim CAD-om. Imali smo i kontrolnu skupinu u kojoj su bili bolesnici s normalnim nalazom koronarne angiografije ili nisu imali značajniji CAD (stenoza koronarnih arterija bila je manja od 50 %). Podatci su analizirani Kruskal-Wallisovim i Pearsonovim hi-kvadrat testom. P vrijednosti manje od 0,05 smatrane su značajnima. Program korišten za analizu podataka bio je IBM SPSS Statisticversion 21.0. (SPSS Inc., Chicago, IL, SAD). Istraživanje je odobrilo Etičko povjerenstvo Stomatološkog fakulteta Sveučilišta u Zagrebu i Etičko povjerenstvo Kliničkoga bolničkog centra Zagreb. Ispitanici su sami odlučivali žele li sudjelovati u istraživanju nakon što su bili potanko obaviješteni o svim detaljima te su morali potpisati informirani pristanak.

The impact of periodontitis on CAD is likely to occur with the entry of bacteria and its products from oral cavity into the bloodstream (8, 9). The activation of host inflammatory response contributes to the atheroma formation, followed by maturation and finally exacerbation which results in formation of blood cloth (thrombus) leading to CHD. Common risk factors such as diabetes mellitus, smoking, genetics, stress, depression, physical inactivity and obesity make it difficult to positively associate periodontitis and CHD (10, 11). However, studies have shown such association regardless of common risk factors to be possible (12-14). Moreover, recent meta-analyses established periodontitis as a risk factor, or as a marker independent of traditional CAD risk factors, for CHD with relative risks ranging from 1.24 to 1.35 (15).

The aim of this research was to investigate the association of periodontitis, both chronic and aggressive form, with the severity of coronary artery disease which was verified angiographically during the patient's hospitalization.

Materials and Methods

Subjects were selected from hospitalized patients at the University Hospital Centre Zagreb, Croatia. Coronary angiography was performed in patients with chest pain using transfemoral or transradial approach. We performed thorough clinical examination which included body mass index (BMI), physical activity, smoking status, education level, number of teeth, as well as the following periodontal indices: plaque index (PI), bleeding on probing (BOP), periodontal probing depth (PD), gingival recession (GR), and clinical attachment level (CAL). Periodontal indices were performed by a single periodontology specialist and measured using dental mirror and a standard periodontal probe (*PCP-15, Hu-Friedy, Chicago, IL, USA*), with prior training and calibration of the examiner. Subjects who were submitted to coronary angiography and had at least 20 teeth in their mouth were included in the study. Patients were also required to fill in a Croatian version of SF-36 Health Survey questionnaire regarding general quality of life assessment (16, 17). Based on the result of the angiography, we divided the examined patients in two test groups: acute coronary syndrome (ACS) test group, which included patients with instable angina pectoris, ST elevation myocardial infarction, non ST elevation myocardial infarction, and stable CAD test group. We had one control group which included subjects who had normal coronary angiography or had no significant CAD (stenoses of coronary arteries were less than 50%). Data were analyzed using Kruskal-Wallis and Pearson's Chi-Square test. P values below 0.05 were considered significant. Software used for data analysis was IBM SPSS Statistics version 21.0. (SPSS Inc., Chicago, IL, USA). This research was approved by the Ethics Committee of School of Dental Medicine, University of Zagreb and by the Ethics Committee of University Hospital Centre Zagreb. Patients were given a choice of participation, all the required information regarding the research and a written consent.

Rezultati

Od 106 pregledanih ispitanika njih 66 (62,3 %) primljeno je zbog ACS-a, 22 (20,7 %) zbog stabilnoga CAD-a, a samo 18 (17,0 %) nije imalo značajniji CAD (tablica 1.). Medijan (interkvartilni raspon) za dob u skupini s ACS-om iznosi 51,0 (45,0 – 59,0) godinu, za skupinu sa stabilnim CAD-om 57,0 (49,0 – 60,0) godina i za skupinu s bolesnicima bez značajnoga CAD-a 51,0 (48,0-59,0) godinu, bez statističke značajnosti među skupinama. Medijan za BMI u skupini s ACS-om iznosi 29,4 (27,0 – 32,2) kg/m², za skupinu sa stabilnim CAD-om 30,0 (27,8 – 33,5) kg/m² i za skupinu bez značajnoga CAD-a 28,2 (25,2 – 29,7) kg/m². Medijan za tjelesnu aktivnost u skupini s ACS-om iznosi 1,0 (0,0 – 3,0), u skupini sa stabilnim CAD-om 1,0 (0,0 – 3,0) i u skupini bez značajnoga CAD-a 0,5 (0,0 – 3,0). Procjena opće kvalitete života nije pokazala značajnost među skupinama. Stupanj obrazovanja pregledanih bolesnika pokazao je značajnost među skupinama, s tim da je najviši stupanj obrazovanja bio najdominantniji u skupini s ACS-om (40 %), a srednji u skupini bez značajnoga CAD-a (72,2 %) (p < 0,05). Skupina s ACS-om imala je najvišu prosječnu vrijednost izloženosti duhanu tijekom života (*pack years*) u iznosu od 16,85 ± 23,13, u skupini sa stabilnim CAD-om to je iznosilo 13,68 ± 22,97, a u sku-
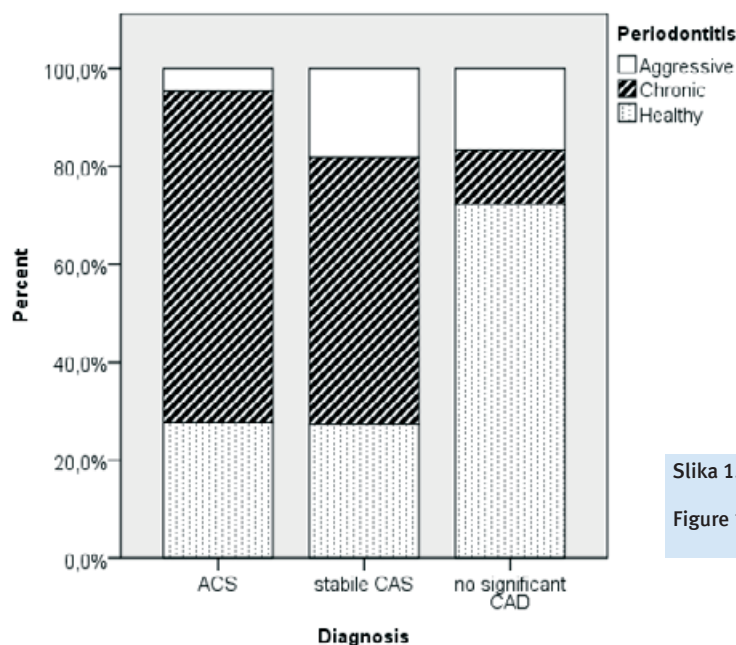
Results

Out of 106 subjects who were examined, 66 (62.3%) were hospitalized for ACS, 22 (20.7%) had stable CAD and only 18 (17.0%) had no significant CAD (Table 1). Median (interquartile range) for age in ACS group was 51.0 (45.0-59.0) years, for stable CAD group 57.0 (49.0-60.0) years and for no significant CAD group 51.0 (48.0-59.0) years with no significant difference between groups. Median BMI for ACS group was 29.4 (27.0-32.2) kg/m², for stable CAD group it was 30.0 (27.8-33.5) kg/m² and for no significant CAD group it was 28.2 (25.2-29.7) kg/m². Median physical activity for ACS group was 1.0 (0.0-3.0), for stable CAD group 1.0 (0.0-3.0) and for no significant CAD group it was 0.5 (0.0-3.0). General quality of life assessment showed no statistical significance in any of the groups. The education level of examined patients showed significance between the groups, with high education level being most dominant in ACS group (40%) and middle education level in no significant CAD group (72.2%) (p<0.05). ACS group had the highest mean value of lifetime tobacco exposure called pack years of 16.85 ± 23.13, stable CAD group had 13.68 ± 22.97 and no significant CAD group had a much less value of 5.00 ± 10.85. Only 26 (24.5%) out of 106 patients were nev-

Tablica 1. Klinički i socijalno-demografski parametri ispitanika
Table 1 Clinical and socio-demographic characteristics of participants

		Dijagnoza • Diagnosis								P
		ACS N=65			Stabilan CAD • Stabile CAD N=22			Bez značajnoga CAD-a • No significant CAD N=18		
Spol • Gender	Muški • Men: n (%)	57	87.7%		17	77.3%		9	50.0%	0.002
	Ženski • Women: n (%)	8	12.3%		5	22.7%		9	50.0%	
Pušenje • Smoking	Ne • No: n (%)	12	18.5%		4	18.2%		10	55.6%	0.011
	Da • Yes: n (%)	33	50.8%		8	36.4%		4	22.2%	
	Bivši • Ex: n (%)	20	30.8%		10	45.5%		4	22.2%	
Stručna sprema • Education Level	NSS: n (%)	6	9.2%		9	40.9%		2	11.1%	0.003
	SSS • High school: n (%)	33	50.8%		8	36.4%		13	72.2%	
	VŠS i VSS • College and university: n (%)	26	40.0%		5	22.7%		3	16.7%	
Dob (broj godina): median (IQR) • Age (number of years): median (IQR)		51.0	(45.0	59.0)	57.0	(49.0	60.0)	51.0	(48.0	59.0)	0.288
BMI (kg/m2): median (IQR) • BMI (kg/m2): median (IQR)		29.4	(27.0	32.2)	30.0	(27.8	33.5)	28.2	(25.2	29.7)	0.247
Tjelesna aktivnost (timesperweek): median (IQR) • Physical activity (times per week): median (IQR)		1.0	(0.0	3.0)	1.0	(0.0	3.0)	0.5	(0.0	3.0)	0.439
Tjelesno funkcioniranje: median (IQR) • Physical Functioning: median (IQR)		55.0	(45.0	70.0)	45.0	(35.0	70.0)	60.0	(45.0	80.0)	0.445
Ograničenje uloge zbog tjelesnih problema: median (IQR) • Role limitation due to Physical problems: median (IQR)		25.0	(0.0	75.0)	12.5	(0.0	75.0)	37.5	(25.0	75.0)	0.368
Ograničenje uloge zbog emocionalnih problema: median (IQR) • Role limitation due to Emotional problems: median (IQR)		66.7	(33.3	100.0)	33.3	(0.0	66.7)	50.0	(0.0	100.0)	0.308
Socijalno funkcioniranje: median (IQR) • Social Functioning: median (IQR)		62.5	(50.0	75.0)	62.5	(50.0	75.0)	56.3	(37.5	75.0)	0.575
Mentalno zdravlje: median (IQR) • Mental Health: median (IQR)		64.0	(52.0	72.0)	52.0	(44.0	76.0)	64.0	(56.0	76.0)	0.307
Energija i vitalnost: median (IQR) • Energy Vitality: median (IQR)		50.0	(40.0	65.0)	37.5	(30.0	55.0)	55.0	(45.0	65.0)	0.263
Bol: median (IQR) • Pain: median (IQR)		50.0	(30.0	70.0)	40.0	(30.0	70.0)	50.0	(30.0	70.0)	0.933
Percepcija općenitog zdravlja: median (IQR) • General Health Perception: median (IQR)		52.0	(35.0	67.0)	43.5	(30.0	50.0)	49.5	(42.0	62.0)	0.176

pini bez značajnoga CAD-a uočena je mnogo manja prosječna vrijednost – 5,00 ± 10,85. Samo 26 (24,5 %) od ukupno 106 ispitanika nije nikad pušilo, 42,4 posto bili su pušači, a 24,5 posto bili su bivši pušači (p < 0,05). U skupini s ACS-om čak 33 od 66 ispitanika bili su pušači (50,0 %), u skupini stabilnoga CAD-a bivši pušači bili su dominantni – njih 45,5 posto, a u skupini bez značajnoga CAD-a bilo je najviše onih koji nisu nikad pušili – 55,6 posto, što je statistički značajno (p < 0,05). Od 106 ispitanika kod 69 (65,1 %) dijagnosticiran je parodontitis. Kronični parodontitis bio je najčešći nalaz u dvjema ispitivanim skupinama – 68,2 posto u skupini s ACS-om i 54,5 posto u skupini sa stabilnim CAD-om, a u kontrolnoj skupini bez značajnoga CAD-a najviše je ispitanika bilo zdravo i bez znakova parodontne bolesti (72,6 %), što je statistički značajno (p < 0,001) (slika 1). Skupina sa stabilnim CAD-om imala je najvišu prosječnu vrijednost izmjere-

er smokers, 42.4% were smokers and 24.5% were previous smokers (p<0.05). In ACS group alone, 33 out of 66 patients were smokers (50.0%), in stable CAD group previous smokers were dominant with 45.5% and in no significant CAD group never-smokers had the highest population of 55.6% with significance between the groups (p<0.05). Out of 106 patients in total, 69 (65.1%) were diagnosed with periodontitis. Chronic periodontitis was the most common finding in the two test groups, with 68.2% in ACS group and 54.5% in patients with stable CAD, while in the control group with no significant CAD the most common finding were healthy patients without periodontitis (72.6%), it was significant between the groups (p<0.001) (Figure 1). Stable CAD group had the highest mean PD (3.92 ± 1.16), GR (1.34 ± 0.78) and CAL (4.60 ± 1.41) values, whereas ACS group had mean PD value of 3.77 ± 0.91, GR 1.11 ± 0.66 and CAL 4.32 ±

Slika 1. Parodontitis u relaciji s koronarnom arterijskom bolesti: hi-kvadrat test, p < 0,001

Figure 1 Periodontitis in relation to coronary artery disease: chi-square test, p<0.001

Tablica 2. Kliničke obilježja
Table 2. Clinical characteristics

	Dijagnoza • Diagnosis									P
	ACS N=65			Stabilan CAD • Stabile CAD N=22			Bez značajnoga CAD-a • No significant CAD N=18			
Broj zuba: median (IQR) • Number of teeth: median (IQR)	23.0	(21.0	27.0)	23.0	(20.0	26.0)	23.0	(21.0	27.0)	0.906
PI – plak indeks (%): median (IQR) • PI - plaque index (%): median (IQR)	63.0	(45.0	76.0)	56.0	(48.0	72.0)	52.0	(40.0	67.0)	0.538
BOP – krvarenje pri sondiranju (%): median (IQR) • BOP – bleeding on probing (%): median (IQR)	42.0	(19.0	60.0)	45.0	(24.0	70.0)	24.5	(15.0	30.0)	0.022
PD – dubina sondiranja (mm): median (IQR) • PD – probing depth (mm): median (IQR)	3.7	(3.0	4.4)	3.7	(3.1	4.6)	2.8	(2.7	3.5)	0.036
GR – recesija gingive (mm): median (IQR) • GR – gingival recession (mm): median (IQR)	1.0	(0.6	1.6)	1.2	(0.6	1.7)	0.6	(0.4	1.0)	0.015
CAL – razina kliničkoga pričvrstka (mm): median (IQR) • CAL – clinical attachment level (mm): median (IQR)	4.4	(3.4	5.1)	4.4	(3.6	4.9)	3.2	(3.0	3.6)	0.010

nih parodontoloških indeksa, odnosno dubinu sondiranja u iznosu od 3,92±1,16, recesija gingive bila je 1,34 ± 0,78, razina kliničkoga pričvrstka 4,60 ± 1,41 i krvarenja pri sondiranju 45,98 ± 26,19. U skupini s ACS-om prosječna izmjerena vrijednost iznosila je za dubinu sondiranja 3,77 ± 0,91, recesiju gingive 1,11 ± 0,66, razinu kliničkog pričvrstka 4,32 ± 1,08 i krvarenje pri sondiranju 41,30 ± 22,09. U kontrolnoj skupini bez značajnoga CAD-a izmjerene prosječne vrijednosti bile su najniže – za dubinu sondiranja 3,27 ± 0,97, recesiju gingive 0,69 ± 0,37, razinu kliničkog pričvrstka 3,62 ± 1,04 te krvarenje pri sondiranju 26,39 ± 13,92 (tablica 2.). Navedeni izmjereni parodontološki indeksi pokazali su statističku značajnost među skupinama (p < 0,05). Jedino indeks plaka nije pokazao značajnost među skupinama, s prosječnom vrijednosti u skupini s ACS-om 58,44 ± 20,99, u skupini sa stabilnim CAD-om 57,45 ± 20,82 i u kontrolnoj skupini bez značajnoga CAD-a 53,67 ± 18,61.

1.08, and no significant CAD group had mean PD value of 3.27 ± 0.97, GR 0.69 ± 0.37 and CAL 3.62 ± 1.04 (Table 2). These periodontal indices showed statistical significance between the groups (p<0.05), as well as BOP whose mean value for ACS group was 41.30 ± 22.09, stable CAD group 45.98 ± 26.19 and no significant CAD group 26.39 ± 13.92 (p<0.05). Only PI did not show significance between the groups, with mean value for ACS group 58.44 ± 20.99, stable CAD group 57.45 ± 20.82 and no significant CAD group 53.67 ± 18.61.

Rasprava

Tradicionalni rizični čimbenici za CHD dobro su poznati. To su muški spol, dob, pušenje, dislipidemija, pretilost, dijabetes, arterijska hipertenzija i nasljedni čimbenici (18). Većina ispitanika primljenih u bolnicu zbog boli u prsima bili su muškarci. U opsežnim epidemiološkim istraživanjima muški spol je identificiran kao rizični čimbenik za CAD (18). Dob je isto tako rizični čimbenik za CAD, ali ovisi i o spolu. Rizični čimbenik za CAD je dob viša od 45 godina za muškarce i viša od 55 godina za žene (19). U našem istraživanju među skupinama nije bilo statistički značajne razlike kad je riječ o dobi.

Pušenje je još jedan rizični čimbenik za CAD (18). U svijetu se može do 30 posto svih ukupnih smrti zbog CHD-a pripisati pušenju cigareta, s tim da je rizik usko povezan s dozom (20, 21). Pušenje djeluje sinergijski s ostalim rizičnim čimbenicima i znatno povećava opasnost od CAD-a. Kao što smo i očekivali, znatno je više ispitanika-pušača u skupinama s ACS-om i stabilnim CAD-om. Pušenje je također dokazani rizični čimbenik za parodontitis (22).

Prekomjerna tjelesna masa definira se kao BMI u rasponu od 25 do 29,9 kg/m2, pretilost kao BMI od > 30 kg/m2 i teška pretilost kao BMI > 40 kg/m2. U više epidemioloških istraživanja procjenjivao se odnos između pretilosti i smrtnosti (23). Opsežna metaanaliza koja je obuhvatila 97 istraživanja (2,88 milijuna ljudi) pokazala je da je pretilost povezana s većom smrtnošću [omjer rizika (HR) 1,18, 95 % CI 1,12 – 1,25 za sve stupnjeve pretilosti kombinirano] (24). Općenito, veći indeks tjelesne mase (BMI) povezan je s povećanom stopom smrtnosti od svih uzroka, pa tako i od CVD-a. Rizik smrtnosti od svih uzroka raste s BMI-om od 25 kg/m2 ili više. Sve skupine ispitanika imale su povišeni BMI, ali nije bilo velike razlike, iako su ispitanici bez značajnoga CAD-a imali najnižu vrijednost.

Vjerojatno zbog manje pregledanih ispitanika nismo uspjeli naći statističku značajnost kad je u pitanju procjena općenite kvalitete života, osim granično u jednoj od osam kategorija – ograničenju uloge zbog tjelesnih problema (p = 0,093).

Discussion

Traditional risk factors for CHD are well known. They include male gender, age, smoking, dyslipidemia, obesity, diabetes, arterial hypertension and hereditary factors (18). Majority of subjects who were admitted to the hospital because of chest pain were largely male. In large epidemiological studies male gender is identified as risk factor for CAD (18). Age is also a risk factor for CAD, but it is also dependent on gender. Risk factor for CAD is over 45 years of age in males and 55 years in females (19). In our study, there were no significant age differences between the groups.

Smoking is another risk factor for CAD (18). As many as 30% of all CHD deaths worldwide each year are attributable to cigarette smoking, with the risk being strongly dose-related (20, 21). Smoking acts synergistically with other risk factors, substantially increasing the risk of CAD. As we expected, significantly more patients with acute coronary syndrome and stable CAD were smokers. Smoking is also a well-established risk factor for periodontitis (22).

Overweight is defined as a BMI of 25 to 29.9 kg/m2, obesity as a BMI of >30 kg/m2. Severe obesity is defined as a BMI >40 kg/m2. A number of large epidemiologic studies have evaluated the relationship between obesity and mortality (23). A large meta-analysis of 97 studies (2.88 million individuals) showed that being obese was associated with higher all-cause mortality (hazard ratio [HR] 1.18, 95% CI 1.12-1.25 for all grades of obesity combined) (24). In general, greater body mass index (BMI) is associated with increased rate of death from all causes and from CVD. The risk of all-cause mortality is increasing with BMI of 25 kg/m2 or higher. All groups of subjects had increased BMI, but there was no statistically significant difference between the groups, although individuals with no significant CAD had the lowest BMI value.

Probably due to a low number of patients examined we were not able to find any statistical significance in the general quality of life assessment, except marginally in one of eight fields of the questionnaire, role limitation due to physical problems (p=0.093).

Glavni nalaz ovog istraživanja pokazao je da gotovo svi izmjereni parodontološki indeksi imaju značajnu povezanost između skupina, osim PI-a, što možemo objasniti lošijom oralnom higijenom tijekom boravka u bolnici. Krvarenje pri sondiranju, dubina sondiranja, recesija gingive i razina kliničkoga pričvrstka bili su značajno viši u ispitivanim skupinama s ACS-om i stabilnim CAD-om. Na osnovi tih mjerenja i kliničkoga pregleda ustanovili smo da je samo trećina ispitanika parodontološki zdrava – hi-kvadrat test p < 0,001, (slika 1.). Nedavno objavljeno pregledno istraživanje o povezanosti klinički ili radiografski dijagnosticirane parodontne bolesti i CVD-a, uključilo je šest od dvanaest istraživanja vezanih za CHD-e te je u svima, osim u jednome, istaknuta pozitivna povezanost između parodontne bolesti i mjerenih indeksa s incidencijom za CVD (25).

Prevencija CHD-a uključuje uklanjanje rizičnih čimbenika, a parodontitis je jedan od njih (15). Nekoliko je autora istraživalo je li potrebna rigorozna preventivna i parodontološka njega kako bi se smanjio kardiovaskularni rizik (26), popravili nalazi biomarkera i ishodi CVD-a (27) te utječe li parodontološka terapija pozitivno na smanjenje razine serumskoga C-reaktivnog proteina i na poboljšanje funkcije endotela (27, 28). Prema tome, pravodobna dijagnoza parodontitisa u populaciji te ciljana terapija i održavanje, trebali bi biti najvažniji u smanjenju opasnosti od CHD-a.

The main findings of the present study showed that almost all measured periodontal indices have significant association between the groups, except PI which can be explained by poor oral hygiene during the stay in hospital. BOP, PD, GR and CAL were significantly higher in both ACS and stable CAD group. Based on these measures and clinical examination, we found that only 1/3 of examined patients were periodontally healthy, chi-square test p<0.001, (Figure 1). Recent systematic review of the association of clinically or radiographically diagnosed periodontal disease and CVD included six out of twelve studies on CHD and all but one study reported positive associations between periodontal disease and status measures and the incidence of CVD (25).

The prevention of CHD includes elimination of risk factors, with periodontitis being one of them (15). Several authors have examined the possibility that rigorous preventive and periodontal care is needed to reduce the cardiovascular risk (26) as well as to improve biomarkers and CVD outcomes (27) and that periodontal therapy has a positive effect in reducing serum C-reactive protein levels and improving the endothelial function (27, 28). Therefore, the diagnosis of periodontitis in population and its treatment and maintenance should be of utmost importance in order to reduce the risk for CHD.

Zaključak

Ovo istraživanje pokazalo je da je parodontitis povezan s angiografski potvrđenom koronarnom arterijskom bolesti. Tjelesna neaktivnost, loša oralna higijena i parodontna upala uočena je kod bolesnika s akutnim koronarnim sindromom i stabilnom koronarnom arterijskom bolesti. Kod gotovo dvije trećine ispitanih bolesnika dijagnosticiran je parodontitis i zato ta skupina bolesnika čini rizičnu skupinu kad je riječ o razvoju koronarne arterijske bolesti.

Conclusion

This study showed that periodontitis is associated with angiographically verified coronary artery disease. Physical inactivity, poor oral hygiene and periodontal inflammation were observed in patients with ACS and stable CAD. Almost 2/3 of the examined patients had periodontitis and as such pose a risk for CAD development.

Izjava

Autori nisu ni u kakvom sukobu interesa.

Transparency declaration

The authors deny any conflicts of interest.

Abstract

Purpose: The aim of this research was to investigate the association of chronic and aggressive periodontitis with the severity of coronary artery disease which was angiographically verified. **Material and methods:** Subjects were selected among the hospitalized patients at the University Hospital Centre Zagreb who had coronary angiography done because of the chest pain. Thorough clinical examination included periodontal indices and clinical and socio-demographic characteristics of participants. Subjects were divided in two test groups, acute coronary syndrome (ACS) and stable coronary artery disease (CAD), and the control group with no significant CAD. Data were analyzed using Kruskal-Wallis and Pearson's Chi-Square test. **Results:** From 106 subjects, 66 (62.3%) were hospitalized for ACS, 22 (20.7%) had stable CAD and only 18 (17.0%) had no significant CAD. Only 26 (24.5%) out of 106 patients were never smokers (p<0.05). Chronic periodontitis was the most common finding with 68.2% in ACS group and 54.5% in stable CAD group, while healthy patients without periodontitis (72.6%) were dominant in the control group (p<0.001). Stable CAD group had the highest mean probing depth (PD) 3.92±1.16, gingival recession (GR) 1.34±0.78, clinical attachment level (CAL) 4.60±1.41 and bleeding on probing (BOP) 45.98±26.19 values, whereas ACS group had mean PD value of 3.77±0.91, GR 1.11±0.66, CAL 4.32±1.08 and BOP 41.30±22.09, and no significant CAD group had mean PD value of 3.27±0.97, GR 0.69±0.37, CAL 3.62±1.04 and BOP 26.39±13.92 (p<0.05). **Conclusion:** Periodontitis was shown to be associated with angiographically verified coronary artery disease. Physical inactivity, poor oral hygiene and periodontal inflammation were observed in patients with ACS and stable CAD.

Address for correspondence
Domagoj Vražić, dr.med.dent.
Sveučilište u Zagrebu
Stomatološki fakultet
Zavod za parodontologiju
Gundulićeva 5, HR-10000 Zagreb,
Hrvatska
tel: +385 14899202
Fax: +385 14802159
vrazic@sfzg.hr

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