Impact of Chronic Periodontitis on the angiographic severity of Coronary Artery Disease

Thesis

Submitted for partial fulfillment of Master degree in Cardiology

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2011

AKNOWLEDGMENTS

I would like to express my deepest gratitude and appreciation to Professor Dr. Soliman Gharib, professor of Cardiology, Cairo University, for his supervision, valuable contribution with knowledgment and advice during the course of this study. Without his support, this work would not have reached its final stages.

My great thanks and appreciation to Dr. Esam Baligh, Assistant Professor of Cardiology, Cairo University, for his exact, generous supervision and his expert guidance during the course of this work.

I would like also to express my sincere appreciation and gratitude to Professor Dr. Samar El Kholy, professor of Oral Medicine and Periodontology, Cairo University, for her sincere help, advice and support.

Abstract

In the present study, 128 patients scheduled for CA, were classified into two groups (patients and control) according to coronary angiographic findings, all study population underwent oral examination for assessment of their periodontal parameters. The angiographic severity of CAD was assessed by the number of diseased coronaries and the SYNTAX score.

Key word: CVD- CAD- CP- coronary- Atherosclerotic

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CVD	Cardiovascular Disease.
CHD	Coronary Heart Disease.
CAD	Coronary Artery Disease.
CP	Chronic Periodontitis.
CABG	Coronary Artery Bypass Grafts
CAL	Clinical Attachment Loss.
CA	Coronary Angiography.
CVRF	Cardiovascular Risk Factors.
DM	Diabetes Mellitus.
GFR	Glomerular Filtration Rate.
GI	Gingival Index.
HDL	High Density Lipoprotein cholesterol.
hsCRP	High sensitive C- Reactive Protein.
IL-1	Interleukin 1.
IL-6	Interleukin 6.
IL-8	Interleukin 8.
LCA	Left Coronary Artery.
LCX	Left Circumflex artery.
LAD	Left Anterior Descending artery.
LDL	Low Density Lipoprotein cholesterol.
LPS	Lipopolysaccharide
MMP	Matrix Metalloproteinase.
MI	Myocardial Infarction
OM	Obtuse Marginal branch.
OR	Odds Ratio.
PD	Periodontal Pocket Depth.
PDA	Posterior Descending Artery.
PLB	Postero-lateral Branch.
PCI	Percutaneous Coronary Intervension.
PGE-2	Prostaglandin E-2.
PD	Pocket Depth.
PVD	Peripheral Vascular Disease.

PI	Plaque Index.
RCA	Right Coronary Artery.
RR	Relative Risk.
SRP	Scaling and Root Planning.
SMC	Smooth Muscle Cells.
SS	Syantax Score.
TNF-**α**	Tumor Necrosis Factor alpha.
VCAM.1	Vascular Cell Adhesion Molecule 1.
WHO	World Health Organisation.

Atherosclerosis affecting the entire arterial circulation, has many clinical manifestations named **CVD** that include: **CHD**, **Stroke** and **PVD**. Among these manifestations CHD is the most important. **(Jukka et al. 2004) (Kuller et al. 1998)**

In the last ten years, several epidemiological studies have assessed the association between oral infection and systemic diseases. These studies have provided support that oral infections, specifically **periodontitis** may confer idependent risks for different systemic conditions. **(Renvert 2003)**

Since **CVD** are the leading cause of death worldwide, greater attension has been focused on the evidence that infections of the oral cavity might be associated with atherothrombosis.

The established risk factors for CVD include male gender, diabetes mellitus, hypertension, smoking and dyslipidemia may explain at least partially the development of coronary artery disease (CAD). However, many cases of CAD develop in the absence of traditional cardiovascular risk factors.

Periodontal disease, which involves gram-negative bacteria has been reported to be a significant predictor of CHD.**(Beck et al. 1996)**

Chronic Periodontitis is characterized by inflammatory destruction of the alveolar bone as well as loss of the soft tissue attachment to the teeth. Once initiated, CP maintains a slowly progressive and destructive character with periods of exacerbation and remission. **(Ranny 1991)** Periodontitis constitutes an active lever for systemic subclinical inflammation enhancement and eventually contributes to endothelial and vascular dysfunction.

Several epidemiological and case-control studies have indicated associations between CVD and CP. **(Morrison et al. 1999)** Contradictory conclusions have also been reported in that when controlling for one

potential confounding factor no significant association between CVD and CP could be identified. **(Hujoel et al. 2001)**

Because both CHD and periodontal disease have a multifactorial etiology, as well as a wide variety of possible confounding factors, a clear cut consensus on the importance of the relationship between these two conditions has been difficult to obtain.

The aim of this study is evaluation of the potential relation between CP and angiografic severity of CHD and assessment of the predictive value of periodontal parameters; Periodontal pocket depth (**PD**), gingival index (**GI**) and plaque index (**PI**) in CAD.

Coronary Artery Disease (CAD)

- **Anatomy of the Coronary Arteries**:

The right and left coronary arteries originate from the right and left sinuses of Valsalva of the aortic root, respectively. The posterior sinus rarely gives rise to a coronary artery and is referred to as the "noncoronary sinus." The locations of the sinuses are anatomic misnomers: The right sinus is actually anterior in location and the left sinus is posterior. The myocardial distribution of the coronary arteries is somewhat variable, but the right coronary artery (RCA) almost always supplies the right ventricle (RV), and the left coronary artery (LCA) supplies the anterior portion of the ventricular septum and anterior wall of the left ventricle (LV). The vessels that supply the remainder of the LV vary depending on the coronary dominance, which will be explained later.**(Anderson Cardiac Anatomy 1980)**

- **RCA Anatomy**;

The RCA arises from the right coronary sinus somewhat inferior to the origin of the LCA. After its origin from the aorta, the RCA passes to the right of and posterior to the pulmonary artery and then emerges from under the right atrial appendage to travel in the anterior (right) atrio-ventricular (AV) groove. In about half of the cases, the conus branch is the first branch of the RCA. In the other half, the conus branch has an origin that is separate from the aorta. The conus branch always courses anteriorly to supply the pulmonary outflow tract. Occasionally, the conus branch can be a branch of the LCA, have a common origin with the RCA, or have dual or mul ple branches. In 55% of cases, the

sinoatrial nodal artery is the next branch of the RCA, arising within a few millimeters of the RCA origin. In the remaining 45% of cases, the sinoatrial nodal artery arises from the proximal left circumflex (LCx) artery. In either case, the sinoatrial nodal artery always courses toward the superior vena cava inflow near the cephalad aspect of the interatrial septum. As the RCA travels within the anterior AV groove, it courses downward toward the posterior (inferior) interventricular septum. As it does this, the RCA gives off branches that supply the RV myocardium; these branches are called “RV marginals” or “acute marginals”. They supply the RV anterior wall. After it gives off the RV marginals, the RCA continues around the perimeter of the right heart in the anterior AV groove and courses toward the diaphragmatic aspect of the heart. **(Kirklin et al.1993)**

- **LCA Anatomy;**

The LCA normally emerges from the left coronary sinus as the left main (LM) coronary artery. The LM coronary artery is short (5–10 mm), passes to the left of and posterior to the pulmonary trunk, and bifurcates into the left anterior descending (LAD) and LCX arteries. Occasionally, the LM coronary artery trifurcates into the LAD artery, the LCX artery, and the ramus intermedius artery. **(Voci et al. 1995)**

❖ Ramus Intermedius Artery:

The most common variation in LCA anatomy is the presence of a trifurcation of the LM coronary artery. In this instance, the LM coronary artery trifurcates into the LAD artery, LCx arteries, and an artery between them called the "ramus intermedius" artery. The ramus intermedius artery itself has variable branching. The ramus intermedius can be distributed as a diagonal branch or as an obtuse marginal branch depending on whether it supplies the anterior or the lateral wall, respectively.**(Schlant Anatomy of the heart 1986)**

❖ LAD Artery:

The LAD artery runs in the anterior interventricular sulcus along the ventricular septum. Commonly, the LAD artery may be embedded within the anterior myocardium forming an overlying myocardial bridge. Myocardial bridging is seen more often on CT than described in the coronary angiography literature. Most myocardial bridges are asymptomatic, although rarely myocardial bridging can be associated with ischemia. The LAD artery has branches called "septal perforators" that supply the anterior ventricular septum. It also has diagonal arteries that course over and supply the anterior wall of the LV. The diagonals and septal perforators are numbered sequentially from proximal to distal (i.e., D1, D2, S1, S2). **(Voci et al. 1995)**