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Original Article

Correlation of plasma osteopontin and osteocalcin with lower renal function in dental patients with carotid artery calcification and tooth loss

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ABSTRACT

Objectives: To investigate plasma osteopontin (OPN) and osteocalcin (OCN) levels in dental patients with carotid artery calcification (CAC) and determine the correlations between these proteins and renal function and tooth loss.
Methods: The health parameters and number of teeth of 99 participants were recorded. Panoramic radiographs were taken for CAC evaluation, and OPN and OCN levels were measured.
Results: None of the participants had overt kidney disease, and 14 (14.14%) had CAC. The age, sex, and health profiles of patients with CAC were not different from those without CAC. The OPN and OCN levels in participants with CAC were higher than in those without ($p = 0.026$ and $p = 0.025$, respectively). The OPN levels were correlated with the estimated glomerular filtration rate (eGFR) ($p = 0.021$) and tooth loss ($p = 0.027$). The OCN levels were correlated with the eGFR ($p = 0.002$), tooth loss ($p = 0.023$), blood urea nitrogen ($p = 0.040$), and creatinine levels ($p = 0.031$). The median tooth loss in individuals with an eGFR <60 mL/min/1.73 m^2 was higher than that of individuals with an eGFR ≥60 mL/min/1.73 m^2 ($p = 0.033$). In individuals with CAC, tooth loss correlated more strongly with the eGFR, and the correlation between OPN and OCN levels was more apparent.
Conclusion: Dental patients with CAC and increased tooth loss have a greater tendency for decreased renal function, which may be associated with OPN and OCN; thus, these patients should be referred for investigation.

1. Introduction

Vascular calcification (VC) appears with increased prevalence in atherosclerosis, cardiovascular disease (CVD), and chronic kidney disease (CKD). Recent investigations have shown that VC is a complicated pathological process in which one of the main factors is low-grade inflammation, which contributes to endothelial dysfunction [1]. Several proteins and factors are associated with VC. Osteopontin (OPN) and osteocalcin (OCN), both bone-related proteins, are involved in vascular remodeling and calcification at ectopic sites and demonstrate a close interaction with the glomerular filtration rate. An overexpression of OPN and OCN in CKD patients has been reported, and these proteins are possible predictive biomarkers in VC, atherosclerosis, CKD, and CVD [2,3].

Osteopontin regulates numerous biological activities, including bone matrix remodeling, tissue calcification, production of various pro–inflammatory cytokines, and it can also promote macrophage adhesion, migration, and vascular smooth muscle cell proliferation [4]. Osteopontin is present in the extracellular matrix of

Abbreviations: BUN, Blood urea nitrogen; CAC, Carotid artery calcification; eGFR, Estimated glomerular filtration rate; OCN, Osteocalcin; OPN, Osteopontin.

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