Older drug users and those of low socioeconomic status were at higher risk for oral health problems.

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Reprints available from H Shekarchizadeh, Dept of Community Oral Health, School of Dentistry, Islamic Azad Univ, Isfahan (Khorasgan) Branch, University Blvd, Arqavanieh, Jey St, PO Box 81595-158, Isfahan, Iran; e-mail: shekarchizadeh@razi.tums.ac.ir

ORAL/SYSTEMIC CONNECTIONS

Dental treatment and risk for cardiovascular events

BACKGROUND

A transient increase in the risk for myocardial infarction (MI) and ischemic stroke (IS) occurs with acute infections and has been attributed to a change in the systemic inflammation levels. Inflammation is an important component in the initiation and progression of atherosclerotic lesions, with rupture of lipid-rich plaque in the arterial wall associated with MI and IS. Evidence has suggested an association between oral health and cardiovascular events that is focused specifically on chronic dental infections inducing atherosclerosis. Some evidence also indicates that invasive dental treatments (IDTs) may be associated with MI/IS, but the association is controversial because of the small sample sizes, participant selection process, and limited adjustment of confounding factors in existing studies. A robust statistical approach was taken to evaluating the relationship between IDTs and MI/IS using a large Taiwanese study cohort.

METHODS

The Health Insurance Database in Taiwan (National Health Insurance Administration 2014) was used to select patients for 2 analytic approaches: a case-crossover design and a self-controlled case series (SCCS) design. Burn patients were used as a negative control group to evaluate the potential effect of residual confounding. A total of 123,819 MI patients, 327,179 IS patients, and 73,247 burn patients were used for the case-crossover analysis. A total of 117,655 MI patients, 298,757 IS patients, and 84,239 burn patients were used for the SCCS analysis. Conditional logistic regression modeling and conditional Poisson regression models were used to estimate the risks of MI/IS.

RESULTS

Case-crossover Analysis

For MI, the odds ratios (ORs) for IDTs for exposure periods of 3 and 7 days and 2, 4, 8, 12, and 16 weeks showed no statistical significance, being very close to unity. The ORs of IDTs were slightly less than 1 but statistically significant when the exposure periods were extended to 20 and 24 weeks.

For IS, the ORs of IDTs for exposure periods of 3 and 7 days and 2 and 4 weeks were not statistically significant and close to unity. They became slightly less than 1 but statistically significant when length of exposure was increased to 8 weeks or longer.

The sensitivity analysis using burn patients indicated ORs of IDTs within 3 and 7 days and 2, 4, and 8 weeks were nonsignificant and close to unity. When the length was extended to 16 weeks or longer, the ORs of IDTs increased to slightly more than 1 but were statistically significant. The gender-specific results were similar to those for the pooled analysis.

For MI, the ORs of high-risk IDTs for exposure periods of 3 and 7 days and 2, 4, and 8 weeks did not reach statistical significance. ORs were statistically significant when the exposure was 12 weeks or longer.

For IS, the ORs of high-risk IDTs were less than 1 but became statistically significant for longer exposures. When burns were considered, the OR of high-risk IDTs within 3 days was 0.69, but became close to 1 and not statistically significant when the exposure was 7 days or longer.

When the analysis considered only patients over age 50 years, the results were similar to those for the analysis of all patients.

Sensitivity analyses excluding previous comorbidities yielded ORs of IDTs and MI of 1.31 and 1.15 for 3- and 7-day exposures, respectively. The ORs approached unity for exposures of 2 weeks or longer. The ORs for IDTs and IS were close to unity for all periods of exposure.

SCCS Analysis

For MI, the age- and seasonality-adjusted incidence rate ratios (AIRRs) were close to unity for all periods of risk. The IS AIRR was 0.94 for 1 to 3 days after IDTs compared to baseline but became significantly higher than 1 for the other risk periods. AIRRs for burn at each period were close

to unity. Similar results were obtained in a gender-specific analysis.

For MI/IS, the AIRRs after high-risk IDTs were similar to those for the primary analysis. AIRRs for burns were 0.75 for 1 to 3 days and 1.18 for 8 to 14 days after IDTs. The burn AIRRs for the other risk periods showed no statistical significance.

A subgroup analysis of AIRRs of MI/IS focused just on patients over age 50 years yielded results similar to those for the primary analysis.

The sensitivity analysis that excluded patients with previous comorbidities yielded AIRRs of MI of 1.16 for 1 to 3 days and 1.13 for 4 to 7 days after IDTs. Those for the remaining risk periods were close to unity and of no statistical significance. The AIRRs of IS in this population were 0.97 for 1 to 3 days but increased thereafter to 1.10 to 1.13, which were statistically significant results, when the risk exposure periods increased. A sensitivity analysis excluding patients who died within 30 days of MI/IS yielded results similar to those of the primary analysis.

DISCUSSION

IDTs and transient risk of either MI or IS showed no substantial association. High-risk IDTs, which can cause more bleeding, also lacked any relationship to either MI or IS. The evidence for various subgroup analyses also did not support a relationship between IDTs and MI or IS.

Clinical Significance

No strong association could be found between the risk for MI/IS and IDTs or high-risk IDTs in this Taiwanese population. A modest relationship was noted for IDTs and an acute incidence for MI in otherwise healthy participants, but age did not influence this relationship. Studies are needed to determine if a long-term relationship is present between dental infections and diseases and MI/IS.

Chen TT, D'Aiuto F, Yeh YC, et al: Risk of myocardial infarction and ischemic stroke after dental treatments. *J Dent Res* 98:157-163, 2019

Reprints available from YK Tu, Inst of Epidemiology and Preventive Medicine, College of Public Health, Natl Taiwan Univ, No 17, Xuzhou Rd, Zhongzheng Dist, Taipei City, Taiwan; e-mail: yukangtu@ntu.edu.tw

Missing teeth indicate cardiovascular event risk

BACKGROUND

Caries and periodontal disease are the primary reasons for the loss of teeth. Poor oral health has been found to be associated with subclinical atherosclerosis and cardiovascular disease (CVD), although no causality has been clearly proved. Oral disease and CVD share risk factors such as age, male sex, smoking, diabetes, hypertension, and obesity. The link between oral disease and CVD may be explained by chronic inflammation and repeated bacteremia from the oral cavity. Tooth loss is a simple way to indicate the accumulated inflammatory burden of oral disease and has been associated independently with cardiovascular events and mortality in epidemiologic studies. The association between oral health as represented by tooth loss and long-term cardiovascular outcomes was evaluated in a nationwide population-based cohort in Korea.

METHODS

The data were taken from the National Health Insurance Service (NHIS), which provides health care benefits and regular health checkups for the Korean population. A total of 4,440,970 subjects were included in the analysis and followed up to 2016. Each had standardized health examinations performed in hospitals. These included dental examinations by a dentist, completion of a questionnaire for dental hygiene, and oral health instructions. Number of teeth lost and presence of periodontal disease were noted. The maximum number of teeth was defined as 28, excluding third molars. Groups were then divided according to the number of teeth lost as 0, 1-4, 5-14, 15-27, and 28, which was considered edentulous. The outcomes investigated were myocardial infarction (MI), ischemic stroke, heart failure (HF), and all-cause mortality. Follow-up lasted a median of 7.59 years.

RESULTS

The mean age of the population at baseline was 42.5 years, and 61.6% were men. Just 2.2% had 5 or more teeth missing, with 97.8% having fewer than 5 teeth missing. Higher tooth loss was noted in the older patients, who also had a higher prevalence of chronic diseases and a higher proportion of low-income individuals.

During follow-up, 68,063 subjects (1.5%) died. Among the survivors, 31,868 (0.8%) had MIs, 22,637 (0.5%) had HF, and 30.941 (0.7%) suffered stroke. Overall incidence rates were 0.95 per