

論文名 : Association of hyper-low-density lipoprotein and hypo-high-density lipoprotein cholesterolemia with low salivary flow rates in Japanese community-dwelling elders (要約)

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Introduction

Saliva has important roles in preventing dental caries and gingival disease. Thus, the prevention and treatment of hyposalivation are important for maintaining good oral health and quality of life. Many researchers have reported on factors and indicators of hyposalivation; for example, the destruction of salivary glands and certain systemic diseases. Female gender, active smoking habit, and the use of certain medications were similarly reported as risk factors for hyposalivation, while patients with depression, anxiety, and stress showed hyposalivation and oral dryness. Aging was also reported as a risk factor. Saliva is produced from blood in the salivary glands. Previous study reported that changes in the blood-flow velocity of the facial artery through stimulating with acid as seen by pulse Doppler sonography were associated with the amount of salivary flow and any decrease in this velocity reduces the salivary flow rate. Meanwhile, the serum level of low-density lipoprotein cholesterol (LDL-C) was positively correlated with brain blood-flow velocity, while that of high-density lipoprotein cholesterol (HDL-C) was negatively correlated.

Therefore, the aim of this study was to assess the relationship between cholesterolemia and reduced salivary flow rates among community-dwelling elders in Japan.

Subjects and Methods

The subjects of the current study were 380 participants aged 78 to 79 years. Among these participants, seven participants who refused blood collection, 29 participants who did not complete the questionnaires including the GHQ-30 and smoking status, and two participants who had a history of head and neck cancer were excluded. Thus, this study analyzed 342 participants (170 males and 172 females).

Unstimulated salivary flow rate (USFR) was assessed using a cotton roll method. Low-USFR was defined as 0.10 g/30 s. Stimulated salivary flow rate (SSFR) was assessed by having participants chew tasteless gum for three minutes. Low-SSFR was defined as 1.0 mL/min. Blood samples were drawn for the measurement of LDL-C, HDL-C, rheumatoid factor, hemoglobin A1c, and creatinine. To assess depression, the General Health Questionnaire 30 was used. A standardized questionnaire was completed, covering the participants' current and previous medications and smoking status.

We stratified participants' serum LDL-C levels as normal, moderate or severe hyper-LDL cholesterolemia and serum HDL-C levels as normal or hypo-HDL cholesterolemia. Multivariate

logistic regression models were established and low-USFR or low-SSFR were set as dependent variables in said models.

Results

There were 175 (51.2%) participants with low-USFR and 118 (34.5%) participants with low-SSFR. Subjects with moderate and severe hyper-LDL cholesterolemia numbered 41 (12.0%) and 19 (5.6%), respectively, while subjects with hypo-HDL cholesterolemia numbered 25 (7.3%).

Hyper-LDL and hypo-HDL cholesterolemia were significantly associated with low-USFR. Hyper-LDL cholesterolemia was also significantly associated with low-SSFR. After controlling for the impact of the other variables, hyper-LDL cholesterolemia was found to be associated with low-USFR. The odds ratios (95% confidence intervals) for low-USFR were 2.25 (1.10–4.61) and 5.69 (1.55–20.8) for moderate and severe hyper-LDL cholesterolemia, while that for hypo-HDL cholesterolemia was 3.41 (1.34–8.71). Low-SSFR was significantly associated with severe hyper-LDL cholesterolemia and female gender, with odds ratios (95% confidence intervals) of 3.89 (1.39–10.8) and 1.89 (1.18–3.05), respectively.

Discussion

The odds ratios were found to increase together with the grade of hyper-LDL cholesterolemia severity. It is speculated from these findings that a high LDL-C concentration leads to low blood velocity, resulting in the salivary flow rate being reduced. The serum HDL-C level was, however, associated only with unstimulated salivary flow rate in our analysis. Of note, arteries plaques are caused by increased serum LDL-C levels and HDL-C absorbs LDL-C and carries it back to the liver. We considered, therefore, that LDL-C would assume the role to change the blood flow directly and HDL-C would play a supportive role, while LDL-C would also play an important role in the reduction of salivary volume. Female gender is a well-known risk factor for reduced salivary flow rates, and our findings during the univariate analysis were also in accordance with this finding. Our study showed that the adjusted odds ratios of the impact of cholesterolemia for reduced salivary flow rates were higher than that of female gender; which might be an important finding when considering the cause of hyposalivation. In conclusion, elderly subjects with cholesterolemia could be at risk for reduced salivary flow rate.