Impacts of Periodontitis on Nonfatal Ischemic Stroke: Comparison with Hypertension and Diabetes Mellitus

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Backgrounds

- Hypertension(HPT) (Farmer et al.,2001,Gorelick et al.,1999) and Diabetes Mellitus(DM) (Anselmino et al.,2010,Kokubo et al.,2010) have been considered major factors on the incidence of stroke.
- Periodontitis and stroke have common risk factors and some studies (Sim et al.,2008, Kim et al.,2010) showed positive association between periodontitis and stroke.
- However, the impact of periodontitis on the incidence of stroke is still in question.

Objectives

To compare the impact of periodontitis on nonfatal ischemic(stroke) stroke with its impact of HPT and DM and to investigate the risk group of the periodontitis-stroke linkage

Design&Ethical consideration

◆ **Case-Control study** : 1:2 (102:204) matched for age and gender

- **IRB** from SNUSOD (#LO605-02) / Informed Consents

Subjects

◆ **Exclusion** pregnancy, antibiotics within 3 months, 〈6 teeth

- **Case** hospitalized nonfatal ischemic stroke(N=143): 61.9yr
- **Control** non-stroke population(N=214): 60.1yr

Data collection

◆ Inpatients that medical specialists diagnosed nonfatal ischemic stroke by using brain imaging of CT and MRI
◆ Clinical attachment level (CAL) by dentists : a UNC-15 probe
◆ Interview using systematic questionnaires was administered to assess potential confounders

Analysis

◆ **Multivariate logistic regression analyses**

- **Outcome :** ischemic stroke
- **Predictor :** periodontitis (CAL ≥ 6mm) : Yes versus No
  : periodontitis (CAL ≥5mm%) : no/mild, 0% to 48.6%; moderate, 48.6% to <73%; severe, ≥73%
- **Covariates :** age, gender, daily tooth brushing, annual dentist visit, number of missing teeth, DMFT index, income, duration of education, smoking, alcohol drinking, diabetes mellitus, cardiac disease, BMI, family hypertension history, family diabetes mellitus history

◆ **Subgroup analyses**
Age group, Gender

Results

※ Adjusted for age(continuous), gender, daily tooth brushing, annual dentist visit, number of missing teeth, DMFT index, income, duration of education, smoking, alcohol drinking, diabetes mellitus, cardiac disease, BMI, family hypertension history, family diabetes mellitus history and mutually

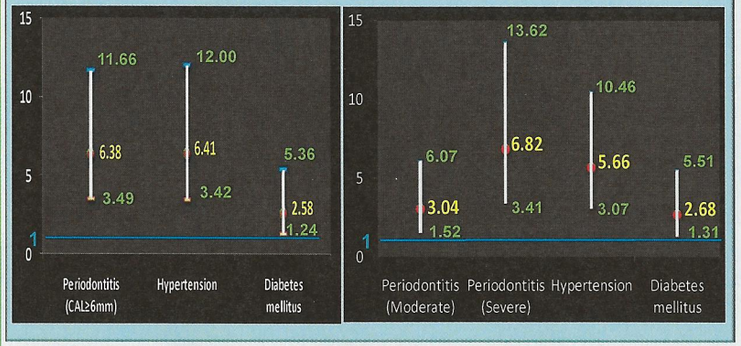

Fig. 1 Odds ratio and 95%CI of periodontitis and other risk factors for nonfatal ischemic stroke

Table 1. Subgroup ANA for the link between periodontitis and stroke.

Subgroup	Variable	Odds ratio (95% Confidence Interval)	P-value
Age	40-59 years (n=160)*		
	CAL≥6mm	**23.41 (6.39-85.82)**	**<0.001**
	Hypertension	**9.38 (2.58-34.15)**	**0.001**
	Diabetes mellitus	**9.38 (1.65-53.41)**	**0.012**
	60-79 years (n=197)*		
	CAL≥6mm	**2.79 (1.23-6.32)**	**0.014**
	Hypertension	**5.53 (2.46-12.43)**	**<0.001**
	Diabetes mellitus	**3.05 (1.18-7.86)**	**0.021**
Gender	Male (n=182)		
	CAL≥6mm	**8.06 (3.31-19.59)**	**<0.001**
	Hypertension	**8.50 (3.26-22.18)**	**<0.001**
	Diabetes mellitus	**4.02 (1.25-12.92)**	**0.020**
	Female (n=175)		
	CAL≥6mm	**6.40 (2.47-16.60)**	**<0.001**
	Hypertension	**7.31 (2.65-20.19)**	**<0.001**
	Diabetes mellitus	2.22 (0.76-6.53)	0.147

Odds ratios are adjusted for covariables in Fig. 1 except the subgroup.
Bold denotes consistency between the two models.
* Controlled for continuous age

Conclusion

Periodontitis is a strong independent risk factor for nonfatal ischemic stroke and its impact is almost same as that of HPT and higher than that of DM in forties to fifties adults

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