Evaluation of inflammatory cytokines and oral health in Alzheimer's disease

So Jeong (Brianna) Lee¹, Karen Chung², Julian N Holland¹, Paul Schulz², Cameron Jeter³, Neha Parikh²

1. Department of Diagnostic & Biomedical Sciences, The University of Texas Health Science Center at Houston, School of Dentistry, Houston, Texas, USA

2. Department of Neurology, The McGovern Medical School of UT Health Houston, Houston, TX, USA

3. Department of Biomedical Sciences Academic Affair, Kansas Health Science Center— Kansas College of Osteopathic Medicine, Wichita, Kansas, USA

Objectives: Alzheimer's disease (AD), characterized with a progressive decline in cognitive function, accounts for 60-80% of dementia cases. Currently established diagnostic procedures for AD are expensive and/or invasive. Moreover, molecular changes and progression to clinical symptoms of AD can take 10-15 years. Early detection of AD using inexpensive/non-invasive approaches such as plasma and saliva is currently lacking. A key hallmark of AD is chronic neuroinflammation. Increasing evidence also links AD to periodontal disease, which is a chronic inflammatory condition. This study aimed to determine systemic inflammatory cytokines and oral health in patients with mild cognitive impairment (MCI) and AD as potential early markers for AD progression.

Experimental Methods: Age-matched participants were enrolled at UTHealth Houston Neurocognitive Center (HSC-MS-19-0219) and categorized into cognitively intact controls (n = 16), MCI (n = 15), and AD patients (n = 31), based on clinical diagnosis. Oral health parameters such as oral hygiene habits, dietary habits, swallowing ability, and plaque index were assessed using published questionnaires/protocols. Plasma samples were analyzed for 48 cytokines/growth factors using the Luminex assay. ANOVA was used for statistical analysis ($\alpha = 0.05$).

Results: AD patients (n = 31) showed worse oral hygiene habits than control group (n = 16). Other oral health assessments were comparable between control, MCI and AD subjects. Plasma levels of pro-inflammatory cytokines MCP-3, MDC, TNFa and sCD40L were higher in AD patients (n = 26-28) compared to MCI subjects (n = 12-15). Other cytokines/growth factors were not significantly different.

Conclusion: AD patients depicted worse oral hygiene habits compared to age-matched controls, highlighting a need for oral health education in high-risk population. AD patients also showed higher plasma levels of certain pro-inflammatory cytokines. Other ongoing experiments and multivariable analysis will further dissect the relationships between chronic inflammation, oral health, and AD progression in older adults.

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