The ARIC study of midlife sleep and late-life brain amyloid

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USA

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The ARIC study of midlife sleep and late-life brain amyloid

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NIH (NIA)

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01/06/2016

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1

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

Acquired Cognitive Impairment... Aging... Alzheimer's Disease... Alzheimer's Disease including Alzheimer's Disease Related Dementias (AD/ADRD)... Atherosclerosis... Behavioral and Social Science... Brain Disorders... Cardiovascular... Clinical Research... Clinical Research - Extramural... Dementia... Lung... Neurodegenerative... Neurosciences... Prevention... Sleep Research

Research Abstract

? DESCRIPTION (provided by applicant): Alzheimer's disease (AD) is one of the largest public health problems facing our nation. Modifiable risk factors must be identified that can be leveraged to prevent AD or slow its progression. Disturbed sleep (defined here as abnormal sleep duration, fragmented sleep, and delayed sleep onset) and sleep-disordered breathing (SDB) are common among middle-aged and older people, and both have been linked to cardiovascular disease and dementia. Most importantly, both can be treated, making them possible targets for dementia prevention. Because it is the most common cause of dementia, prevention of AD is a major focus of public health efforts. This proposal will evaluate whether disturbed sleep and SDB, particularly in midlife, are associated with increased ?-amyloid (A?) deposition, implicated as a major cause of AD. Disturbed sleep likely reduces time in slow-wave sleep, which may function to reduce A? aggregation. In addition, animal data suggest that the core features of SDB-hypoxia and sleep fragmentation-may promote AD pathology. In the proposed research, we will determine the associations between disturbed sleep and SDB, each, in late midlife and A? in later life. We will capitalize on data already collected from participans in two overlapping community- based cohort studies: the Atherosclerosis Risk in Communities (ARIC) Study, and the Sleep Heart Health Study (SHHS). The 1,920 individuals who participated in both studies completed ambulatory polysomnography (PSG) in their homes between 1996 and 1998 (at ages 53-72 years), with significant information available about vascular risk factors and cognitive status through five in-person visits in ARIC; more than 500 of these persons from the Washington County, MD field center are still living and followed by ARIC. For 150 ARIC/ SHHS participants at this site, nearly 20 years after this evaluation of disturbed sleep and SDB, we propose to quantify A? burden using florbetapir positron emission tomography (PET), and to repeat PSG to study SDB in late-life; we hypothesize that onset of SDB in midlife is a more important risk factor for A? deposition than is SDB onset in late-life. W will evaluate slow-wave sleep, vascular disease and inflammation as possible mechanisms for the proposed associations between disturbed sleep/SDB and AD. Furthermore, because AD and SDB share a common genetic risk factor (the apolipoprotein E ?4 allele), we will evaluate whether sleep differentially increases A? deposition among persons with an ?4 allele. Given the prevalence of disturbed sleep and SDB and the availability of effective treatments for these conditions, evidence for an association between disturbed sleep and SDB and subsequent AD pathology would help establish these as modifiable risk factors for AD, and therefore potential targets for AD prevention. By studying sleep nearly two decades before measurement of A?, we will minimize the possibility that positive findings are due to sleep disturbances caused by AD itself, instead supporting disturbed sleep/ SDB as possible causes of AD. The proposed study would also enhance understanding of mechanisms underlying AD that may serve as targets for AD therapeutics.

Lay Summary

PUBLIC HEALTH RELEVANCE: Alzheimer's dementia is a growing public health concern in our aging population. Knowledge of the importance of disturbed sleep (i.e., abnormal sleep duration, fragmented sleep, delayed sleep onset) and sleep-disordered breathing in the development of Alzheimer's disease is critical as it may lead to distinct avenues for development of therapies to prevent Alzheimer's dementia or slow its progression. We propose to study the extent to which disturbed sleep and sleep-disordered breathing are associated with neuroimaging evidence of ?-amyloid deposition, the hallmark of Alzheimer's disease, almost 20 years later.

Further information available at:

Types:
Investments > €500k

Member States:
United States of America

Diseases:
Alzheimer's disease & other dementias

Years:
2016

Database Categories:
N/A

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