



Brief Communication

Poor sleep quality and silent markers of cerebral small vessel disease: a population-based study in community-dwelling older adults (The Atahualpa Project)



Oscar H. Del Brutto ^{a,b,*}, Robertino M. Mera ^c, Mauricio Zambrano ^d, Julio Lama ^e, Victor J. Del Brutto ^d, Pablo R. Castillo ^f

^a School of Medicine, Universidad Espíritu Santo – Ecuador, Guayaquil, Ecuador

^b Department of Neurological Sciences, Hospital-Clinica Kennedy, Guayaquil, Ecuador

^c Gastroenterology Department, Vanderbilt University, Nashville, TN, United States

^d Community Center, The Atahualpa Project, Atahualpa, Ecuador

^e Imaging Department, Hospital-Clinica Kennedy, Guayaquil, Ecuador

^f Mayo Clinic College of Medicine, Jacksonville, FL, United States

ARTICLE INFO

Article history:

Received 9 August 2014

Received in revised form 8 September 2014

Accepted 15 October 2014

Available online 28 January 2015

Keywords:

Sleep quality

Cerebral small vessel disease

White matter hyperintensity

Silent stroke

Deep microbleeds

Population-based study

ABSTRACT

Background/Objectives: Evidence of a relationship between non-breathing-related sleep symptoms and silent markers of cerebral small vessel disease (SVD) is scarce. The present study aimed to evaluate this association in older people living in rural Ecuador, where the burden of stroke is on the rise.

Methods: A group of Atahualpa residents, aged ≥ 60 years, were interviewed with a validated Spanish version of the Pittsburgh Sleep Quality Index, and underwent magnetic resonance imaging (MRI) for identification of silent markers of SVD. Using multinomial logistic regression analysis, after adjusting for demographics and cardiovascular health status, it was evaluated whether sleep quality is associated with the severity of white matter hyperintensity (WMH), lacunar infarcts, and deep microbleeds.

Results: Out of 311 people aged ≥ 60 years, 237 (76%) were enrolled into the study. Mean age was 70 ± 8 years, 59% were women, 83% had primary school education only, and 73% had a poor cardiovascular health status. Seventy-eight (33%) had poor sleep quality. The MRI showed: WMH in 154 (65%) participants (moderate-to-severe in 52); silent lacunar infarcts in 28 (12%); and deep microbleeds in 17 (7%). Poor sleep quality was associated with WMH presence (OR 2.44, 95% CI 1.26 to 4.71, $p = 0.008$) and severity (β coefficient 0.77, SE 0.37, $p = 0.037$), but not with silent lacunar infarcts or deep microbleeds.

Conclusions: The present study showed an association between poor sleep quality and WMH severity. Further longitudinal studies would help to elucidate the cause and effect of this relationship.

© 2014 Elsevier B.V. All rights reserved.

1. Introduction

Owing to increased life expectancy and changes in lifestyles, the prevalence rates of sleep disorders and stroke are on the rise in many low-income and middle-income countries [1–3]. There is also growing evidence that links both conditions, but most studies have focused on cerebrovascular correlates of obstructive sleep apnea [4–6] and little attention has been given to other sleep-related symptoms [7]. In addition, no study has systematically evaluated the relevance of the association between these symptoms and all the silent markers of cerebral small vessel disease (SVD). This is of particular interest as SVD is a rather common pathogenetic mechanism that underlies stroke and

vascular cognitive impairment in some of these regions [8]. Detection of persons at risk of developing these adverse vascular outcomes – beyond those with traditional risk factors – is important for the implementation of cost-effective preventive strategies.

The Atahualpa Project is an ongoing population-based study designed to reduce the increasing burden of non-communicable diseases in rural Ecuador [9]. Preliminary findings from the present cohort suggested an association between poor sleep quality with cardiovascular risk factors [10] and between short sleep duration with overt stroke [11]. It was hypothesized that non-breathing-related sleep symptoms are also associated with silent SVD; this study was conducted to assess the actual magnitude of the problem.

2. Methods

The Institutional Review Board of Hospital-Clinica Kennedy, Guayaquil, Ecuador (FWA 00006867) approved the protocol and the written

* Corresponding author. Air Center 3542, P.O. Box 522970, Miami, FL 33152-2970, United States. Tel.: +1 593 42285790.

E-mail address: oscardelbrutto@hotmail.com (O.H. Del Brutto).

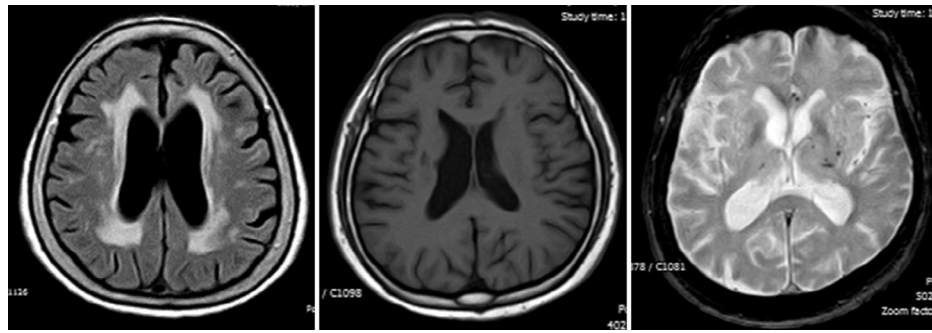


Fig. 1. Silent markers of cerebral small vessel disease on MRI. From left to right: severe white matter hyperintensities of presumed vascular origin (fluid-attenuated inversion recovery – TR 9000, TE 120, TI 2500), lacunar infarct in right subcortical white matter (T1-weighted – TR 594, TE 15), and deep microbleeds (gradient-echo – TR 686, TE 23). Images correspond to three different people aged ≥ 60 years.

informed consent. Atahualpa is a village that is representative of the rural coastal areas of Ecuador. More than 95% of the population belongs to the Native/Mestizo ethnic group (Amerindians) and their living characteristics have been detailed elsewhere [9].

All Atahualpa residents aged ≥ 60 years were identified during a door-to-door survey and invited to participate in the study. During the survey, trained rural doctors interviewed consenting individuals with field instruments directed at assessing demographics, vascular risk factors and sleep quality. Enrolled participants with no contraindications were then transported to Guayaquil for magnetic resonance imaging (MRI) neuroimaging evaluation.

2.1. Vascular risk factors

The cardiovascular health (CVH) status was evaluated by the use of the seven metrics proposed by the American Heart Association, including: smoking status, body mass index, physical activity, diet, blood pressure, fasting glucose, and total cholesterol blood levels. Each metric was categorized as ideal, intermediate or poor, and the CVH status was classified as poor if at least one metric was in the poor range [12]. To recognize people with overt strokes, rural doctors screened all persons with the use of a validated field questionnaire, and then certified neurologists confirmed the diagnosis, as previously described [13].

2.2. Sleep quality investigation

A validated Spanish version of the Pittsburgh Sleep Quality Index was used [14]. This questionnaire evaluates symptoms in the previous month and consists of 18 questions assessing: sleep duration, sleep disturbances, sleep latency, days of dysfunction due to sleepiness, sleep efficiency, overall sleep quality, and any medications needed to sleep (maximum score is 21 points). The cutoff value for poor sleep quality is ≥ 6 points.

2.3. Imaging protocol

All studies were performed with a Philips Intera 1.5T (Philips Medical Systems, the Netherlands) at the Hospital-Clinica Kennedy. The MRI included two-dimensional multi-slice turbo spin echo T1-weighted, fluid attenuated inversion recovery (FLAIR), T2-weighted, and gradient-echo sequences in the axial plane, as well as a T1-weighted sequence oriented in the sagittal plane. The pre-established brain-imaging package, delivered by the manufacturer to assure uniformity of the data, was used. Slice thickness was 5 mm, with a 1 mm gap between slices.

The MRIs were independently interpreted by an experienced neurologist (OHD) and a neuroradiologist (JL), who were blinded

to clinical data. Inter-rater agreement was assessed for all findings, and disagreements were resolved by consensus. Interest focused on the presence of silent markers of SVD. These included white matter hyperintensity (WMH), lacunar infarcts, and deep microbleeds (Fig. 1). The WMH were defined as lesions appearing as hyperintense on T2-weighted images that remained bright on FLAIR (without cavitation) and were graded according to the modified Fazekas scale [15]. Lacunar infarcts were defined as fluid-filled cavities measuring 3–15 mm located in the territory of a perforating arteriole [16]. Deep microbleeds were identified and rated according to the microbleed anatomical rating scale (MARS) [17].

2.4. Statistical analyses

Descriptive statistics were presented as means with standard deviations for continuous variables and as percentages with 95% confidence interval (CI) for categorical variables. Kappa statistics were used to assess inter-rater agreement. To evaluate the association between silent markers of SVD and sleep quality, a multinomial logistic regression analysis was performed with WMH, lacunar infarcts, and deep microbleeds as the outcomes; sleep quality as the exposure; and confounders (age, sex, education, and CVH status) as the independent variables. Statistical analyses were carried out by using STATA version 13 (College Station, TX, USA).

3. Results

Out of the 311 Atahualpa residents aged ≥ 60 years, 258 (83%) underwent MRI. The reasons for not obtaining MRI included: refusal to participate ($n = 26$), severe disability ($n = 11$), claustrophobia ($n = 8$), and an implanted pacemaker ($n = 1$); seven additional people had died or emigrated between the survey and the invitation. Twenty-one of the 258 people were further excluded because of a clinical diagnosis of overt stroke.

The mean age of the 237 participants was 70 ± 8 years, 140 (59%) were women and 196 (83%) had primary school education only. A poor CVH status was noticed in 172 (73%) participants, with a mean of 1.2 ± 1 poor metrics per person. Seventy-eight (33%) had poor sleep quality. Kappa coefficients for inter-rater agreements ($n = 237$) of MRI lesions of interest were 0.88 for WMH, 0.86 for lacunar infarcts, and 0.76 for deep microbleeds. After consensus, 154 participants (65%) had WMH, which were moderate-to-severe in 52. Silent lacunar infarcts were noticed in 28 (12%) cases, and deep microbleeds in 17 (7%).

Participants with poor sleep quality were older than those with good sleep quality (72.5 ± 10 vs 68.6 ± 6.7 years, $p = 0.001$), but when both groups were compared, there were no differences in the other independent variables. Some of the independent variables

Download English Version:

<https://daneshyari.com/en/article/6060972>

Download Persian Version:

<https://daneshyari.com/article/6060972>

[Daneshyari.com](https://daneshyari.com)