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Original article

Temperament and character in primary insomnia

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Abstract

Recent studies by Cloninger suggest that the temperament dimension of harm avoidance might be related to serotonergic activity. Since serotonergic mechanisms equally play a major role in sleep regulation, we decided to use Cloninger's psychobiological model of temperament and character to assess whether there is a link between psychophysiologic insomnia and specific personality traits. Chronic insomnia is a common complaint in modern society, and it is still controversial whether insomniacs share specific personality traits. Thirty-two chronic insomniacs (<50 years) were studied. They underwent polysomnography for two consecutive nights and filled out the 226-item self-questionnaire of Temperament and Character Inventory as well as the Hospital Anxiety and Depression scale. (1) Harm avoidance for all subscores was significantly higher in insomniac patients when compared with controls; (2) self-directedness scores were lower in insomniacs; (3) sleep latency was positively correlated to harm avoidance; (4) HA1 (anticipatory worry) was negatively correlated to REM latency. Temperament and Character Inventory is a useful tool in the investigation of chronic insomnia. Serotonergic mechanisms might explain the high incidence of harm avoidance as personality trait in psychophysiologic insomniac patients. Further studies are needed to see whether harm avoidance could be a psychological vulnerability marker for primary insomnia and be used as predictor of SSRI treatment responders.
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1. Introduction

Insomnia is reported to affect 9–13% of the adult population on a regular, chronic basis [10,28–30]. Chronic insomnia is a difficulty in initiating sleep and/or maintaining sleep, as manifested by prolonged awakenings during the night or waking up too early in the morning, for more than 6 months [2,39]. Chronic insomnia can be a syndrome in itself (Primary insomnia) or it can be secondary to various medical conditions (Secondary insomnia), to another sleep disorders (sleep apnea, restless leg syndrome) or to psychiatric disorders in particular major depression, general anxiety and post-traumatic stress syndrome or caused by alcohol or drug abuse. Primary insomnia categorized as psychophysiologic insomnia (PI) is a diagnosis often made by exclusion of the preceding factors [17,35,39]. However, some degree of psychopathology is found in almost all chronic insomniacs [14]. Two major components have been described in primary insomnia. First, primary insomnia has been associated with high physiological activation as demonstrated by measures such as metabolic rate, body temperature and heart rate. It has recently been shown an elevated beta (14–30 Hz) activity with a lower delta (0.5–3.5) power in chronic primary insomnia, reflecting a state of hyperarousal. The second component is characterized by psychological factors such as intrusive presleep thoughts, worry in anticipation of not sleeping, lack of openness to experience, anxiety or fear about health, personal problems and daytime functioning. Theses psychological factors play a major role in perpetuating insomnia [20].

A number of these studies [12,24,28,36] have used the Minnesota Multiphasic Personality Inventory (MMPI), postulating that insomnia was due to a process of internalization of psychological distress [19,20]. Also, insomniacs seem more self-preoccupied than controls [14,25]. Using both the MMPI and Zucherman test, Hauri and Fisher [17] reported that PI patients revealed more guardedness, defensiveness and sensation avoiding and less psychopathology than dysthymic patients. Concerning the relationship between personality characteristics and sleep stages and using the Eysenck personality inventory however, Dorsey did not find a significant correlation [11].

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The psychobiological model of personality developed by Cloninger et al. [7] claims that personality can be assessed in terms of seven scales which represent two global constructs: temperament and character. Of the seven scales, the four which represent temperament are thought to be heritable and genetically based. The remaining three scales, which represent character dimensions, are thought to represent sociocultural influences. The Temperament and Character Inventory (TCI). The TCI is a 226-item true–false questionnaire measuring the temperament dimensions: novelty seeking (NS), harm avoidance (HA), reward dependence (RD) and persistence (P) and the dimensions of character called self-directedness (SD) (individual responsibility), cooperativeness (C) (social responsibility) and self-transcendence (ST) (spiritual maturity) [17–19]. NS is a "tendency toward frequent exploratory activity in response to novelty, impulsive decision making, extravagance in approach to cues of reward." HA is related to brain systems involving behavioral inhibition. HA is tendency to respond intensely to aversive stimuli, thereby facilitating learning to inhibit behavior in order to avoid punishment and frustrative omission of respected rewards.

Studies by Cloninger et al. [6–9] suggest that serotonergic (5-HT) activity has an influence on the temperament dimension of HA. For example, high harm avoidance was associated with increased 5-HT2 receptor sensitivity [31]. Similarly self-directedness was positively correlated with low 5-HT2 receptor sensitivity. Other experiments indicate that 5-HT2 receptor sensitivity is related to central basal 5-HT levels [16]. Thus, high harm avoidance was associated to low central basal levels of 5-HT. In the present study, we therefore decided to use the TCI, which has never before been used in the study of insomnia. Based in the above considerations and the prior results of Cloninger, we hypothesized (1) that there exist vulnerability temperament which predispose some individuals to develop insomnia, and (2) in these patients HA measured by the TCI would be associated with some altered sleep variables as measured by polysomnography.

2. Materials and methods

2.1. Subjects

Subjects were drawn from an initial pool of consecutive patients with the complaint of chronic insomnia who underwent diagnostic polysomnography (PSG) following clinical referral to our sleep disorders center. Selection criteria consisted of a completed PSG evaluation, with no previous diagnosis of psychiatric disorder (Axis I of DMS-IV) put in evidence by clinical assessment. Patients with a somatic disease, sleep apnea or restless legs syndrome were also excluded. The final group was 32 adult patients (11 men, 21 women; age range, 22–49 years). All these selected patients had a current diagnosis of chronic insomnia corresponding to a psychophysiological insomnia of the International Classification of Sleep Disorders. They underwent PSG and completed two questionnaires (see below). All patients had long periods of intra-sleep waking.

A population of healthy volunteers (216, age range, 22–49) were considered for the control group. The selection criteria for the normal control subjects were as follows: all individuals had to have a regular sleep–wake cycle that was established on the basis of a sleep diary. They were excluded if they had more than 30 min of sleep latency and/or awake time during the night. They were also excluded if they could not speak French and had a history of psychiatric illness. The protocol was approved by Geneva ethics review committee, and that informed consent was obtained from all subjects.

2.2. Polysomnography

Patients slept in our laboratory and were allowed to sleep during their usual times. They were also allowed their normal sleep lengths for three consecutive nights, designated: one for adaptation and the two others for sleep recordings. Sleep was recorded from C3-A2, C4-A1 and Pz-O2 together with the two electrooculograms (EOGs), one for ECG and one EMG. All signals were on-line digitized (at a sampling rate at 128 Hz for the EEG) and digitally low- and high-pass filtered at 0.5–70 Hz. Sleep records were assessed according to the standard criteria of Rechtschaffen and Kales [34] using 20 s epochs. The following sleep variables of the last sleep recording night were used in this study: sleep latency, stage 2, REM sleep duration, REM latency, intra-sleep waking. Sleep latency was defined as the time from lights off to the first epoch of stage 2, REM sleep latency was defined as the time between sleep onset and the first epoch of REM sleep; intra-sleep waking was the amount of wakefulness following sleep onset. All sleep variables are given in minutes.

2.3. Questionnaires

All patients (n = 32) completed the 226-item self-questionnaire TCI (French version) during their stay in the sleep laboratory. This TCI version has been validated, and normative data have been obtained from a French population [32]. Because HA scores are known to be affected by the presence of depressive symptoms, the Hospital Anxiety and Depression Scale (HAD) [40], was also completed.

The HAD is a self-report rating scale designed to measure both anxiety and depression. It consists of two subscales (HAD-Anxiety and HAD-Depression), each containing seven items.

2.4. Data analysis

Differences between insomniacs and healthy subjects were tested using the Spearman's rho correlation and the Mann–Whitney U test. For the relationship between TCI results and sleep variables we only used the data of drug-free

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