



Cardiac Vagal Control, Depression, and Insomnia

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Introduction

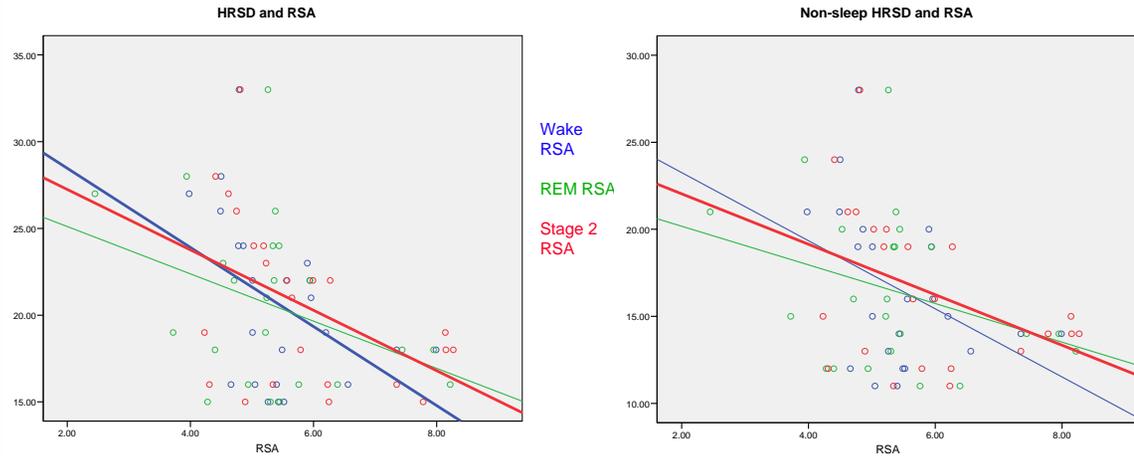
Cardiac vagal control (CVC), as indexed by respiratory sinus arrhythmia (RSA), is a measure of parasympathetic nervous system function. Lower CVC during wake has been associated with mood and sleep disturbances in various populations. Here, we examined the relationship between nocturnal RSA and the severity of depression and insomnia in participants with both disorders.

Methods

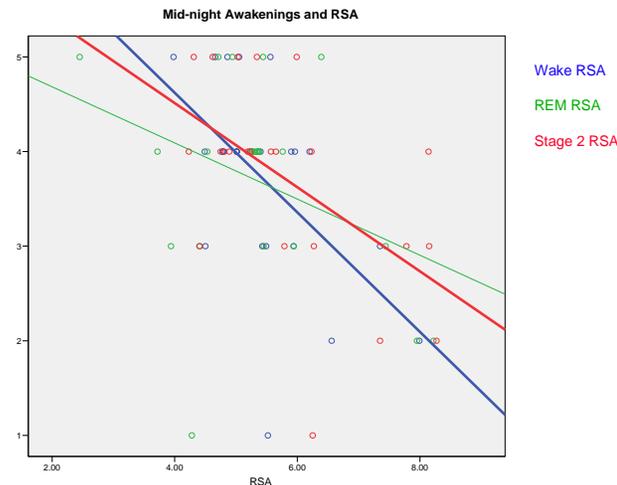
Data were obtained from 24 participants (15 females) aged 25-69 (Mean age = 46.6). Depression was diagnosed using the Structured Clinical Interview for DSM-IV Disorders and the Hamilton Rating Scale for Depression (HRSD). Insomnia was diagnosed based on the Duke Screening Interview and baseline daily sleep diaries. Severity of insomnia was measured with the Insomnia Severity Index (ISI). Participants' sleep was recorded at home using ambulatory polysomnography, which included heart rate (sampled at 256 HZ). Sleep stages were scored according to standard criteria. RSA was calculated for ten minutes of wake before sleep onset, stage 2 of the first sleep cycle, and REM of the second sleep cycle.

Results

RSA during wake and stage 2 sleep were negatively correlated with the HRSD ($r = -.40, p = .045$ and $r = -.47, p = .02$, respectively). RSA during REM showed a trend correlation with total scores on the HRSD ($r = -.38, p = .065$). RSA during stage 2 was negatively correlated with score on the non-sleep items of the HRSD, while RSA during wake and REM sleep showed trend correlations ($r = -.42, p = .04$, $r = -.37, p = .07$, and $r = -.34, p = .10$, respectively).



RSA during wake and stage 2 were also negatively correlated with mid-night awakenings as measured by the ISI ($r = -.52, p = .009$ and $r = -.54, p = .006$, respectively) while RSA during REM showed a trend correlation ($r = -.35, p = .09$). Additionally, stage 2 RSA was negatively correlated with total ISI scores ($r = -.35, p = .08$), while RSA during wake showed a trend correlation ($r = -.48, p = .02$). RSA during REM, while in the same direction, was not significantly correlated with total ISI scores ($p > .1$).



Conclusions

Past results pertaining to depression and daytime RSA have been replicated and extended to include RSA measured during stage 2 sleep, REM sleep and pre-sleep wakefulness. Lower cardiac vagal control during stage 2 and REM sleep, as well as during wake, appear to be psychophysiological markers of severity of insomnia, especially during the middle of the night. Additionally, lower cardiac vagal control is associated with more severe depression as measured by the HRSD, even when sleep is not considered.

Acknowledgements

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