Reviewer’s report

Title: Change in heart rate variability precedes the occurrence of periodic leg movements during sleep: an observational study

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Reviewer: Salvatore Galati

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The article entitled “Change in heart rate variability precedes the occurrence of periodic leg movements during sleep: an observational study” is an interesting description of the dynamic changes in heart rate variability (HRV) at the onset of the period in which periodic leg movements during sleep (PLMS) are observed using complex demodulation method. They found that the elevation of sympathetic nervous activity and the high frequency fluctuation occur several tens of seconds before the beginning of the period with PLMS. They hypothesize that dynamic changes in the autonomic nervous system activity could be related with the vulnerability to PLMS occurrence during a night.

I have some general comments regarding the manuscript:
- First of all I think that the question whether changes in HRV precede PLMS series is new and original.
- the statistical methods are adequate for non-PLMS epochs but needs to be carefully considered for epochs containing PLMS: If HRV are associated with PLMS than the frequency of the PLMS would determine the HRV frequency component which is around every 20 to 40s. I suggest that the frequency of PLMS needs to be better described to assess whether this matches the HRV frequency components.
- the terminology concerning HF and HFF is a little bit confusing and should be more clearly described. I suggest to use a different abbreviation to make the difference clearer between the two.
- page 6,line 15 “duration of 0.5–10 s, a period, length between two consecutive movements of” consider rephrasing.
- page 11, results, line 14/15 “No significant change in EEG spectral powers in this transitional period was observed in any frequency band (Fig. 3).” This analysis and the results are questionable since spectral analysis results were averaged across subjects/periods, therefore if changes are associated with leg movements, these would average out unless the leg movements were in the exact same position over the 15 min period.
- page 14, discussion, lines 8-14: refers to the same point as above: the absence of changes in averaged EEG spectra does not mean that no transient events were there, only that they were not synchronized. Please state whether you also considered CAP phases as an exclusion criteria. In addition, also K-complexes
are transient events and hallmarks of NREM sleep, so I question the statement that in the selected periods no transient EEG events were present.

- page 15, discussion, lines 1-4: “First, because it was necessary to exclude many data because of movement artifacts on the EEG signal, respiratory events, and cortical arousal, the number of patients became too small to clarify autonomic nervous system activity before the period with PLMS.” I am confused, because I understood that you were doing just this, characterizing ANS in periods before PLMS, please clarify.

- Although in general the paper is well written, the quality of the English deteriorates significantly at the end of the discussion.

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests