Real Time Assessment Of Blood Pressure Changes During Periodic Limb Movements In Sleep Of Patients With Restless Legs Syndrome

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Introduction

- Restless Legs Syndrome (RLS) is a condition thought to occur in 2.5 to 15% of the U.S. population. Studies suggest that more than 90% of physician diagnosed RLS patients experience Periodic Limb Movements in Sleep (PLMs)[1].
- Evidence suggests that factors that cause frequent and chronic sleep disruptions may contribute to hypertension, stroke and heart disease[2].
- PLMs are associated with micro arousals that occur in temporal conjunction with the limb movements and can contribute to complaints of non-restorative sleep.
- Arousals during sleep are often associated with increase in heart rate[3], with arousal intensity strongly correlated with degree of heart rate increase[4].
- We evaluated the relationship between PLMs power and changes in blood pressure (BP) in patients with RLS.

Methods

- Ten patients ages 37-66 meeting the International RLS Study Group criteria for moderate to severe RLS (24.7±4.0) underwent polysomnography using a PSG acquisition system (SOMNOmedics America Inc) that allows for real time cuff free BP derivations based on pulse transit time (PTT) and measuring the anterior tibialis EMG power during PLMs.
- Records were scored according to the AASM criteria for sleep stages, PLMI (PLMs per hour of sleep) and PLMAI (PLMs associated arousals per hour of sleep).
- The % PLM systolic BP increase was used to measure the contribution of PLMs to overall systolic BP changes.
- A BP fluctuation is defined as a continuous BP increase of at least 12 mmHg and lasting 3-30 seconds.
- PLMs average power is defined as the average EMG amplitude over the average duration of the PLM events.

Results

- Patients averaged 55.1±30.5 PLMs/hr (14.6-96.9) and a PLMAI of 17.3±10.8 (7.1-41.5). Mean PLMs power was 17.7±7.6 µv (11-33) and mean % PLM Systolic BP increase was 5.21±4.1 (0.2-11.5)(Table1).
- The data showed a strong correlation between % PLM systolic BP increase and PLMs power (r= 0.702, p= 0.01).
- There was no significant correlation between % PLM systolic BP increase and PLMI (r= 0.587, p= 0.06) and PLMAI (r=0.429, p= 0.23).

Figure 1. Correlation between PLM power and % PLM systolic BP increases in patients with RLS

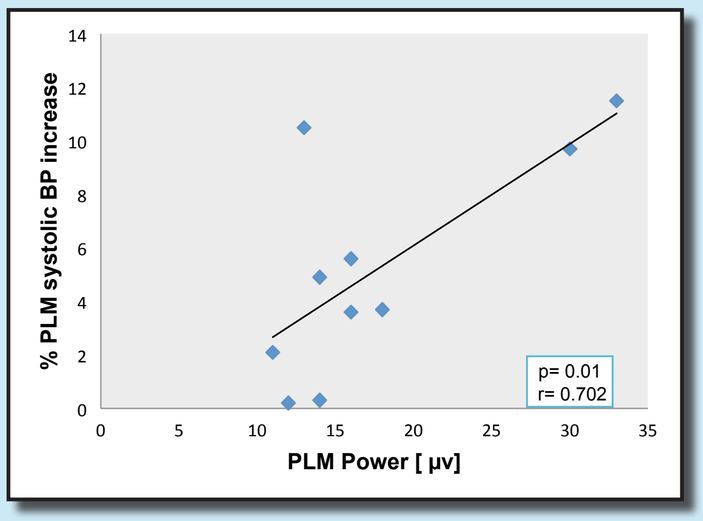

Figure 2. Correlation between PLM index and % PLM systolic BP increases in patients with RLS

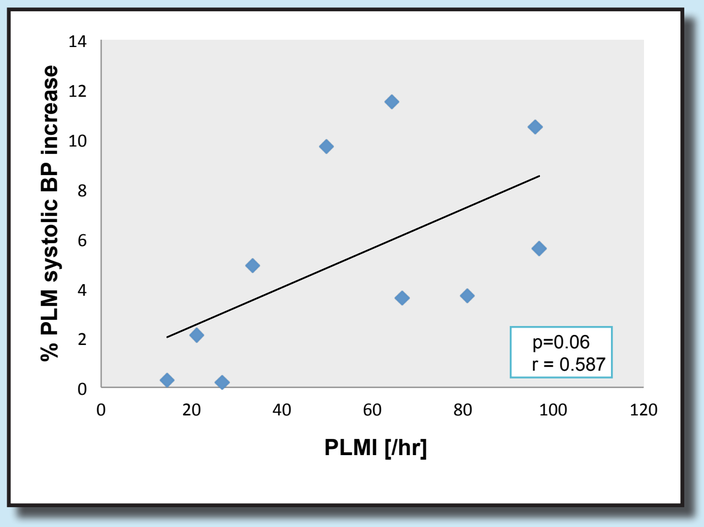

Figure 3. Correlation between PLM arousal index and % PLM Systolic BP increases in patients with RLS

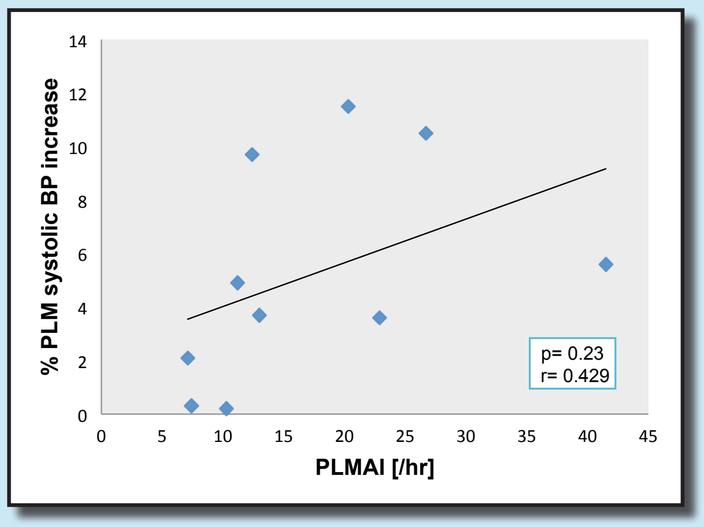

Table 1. Blood pressure parameters of subjects with RLS (n= 10) during TST

	Mean ± SD
Diastolic BP [mmHg]	69.4 ± 13.1
Systolic BP [mmHg]	108.6 ± 14.2
Systolic BP increase [mmHg]	13.8 ± 0.9
% BP increase during sleep caused by a PLM	24.0 ± 15.6

Conclusion

- The results extend the findings of Azarbarzin relating PLMs intensity to arousal intensity in RLS patients by demonstrating a correlation between PLMs intensity and blood pressure[5].
- These result suggest that the power of PLMs in RLS patients maybe more useful than PLMI and PLMAI in predicting BP changes that over time may impact cardiovascular health.

References

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