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Research Article

Understanding autonomic changes in bipolar disorder: Sympathetic skin response from the manic phase to euthymia

Hamidreza Farpour^{1,2}, Ebrahim Moghimi Sarani^{3*}, Faisal Ahmed⁴, Elahe Keshavarzi¹, Leila Behjat Haghighi³, Mohadeseh Zakeri Baghestani¹, Hossein Ali Nikbakht⁵, Mohamed Badheeb⁶

¹Shiraz Geriatric Research Center, Department of Physical Medicine and Rehabilitation, Shiraz University of Medical Sciences, Shiraz, Iran

²Orthopedic & Rehabilitation Research Center, School of Medicine, Shiraz University of Medical Sciences, Shiraz, Iran

³Psychiatry and Behavioral Research Center, Shiraz University of Medical Sciences, Shiraz, Iran

⁴Department of Urology, Ibb University of Medical Sciences, Ibb, Yemen

⁵Social Determinants of Health Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, Iran

⁶Department of Internal Medicine, Yale New Haven Health, Bridgeport Hospital, Bridgeport, USA

* Email: moghimiebrahim@yahoo.com

<http://doi.org/10.5339/avi.2025.5>

Submitted: 18 August 2024

Accepted: 18 March 2025

Published: 20 May 2025

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ABSTRACT

Background: Autonomic dysfunction, characterized by heightened sympathetic and diminished parasympathetic activity, is increasingly recognized as a significant factor in the pathophysiology and therapeutic management of bipolar disorder (BD). The aim of this study is to investigate the changes in sympathetic skin response (SSR) among BD type 1 patients during the manic phase compared to their state after clinical remission.

Methods: This retrospective cross-sectional study enrolled 17 patients who were newly diagnosed with BD type 1 in the manic phase, adhering to DSM V criteria, over 4 years from January 2018 to December 2022. All subjects received treatment with sodium valproate, and SSR testing was performed during both the manic phase and following a washout period. The latency and amplitude of bilateral palmar and plantar SSRs were examined using electrical stimulation of the median and tibial nerves. Statistical analyses were conducted using paired *T*-tests and Mann–Whitney *U* tests to assess the mean differences in SSR latency and amplitude pre- and post-treatment.

Results: The treatment led to a statistically significant reduction in SSR latency for the right tibial nerve (from 2.380 ± 0.370 to 2.126 ± 0.241 seconds, $p = 0.014$) and the left median nerve (from 1.829 ± 0.410 to 1.600 ± 0.217 seconds, $p = 0.033$), indicating moderate effect sizes. In contrast, SSR amplitude demonstrated minimal variation across all examined nerves, with no statistically significant increase observed following treatment (all p -values ≥ 0.05).

Limitations: The small number of participants in the study could affect the reliability of the results.

Conclusion: The results of the study indicate that SSR latency may serve as a promising biomarker for evaluating autonomic function in patients experiencing manic and euthymic phases of BD following mood stabilizer treatment. Nonetheless, further validation through larger cohort studies with long-term follow-up is essential to corroborate these preliminary findings and better understand the implications for clinical practice.

Keywords: Acute mania, autonomic nervous system dysfunction, bipolar disorder, sympathetic skin response

Cite this article as: Farpour H, Sarani EM, Ahmed F, Keshavarzi E, Haghighi LB, Baghestani MZ, et al. Understanding autonomic changes in bipolar disorder: Sympathetic skin response from the manic phase to euthymia. *Avicenna* 2025(1):5. <http://doi.org/10.5339/avi.2025.5>

the reliability and generalizability of these findings. Such investigations will be crucial in elucidating the complexities of autonomic dysregulation in BD and refining treatment approaches based on SSR metrics.

ETHICS STATEMENT

The study methodology was approved by the Medical Ethics Committee of Shiraz University of Medical Sciences (SUMS) under the reference number “IR.SUMS.MED.REC.1396.101”, conducted in compliance with the Declaration of Helsinki. Written informed consent was obtained from all patients, with thorough explanations of the benefits and risks associated with participation.

AUTHORS' CONTRIBUTION

All authors contributed significantly to the study conception, design, execution, data acquisition, analysis, interpretation, and drafting or revising of the article. All authors approved the final version for publication and agreed to be accountable for all aspects of the work.

ACKNOWLEDGMENTS

This article was a part of the thesis of Leila Behjat Haghighi (No. 11757) that was approved by the vice-chancellor of research, Shiraz University of Medical Sciences, Shiraz, Iran. The study method was approved by the Medical Ethics Committee of Shiraz University of Medical Sciences (SUMS) with the reference number “IR.SUMS.MED.REC.1396.101”. The authors thank the Center for Development of Clinical Research of Nemazee Hospital and Dr. Nasrin Shokrpour for editorial assistance and the Research Consultation Center (RCC) of Shiraz University of Medical Sciences, Shiraz, Iran, for statistical analysis.

COMPETING INTERESTS

The authors have no conflicts of interest to declare.

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