

Aleexev V.G and Kuznecova L.V. Bioimpedance application in Selective Serotonin Reuptake Inhibitor (SRI) treatment monitoring. Psychology Research and Behavior Management.

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Abstract

Background:

Bioimpedance has been shown to be a safe technique when used in a number of biomedical applications. In this study, we use a device named Electro Interstitial Scan (EIS) performing bioimpedance measurements to follow up the effect of SSRI treatment in depressed subjects.

Method and material:

Fifty nine subjects (Age 47 from 17 to 76 years old and 38 women) diagnosed with major depression disorder by psychiatric assessment at the Botkin Hospital according to DSM-IV and CGI (Clinical Global Impression) were recorded with the EIS System before undergoing anti depressant SSRI treatment. Then, SSRI treatment follow-up was undertaken on one hand with the EIS bioimpedance measurements (electrical conductivity and dispersion α parameter) and on the other hand by treatment responses based on Hamilton Depression Scale (Ham-D) and CGI each 15 days during 60 days.

At day 45, 2 groups were constituted: group 1: group with treatment response and group 2: group with non treatment response. At day 60, 2 groups were constituted: group 3: group with treatment response and group 4: group with non treatment response

Results:

Comparing the group 1 and 2, electrical conductivity measurement of the pathway between the 2 disposable forehead electrodes has a specificity of 72 % and a sensitivity of 85.3% ($p < 0.0001$) with a cutoff $> 4.32\mu\text{Si}$. Comparing the group 3 and 4, electrical conductivity of the same pathway has specificity of 47.6 % and a sensitivity of 76.3% ($p < 0.16$) with a cutoff $> 5.92\mu\text{Si}$. Comparing the group 1 and 2, electrical dispersion α parameter of the pathway between the 2 disposable forehead electrodes has a specificity of 80 % and a sensitivity of 85.2% ($p < 0.0001$) with a cutoff > 0.678 . Comparing the group 3 and 4, electrical dispersion α parameter of the same pathway has specificity of 100 % and a sensitivity of 89.5% ($p < 0.0001$) with a cutoff > 0.692 .

Conclusion:

The EIS electrical conductivity measurement of the forehead pathway has a high specificity and sensitivity at D+ 45 comparing the patients' response group and non response group. The specificity and sensitivity decrease at D+60. The EIS electrical dispersion α parameter of the forehead pathway has a high specificity and sensitivity at D+ 45 comparing the patients' response group and non response group. The specificity and sensitivity raise at D+60. The practitioners could therefore have available in the EIS System, a non-invasive, low-cost system that is easy to use in the office and that could offer major depression disorder treatment monitoring in adjunct to DSM-IV questionnaires and CGI.