Introduction

The most devastating outcome of Treatment-Resistant Depression (TRD) is suicide, with approximately 30% of patients with TRD attempt or complete suicide once in their lifetime. However, most clinical trials treating TRD subjects have failed to address and measure suicidality as a treatment outcome. We aimed to characterize the clinical response and suicidal ideation trajectories of patients with TRD receiving low-frequency 1Hz rTMS on the R-DLPFC. We also investigated several factors that could be associated with both trajectories.

Methods

Fifty five patients with TRD received low-frequency 1Hz stimulation to the right dorsolateral prefrontal cortex (R-DLPFC) for 4 weeks. The Inventory of Depressive Symptomatology (IDS-C) was used to measure clinical response once a week over the treatment course, while the Concise Health Risk Tracking scale (CHRT) was used to measure suicidal ideation. Since we also aimed to compare the trajectory patterns between clinician rated and the self-rated score, and in order to make the clinician rated and the self-rated comparable, we have the 'abbreviated' IDS score, which only includes items that are also on the self-rated QIDS-SR questionnaire. Latent class mixed effect model was used to identify subgroups of longitudinal response trajectories for both IDS-C and CHRT scales. The analysis was mainly done by using R package "lcmm" [1,2].

Results

We identified two distinct trajectories in all three symptom domains (i.e. overall depression scores, mood subdomain scores, and suicidal ideation score), which we classified as "improvement" and "no improvement" groups. We then further looked at the classification concordance between the CHRT and Mood symptoms, as well as the clinician rated and self-rated, by the latent mixed effect models. The IDS-30 total score:

The overall trend for the population is decreasing, as shown in the figure below(left). However, if looking at the figure with two subpopulations classified by latent mixed model (right), there is actually a "No improvement" subpopulation where people in this category did not show clearly decreasing trend. It is also noticeable that there is a "Rapid improvement" subpopulation where people in this category benefits from the treatment. This indicates the advantages of using this modelling to characterize the trend of the longitudinal trajectories to evaluate the overall depression rating.

The CHRT score:

For the CHRT score, the trajectory patterns are a little different from total score or mood score. Patients on average tended to have a slow decrement during week 2 to week 4 but experienced a sharp decrease at week 5. This trend is also observed for the two subpopulations:

The concordance between the suicidal ideation and the mood symptoms

It will be interesting to see what is the concordance rate between classifying the patients based on mood score trajectory and CHRT score trajectory thus we demonstrate the following concordance table:

<table>
<thead>
<tr>
<th></th>
<th>Improvement</th>
<th>No response</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement</td>
<td>25</td>
<td>8</td>
<td>33</td>
</tr>
<tr>
<td>No response</td>
<td>4</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>26</td>
<td>55</td>
</tr>
</tbody>
</table>

The comparisons of the clinician rated and self-rated: total score

Conclusion

- The latent mixed effect model separate the heterogeneous population into subpopulations where the two sub-populations showed two distinct trajectory patterns.
- The clinician-rated and self-rated has a good concordance in the total score, but not in the mood score.

References