Variability of Cognitive Performance on the MATRICS Consensus Cognitive Battery (MCCB): Adding a Different Perspective

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SUBMISSION DETAILS

What is the Methodological Question Being Addressed? Does intra-individual variability of MCCB subtest scores (dispersion) provide information beyond that provided by composite scores in patients with recent-onset schizophrenia receiving antipsychotic therapy?

Introduction Greater dispersion on neurocognitive tests within a battery is linked to higher risk of schizophrenia, and dispersion is greater in patients with schizophrenia relative to matched and family controls. We sought to (1) characterize dispersion on the 9 subtests of the Neurocognitive Composite of the MCCB, the most frequently used cognitive measure in clinical trials of schizophrenia, and (2) determine if different antipsychotic formulations impact dispersion over the course of a trial.

Methods This is a post hoc analysis of a randomized, controlled trial (DREaM: NCT02431702) comparing paliperidone palmitate (PP) long-acting injection with oral antipsychotic (OAP) treatment in patients with recent-onset schizophrenia or schizoaffective disorder. DREaM had 3 phases: a 2-month oral run-in (Part I), a 9-month disease progression phase (Part II: PP or OAP), and 9 months of additional treatment (Part III: PP/PP; OAP re-randomized: OAP/OAP or OAP/PP). PP/PP and OAP/OAP comprised the 18-month extended disease progression phase. Using the MCCB neurocognitive subtests (ie, excluding the Mayer-Salovey-Caruso Emotional Intelligence Test), dispersion for each participant, by visit, was calculated as the variability of subtest scores relative to the participant’s mean performance (expressed in T-score units) on that testing occasion. Domain scores were not used. Data were analyzed with a repeated measures mixed effects model, with treatment and visit as fixed effects and a treatment-by-visit interaction. The correlation of the repeated measures within participants was modeled with an unstructured covariance structure. Because primary analyses were not powered to detect differences in dispersion, this post hoc analysis examined contrasts to identify potential differential temporal patterns within groups.

Results The numbers of patients with MCCB data at baseline of Part II (Day 57), Day 260 of Part II, and Day 260 of Part III, respectively, were 49, 49, and 39 (PP), and 63, 59, and 44 (OAP). Analyses revealed a significant effect of visit ($P<0.05$) but no treatment-by-visit interaction ($P=0.548$) or effect of treatment group ($P=0.425$). Analyses focusing on contrasts between baselines and endpoints revealed different temporal patterns of dispersion. In Part II, a nonsignificant improvement (ie, decline) in dispersion was observed in both groups. In Part III, dispersion remained stable in the PP group, whereas the OAP group became significantly more variable ($P<0.01$). Both groups performed similarly on the Neurocognitive Composite of the MCCB, improving significantly during Part II (PP: $P<0.05$, OAP: $P<0.001$) and remaining stable during Part III (PP: $P=0.821$, OAP: $P=0.375$).

Conclusion MCCB subtest score dispersion may be a fruitful outcome in studies of neurocognitive performance, similar to findings reported with other batteries. Variability of neurocognitive performance reveals more starkly what is evident in the mean scores of the MCCB Neurocognitive Composite: both groups improved modestly during the first 9 months of treatment after oral run-in, but these gains were maintained more effectively in the PP group during the ensuing 9 months. The clinical meaningfulness of changes in the first 9 months of antipsychotic treatment merits further investigation.

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Guidelines I have read and understand the Poster Guidelines

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