Cognitive and behavioural impulsivity in patients with Juvenile Myoclonic Epilepsy

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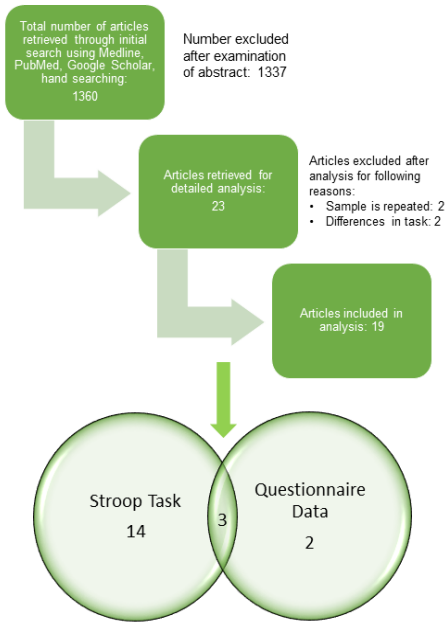
Purpose

When patients with juvenile myoclonic epilepsy (JME) present at clinic, the presence of impulsive behaviour and/or poor inhibitory control is often reported yet research findings are variable. The aim of this meta-analysis is to draw together existing research evidence to understand more about cognitive and behavioural impulsivity traits in this patient group.



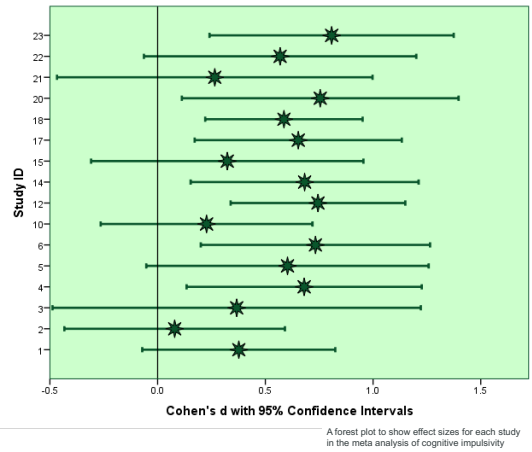
Methods

•Meta-analyses of 19 articles published between 2007 and 2016
•Studies of patients diagnosed with JME as defined by the International League against Epilepsy
•Overall effect sizes and heterogeneity were measured for
- the Stroop Task, a measure of **cognitive impulsivity** based on inhibition of interference (see above) (n=17)
- scores on questionnaires measuring **behavioural impulsivity** traits (n=5).

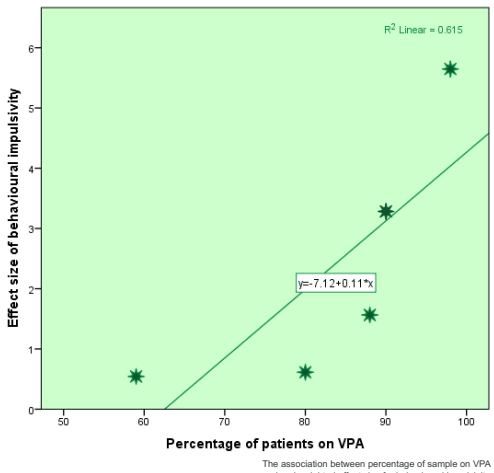
•Separate meta-analyses for the two measures of impulsivity were performed using SPSS scripts and mean effect sizes (ES) were calculated
•For both meta-analyses, homogeneity testing determined the extent to which there was variation in findings between studies using potential indicators.
•Heterogeneity was interpreted using a random effects weighted multiple regression (meta-regression) analysis: potential predictors of effect size were explored for their importance

Results

•Mean Cohen's *d* was d = .66 (95% CI 0.41–0.74; z = 8.00; p=<.0001) for cognitive impulsivity and d = 1.39 (95% CI .64–2.14; z = 9.47; p=<.0003) for behavioural impulsivity.
•Both sets of effect sizes were significantly variable (cognitive impulsivity: Q=25; p =.036; behavioural impulsivity: Q=111; p <.0001)
•The high variability of effect sizes associated with cognitive impulsivity was fully explained by an outlier which was removed resulting in homogeneity (Q=13; p = .72) and a slightly reduced but significant overall effect size of .56 (.44-.69) (z=8.8; p <.0001) (see below)
•Although for the behavioural data power was very limited we looked for potential associations and found that the higher the percentage of patients in sample who were medicated with sodium valproate (VPA) the larger the effect size (see below)



A forest plot to show effect sizes for each study in the meta analysis of cognitive impulsivity



The association between percentage of sample on VPA and and weighted effect size for behavioural impulsivity

Conclusion

We confirm that studies of patients with JME consistently find moderate effect sizes associated with cognitive impulsivity. Effect sizes for behavioural impulsivity are fewer, larger, more wide spread and correlate strongly with proportion of patients in each study taking VPA. This association could be due to a correspondingly a) higher number of male patients and b) higher number of severe cases of JME in those studies with higher effect sizes. Future studies should consider gender and severity effects in their analyses.

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