Neuropsychological and behavioral outcomes from a comprehensive magnetic resonance study of children with fetal alcohol spectrum disorders

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ABSTRACT

Background: Clinical and research advancements in the field of fetal alcohol spectrum Disorders (FASD) require accurate and valid identification of FASD clinical subgroups.

Objectives: A comprehensive neuropsychological battery, coupled with magnetic resonance imaging, (MRI), MR spectroscopy (MRS), and functional MRI (fMRI) were administered to children with fetal alcohol spectrum disorders (FASD) to determine if global and/or focal abnormalities could be identified across the spectrum, and distinguish diagnostic subclassifications within the spectrum. The neuropsychological outcomes of the comprehensive neuroimaging study are presented here.

Methods: The study groups included: 1) FAS/Partial FAS; 2) Static Encephalopathy/Alcohol Exposed (SE/AE); 3) Neurobehavioral Disorder/Alcohol Exposed (ND/AE) as diagnosed by an interdisciplinary team using the FASD 4-Digit Code; and 4) healthy peers with no prenatal alcohol. A standardized neuropsychological battery was administered to each child and their primary caregiver by a psychologist.

Results: Use of the 4-Digit Code produced three clinically and statistically distinct FASD clinical subgroups. The three subgroups (ND/AE, SE/AE and FAS/PFAS) reflected a linear continuum of increasing neuropsychological impairment and physical abnormality, representing the full continuum of FASD. Behavioral and psychiatric disorders were comparably prevalent across the three FASD groups, and significantly more prevalent than among the Controls. All three FASD subgroups had comparably high levels of prenatal alcohol exposure.

Conclusions: Although ND/AE, SE/AE, and FAS/PFAS are distinct FASD subgroups, these groups are not distinguishable solely by their neuropsychological profiles. While all children within a group shared the same *magnitude* of neuropsychological impairment, the patterns of impairment showed considerable individual variability. MRI, MRS and fMRI further distinguished these FASD subgroups.