medications was assessed. Aortic dilation (root or ascending aorta z-score >2.0) was also recorded. Analyses were performed to associate the composite adverse outcome and aortic dilation with maternal medications, pacing, and fetal disease status, including a severity score based on mortality risk factors such as lower fetal heart rate and extranodal disease.

**Results** The composite adverse outcome for cardiac dysfunction was identified in 21.1% of echos in children ages 0–1, 13.2% ages 1–17%, and 29.2% ages >17. In 89 children in which echos were available at ages 0–1 and 1–17, 6/16 with dysfunction at ages 0–1 were also affected at ages 1–17, while 10 reverted to normal. Among those without dysfunction at age 0–1, 89/90 developed new worsening of cardiac function during age 1–17. In 35 cases with echos at ages 1–17 and >17, 3/3 cases with dysfunction at age 1–17 were also affected at >17, and 2/32 developed new dysfunction in adulthood. Cardiac dysfunction was significantly associated with number of years paced at all ages (p<0.001, 0.001, <0.001). A lower fetal ventricular heart rate at the first time of heart block detection was associated with cardiac dysfunction age 0–1 and >17 (p=0.048, 0.005 respectively) and lowest heart rate in utero associated with dysfunction at age <1 and 1–17 (p<0.001, 0.015). Fetal extranodal cardiac disease was associated with dysfunction in ages 1–17 and >17 (p=0.026, 0.023). Higher fetal severity score associated with postnatal dysfunction in ages 0–1 and 1–17 groups (p=0.013, 0.001). Aortic dilation was present in 13.4% at ages 0–1% and 14.9% at ages 1–17, but >17, dilation only occurred in 9.2%. There was no association of postnatal cardiac dysfunction or aortic dilation with maternal medication use, maternal rheumatic disease, fetal age at heart block detection or gestational age of birth.

**Conclusions** Cardiac dysfunction in the first year normalizes by later childhood in the majority of cases, possibly due to the short term effects of cardiac pacing or resolution of inflammation with the clearance of maternal autoantibodies. However, new onset dysfunction can occur after the first year of life. Aortic dilation can continue for longer periods, but may decrease in frequency with age. Nevertheless, cardiac dysfunction is present in roughly 30%, and in adulthood there are associations with fetal extranodal disease and heart rate at detection. Patients who develop morbidity in utero may have subclinical damage or be more susceptible to future insults that manifest later in life, which can be exacerbated by prolonged pacing. Close monitoring and aggressive treatment of early extranodal disease in cardiac NL may have long term benefit in preventing subsequent morbidity.
Integrated Biologic and Clinical Approaches (The ABC Study) is an ongoing, investigator-initiated, clinical trial, conducted at the Oklahoma Medical Research Foundation (OMRF), with funding from Bristol Myers Squibb (NCT02270957).

### CS-06

**STRUCTURAL BRAIN ABNORMALITIES IN YOUTH WITH SYSTEMIC LUPUS ERYTHEMATOSUS**

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**Background** Conventional magnetic resonance imaging (MRI) is limited for detection of clinically relevant brain changes in youth with systemic lupus erythematosus (SLE) and neuropsychiatric symptoms. We aimed to examine structural brain abnormalities in youth with SLE compared to healthy controls, utilizing advanced MRI analysis.

**Methods** We cross-sectionally compared images from clinically-obtained brain MRI for adolescents and young adults with SLE, to those from age and sex-matched healthy control subjects with research MRI. Images were obtained from 2007–2015 on the same 3T scanner using a T1-weighted MPRAGE (magnetization-prepared rapid, acquisition gradient echo) protocol. A neuroradiologist performed conventional MRI reads, and was blinded to subsequent structural MRI volumetric analysis. An advanced multi-atlas segmentation algorithm divided the brain into 154 anatomical regions of interest (ROIs). Calculated volumes for large brain structures and ROIs were corrected for average intracranial volume of the sample, then compared between SLE and control subjects using univariate paired t-tests, with Bonferroni correction for multiple comparisons.

**Results** 29 SLE were compared to 29 control images. SLE subjects had a median disease duration of 1.1 years (interquartile range, 0.3–3.3) at brain MRI, with clinical indications including cognitive changes (31%), headache (24%), depression/anxiety (21%), and seizures (14%). Nonspecific findings on conventional MRI read were higher for SLE subjects compared to controls, including T1 hyperintensities/T2 hypointensities (48% vs 17%, p<0.05) and mild diffuse volume loss (28% vs 0%, p<0.01); hemorrhage/infarct was also higher (14% vs 0%, p<0.05). On structural MRI analysis, SLE subjects had significantly increased total white matter volume compared to controls (p<0.05), but no difference in total gray matter volume. For all subjects, total white and gray matter volumes were inversely correlated (\( r = -0.86, \rho < 0.0001 \)); age was correlated with increased total white matter (\( r = 0.49, \rho < 0.001 \)) and decreased total gray matter volume (\( r = -0.53, \rho < 0.001 \)). Compared to controls, SLE subjects had significantly decreased volumes of 15 specific gray matter ROIs (figure 1) involved in decision-making, attention, memory, social cognition, emotional and language processing, and topographical and facial recognition. Sensitivity analyses excluding SLE subjects with clinician-diagnosed neuropsychiatric SLE (n=6) did not change results of the structural MRI comparisons.

**Conclusions** Compared to healthy peers, youth with SLE early in their disease course have increased white matter and decreased regional gray matter volumes, possibly representing acceleration of normal age-related brain changes. Future study will examine the relationship between structural brain changes, disease-related factors and cognitive function in youth with SLE.

**Abstract CS-06 Figure 1** Volumetric comparisons of gray matter regions of interest (ROI) between SLE and control subjects

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