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P.1.e Basic and clinical neuroscience - Brain imaging

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## Subgenual cingulate volumes in offspring of bipolar parents

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**Purpose of the Study:** Little is known about which of the many neuroanatomical abnormalities found in bipolar patients meet criteria for endophenotype. Decreased volumes of subgenual cingulate (SGC) among familial bipolar patients have been reported in previous studies. In order to test whether SGC volumes represent an endophenotype (biological risk factor) for bipolar disorder (BD), we measured SGC volumes in unaffected and affected (with bipolar or unipolar disorder) offspring of bipolar patients. If SGC volumes are an endophenotype for BD, than affected offspring should show significantly lower SGC volumes relative to controls with unaffected subjects having intermediate volumes. **Methods Used:** Thirty-five HR (high risk) offspring (22 females) between 15-30 years of age were recruited from thirty-two families where one parent was affected with bipolar disorder, and the other parent was unaffected. Twenty offspring were healthy and 15 were affected with mood disorder (9 with bipolar disorder and 6 with unipolar disorder). The offspring as well as parents were interviewed using the Schedule for Affective Disorders and Schizophrenia - Lifetime Version (SADS-L). Control subjects consisted of 18 healthy offspring of well parents. The groups were matched by age, sex, handedness. The affected and unaffected HR offspring did not differ in sex of the affected parent, parental diagnosis or lifetime history of psychosis among parents. All subjects were euthymic during MRI assessment. SGC volumes were measured on 1.5T 3D anatomical MRI images using the AFNI software according to a well-established procedure. Segmentation was performed by investigator blinded to the diagnosis and group assignment of subjects. Intra-class correlation coefficient for 10 randomly selected SGCs of the study subjects measured twice by the same rater was  $r = 0.98$  and  $r = 0.97$  for the left and right SGC respectively. Calculation of intracranial volumes was performed automatically using 3dAnhist command in AFNI software. For comparison of high risk subjects, we performed repeated measures analysis of variance (ANOVA) with subgenual cingulate volumes as the dependent variable, laterality as the repeated measure and status (affected, unaffected, control subjects) as the grouping variable. To compare intracranial volumes between 3 groups we used one-way ANOVA.

**Summary of results:** There were no differences among the groups in total cerebral volumes. Likewise the unaffected, affected HR offspring of bipolar parents and controls showed comparable SGC volumes ( $F = 0.7$ ,  $df = 2$ ; 50,  $p = 0.47$ ), with no main effect of laterality ( $F = 1.48$ ,  $df = 1$ ; 50,  $p = 0.23$ ), and no laterality by group interaction ( $F = 0.14$ ,  $df = 2$ ; 50,  $p = 0.87$ ). The largest effect size of Cohen's  $d=0.39$  was found for a smaller left SGC in affected HR subjects relative to controls. These results remained comparable when we covaried for age.

**Conclusions:** We found comparable subgenual cingulate volumes among the affected, unaffected offspring of bipolar parents and controls and thus did not meet criteria for endophenotype. This study was supported by a grant from Internal Grant Agency of Ministry of Health of Czech Republic No. NR/8786