

Brain Structural Abnormalities in Violent Offenders with Schizophrenia

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Introduction: Schizophrenia patients with a history of community violence constitute a sub-group of schizophrenia patients (SCZ) that receive much public attention. While brain structural abnormalities are established in SCZ, there are few studies of brain morphology in violent SCZ.

Objectives: To conduct a pilot study of brain morphology in a SCZ cohort with a history of severe community violence from a high security forensic psychiatric unit.

Aims: Investigate differences in hippocampal, ventricular, thalamic, and amygdala volumes in violent SCZ, SCZ, and healthy controls (HC).

Methods: Structural 3T MRI scans were acquired of 47 subjects (violent SCZ n=11, mean age 33.2 years (SD 9.0), 91% male; SCZ n= 17, 34.3 years (7.4), 94% male; HC n=19, 33.2 years (9.1), 90% male). Violent offence included murder, attempted murder, or severe assault (with or without weapon) towards other people. The FreeSurfer 5.3.0 software was used to obtain subcortical brain volumes. Effects of age, sex, and intracranial volume were controlled for, and Bonferroni correction was applied.

Results: Violent SCZ had smaller right hippocampal volumes ($F(2,42)=4.11$, $p=.024$) compared to HC ($p_{adj}=.028$) and SCZ ($p_{nom}=.046$). On a trend level, violent SCZ had larger right lateral ventricles than HC ($p_{nom}=.032$) and SCZ ($p_{nom}=.049$), and smaller left hippocampus than HC ($p_{nom}=.027$). No differences in thalamus and amygdala volumes were found.

Conclusions: Violent SCZ may be associated with more pronounced brain abnormalities than non-violent SCZ. Future studies are needed to verify the observed abnormalities and determine the pathophysiological mechanisms and functional consequences.