

HIPPOCAMPAL SUBFIELD VOLUME ALTERATIONS IN SCHIZOPHRENIA: RELATIONSHIPS WITH SYMPTOM SEVERITY, VERBAL MEMORY PERFORMANCE AND OXIDATIVE STRESS**Muhammet Gündüz¹, Osman Özdel², Yaşar Enli³, Ergin Sağtaş⁴**¹*Psychiatry Clinic, Bolvadin State Hospital, Afyonkarahisar, Türkiye*²*Department of Psychiatry, Pamukkale University, Denizli, Türkiye*³*Department of Biochemistry, Pamukkale University, Denizli, Türkiye*⁴*Department of Radiology, Pamukkale University, Denizli, Türkiye*

BACKGROUND AND AIM: Hippocampal volume reduction is a well-documented phenomenon in schizophrenia. Multiple studies have shown the hippocampal subfield volume alterations. The hippocampus is one of the most vulnerable parts of the central nervous system to oxidative stress. This study investigates hippocampal subfield volume alterations in schizophrenia and their association with verbal memory performance, symptom severity, and oxidative stress markers.

METHODS: Using Magnetic Resonance Imaging and blood samples, 22 schizophrenia patients (first episode and chronic) and 22 healthy controls were assessed. The schizophrenia group was assessed using the Positive and Negative Syndrome Scale, the Clinical Global Impression Scale, and the Auditory Verbal Learning Test. (Ethics committee approval 7th April 2022 E-60116787-020-193267.)

RESULTS: All participants in schizophrenia group were taking antipsychotic medication and average duration of disease was 69 months. Bilateral hippocampal body volume was significantly decreased compared to healthy controls (right $f(1-41)=5,306$, $p=0,024$, left $f(1-41)=5,523$, $p=0,024$). Additionally, a significant decrease seen in several subfields; bilateral subiculum body (left: $f(1-41)=6,451$, $p=0,015$, right: $f(1-41)=4,378$,

$p=0,043$), right presubiculum (head $f(1-41)=4,322$, $p=0,044$, body $f(1-41)=5,563$, $p=0,023$), right CA1 head ($f(1-41)=4,387$, $p=0,042$), and right posterior molecular layer of hippocampal plate volumes ($f(1-41)=5,326$, $p=0,026$) in schizophrenia group. While the volumes of several subfields of the hippocampal body were reduced in the schizophrenia group, only the right CA1 and presubiculum was reduced in hippocampal head. Hippocampal volumes were negatively correlated with negative symptoms and positively correlated with memory performance.

In schizophrenia group 8-hydroxy-2-deoxyguanosine levels were negatively correlated with the volume of right subiculum-head. However, we did not find any further evidence supporting our hypothesis that proposed oxidative stress as a causal factor in hippocampal volume loss. Neurotrophin-4 levels showed negative correlations with specific hippocampal subfields in the schizophrenia group.

CONCLUSIONS: These findings suggest that hippocampal volume alterations in schizophrenia are heterogeneous along its longitudinal axis and are associated with negative symptoms and verbal memory performance.

Keywords: Hippocampal subfields, oxidative stress, schizophrenia