

VERBAL MEMORY LOSS AFTER ATL BASED ON DEGREE OF HIPPOCAMPAL SCLEROSIS

Risk to Verbal Memory After Anterior Temporal Lobectomy in Patients with Severe Left-Sided Hippocampal Sclerosis

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BACKGROUND: Previous investigations indicate low risk for memory loss after anterior temporal lobectomy (ATL) in patients with severe hippocampal sclerosis (HS) compared with patients with mild HS. However, these conclusions have been established primarily with group-level analyses.

PURPOSE: To investigate individual base rate risk for verbal memory loss after ATL in patients who have pathologically verified mild, moderate, or severe HS. **METHODS:** One hundred fifteen patients with unilateral temporal lobe epilepsy (68 with left-sided and 47 with right-sided epilepsy) were included. Acquisition, retrieval, and recognition components of verbal memory, as measured by the California Verbal Learning Test, were assessed before and after ATL. Postoperatively, the degree of neuronal loss and reactive gliosis of the hippocampus was assessed with a three-tiered rating system establishing mild, moderate, and severe pathologic features. Patients with preoperative magnetic resonance imaging–based evidence of lesions outside the mesial temporal area (side of surgical resection) were excluded.

RESULTS: Neither seizure laterality nor severity of HS was associated with preoperative verbal memory performance. Postoperatively, the left-sided ATL group demonstrated significant decline across the acquisition ($P < 0.01$), retrieval ($P < 0.001$), and recognition ($P < 0.001$) verbal memory components compared with the right-sided ATL group. Patients who underwent left-sided ATL and had mild HS displayed the largest magnitude and percentage proportion of postoperative decline across

all verbal memory components. However, 28 (48%) of the 58 patients who underwent left-sided ATL and who had moderate and severe HS displayed statistically reliable declines on retrieval aspects of verbal memory. Most patients undergoing right-sided ATL, regardless of the extent of hippocampal pathologic features, displayed no postoperative memory change.

CONCLUSIONS: Substantial individual heterogeneity of memory outcome exists across groups of patients undergoing ATL, with various degrees of pathologically verified HS. Patients undergoing left-sided ATL who have mild HS seem at greatest risk for broad-spectrum verbal memory decline. However, in examining outcome on a patient-by-patient basis, many patients undergoing left-sided ATL who have moderate to severe HS were also vulnerable to verbal memory loss. This risk seems selective to a retrieval-based aspect of verbal memory.

COMMENTARY

Martin et al. performed a careful study evaluating the degree of hippocampal sclerosis in surgical specimens and its association with change in verbal memory after standard anterior temporal lobectomy (ATL). Interestingly, subjects with pathologically proven “mild” hippocampal sclerosis as well as subjects with greater degrees of hippocampal sclerosis showed a decline in verbal memory scores, specifically in verbal retrieval as measured by the California Verbal Learning Test (CVLT).

Although the subjects with mild hippocampal sclerosis had a decline in all verbal memory scores on the CVLT, the risk of decline in verbal retrieval was high for all degrees of sclerosis. Older age at onset of epilepsy, among other factors, was mildly associated with verbal retrieval decline after left left-sided ATL. This suggests that the development of the epileptic process later in life is associated with less ability for reorganization of verbally mediated memory, irrespective of the severity of hippocampal sclerosis.



Although this study does not provide any new information to discuss with our prospective epilepsy surgery patients, because the overall groups had verbal decline similar to that in previous studies, evaluating the individual subject's verbal change after ATL in terms of degree of hippocampal sclerosis provides insight into the meaning and impact of hippocampal sclerosis on persons with epilepsy.

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