VERBAL MEMORY DECLINES ARE LARGEST FOR PATIENTS WITH DEPRESSION AND ANXIETY AFTER ANTERIOR TEMPORAL LOBECTOMY


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OBJECTIVE
To characterize the relationship between the presence of depression and/or anxiety and changes in memory function after anterior temporal lobectomy (ATL).

BACKGROUND
Depression and anxiety are the most common psychiatric disorders found in patients with temporal lobe epilepsy (TLE) before and after anterior temporal lobectomy (ATL) (Glosser et al., 2000; Jones et al., 2005). As Figure 1 demonstrates, severity of depressive symptoms is associated with level of memory impairment in TLE patients, especially for patients with a left-sided seizure focus (from Dudai et al., 2004).

RESULTS: Rates of Depression and Anxiety
Twenty-seven patients (48% of the sample) received recommendations for psychiatric treatment after surgery: 13 for possible mood disorders, 2 for anxiety disorders, and 12 for comorbid mood and anxiety disorders.

RESULTS (Figure 2)
Repeated measures ANOVA indicated that left-ATL patients with emotional disturbance had the largest verbal memory reductions from before to after surgery compared to all other groups (Tukey post-hoc p values < 0.01). There was also a drop in the number of words recalled by left-ATL patients without emotional disturbance, but the reductions were significantly greater for left-ATL patients with emotional disturbance.

RESULTS: Right-ATL
There was slight improvement in verbal recall ability for right-ATL patients after surgery regardless of psychiatric status (see Figure 2). There were no significant interactions or main effects for the nonverbal memory tasks.

APPARATUS, PROCEDURES & ANALYSES

PARTICIPANTS
◆ We studied 56 patients (ages 17-56 years) who underwent ATL for refractory epilepsy.
◆ Patient data were divided into four groups: left-ATL with (N=10) and without (N=13) emotional disturbance and right-ATL with (N=17) and without (N=16) emotional disturbance.
◆ Patients were included if their MMSE score was greater than 24 to ensure that memory deficits were not attributable to general cognitive impairment.

RESULTS: Pathology
Table 1 below shows that patients with classic Ammon’s Horn Sclerosis were more likely to have emotional disturbance compared to patients with ganglioglioma both before and after surgery.

Table 1. Secondary conditions divided by pathology before and after surgery

<table>
<thead>
<tr>
<th>Neuro-pathology</th>
<th>AHS</th>
<th>Atypical MTS</th>
<th>GG</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before Surgery</td>
<td>Memory impairment</td>
<td>61.9%</td>
<td>36.4%</td>
<td>41.7%</td>
</tr>
<tr>
<td>Emotional disturbance</td>
<td>61.8%</td>
<td>27.3%</td>
<td>16.7%*</td>
<td>75.0%</td>
</tr>
<tr>
<td>After Surgery</td>
<td>Good seizure outcome</td>
<td>87.3%</td>
<td>91.1%***</td>
<td>75.0%</td>
</tr>
<tr>
<td>Memory impairment</td>
<td>58.0%</td>
<td>81.8%</td>
<td>50.0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Emotional disturbance</td>
<td>51.2%</td>
<td>36.4%</td>
<td>16.7%*</td>
<td>58.3%</td>
</tr>
</tbody>
</table>

AHS ~ Ammon’s horn sclerosis; MTS ~ Mesial temporal sclerosis; GG ~ Ganglioglioma; *p < 0.05 compared to AHS after surgery; **p < 0.01 compared to AHS before surgery; ***p < .001 compared to AHS and GG after surgery.

Context for Our Findings
Interactive Model Between Mood Regulation and Outcome

| Functional Outcome (Perceived Health, Quality of Life, Work, Independence) |
|-----------------------------|-------------------|-------------------|-------------------|-------------------|
| Cognitive Factors           | Host Factors      | Social Factors    | Disease/Treatment Factors | CNS Factors |
| Memory                      | Age               | Support Network   | Duration           | Pathology         |
| Executive Function          | Gender            | Church            | Age-Opted          | Lability          |
| Attention                   | History of        | Normality         | Frig/Severity      | Neurotransmitter  |
| Language                    | Depression        | Coping            | Etiology           | Localization     |
| Cognitive and Motor Speed   | Cognitive level   | Substance Use     | Poly-pharmacy      | Surgery         |

SUMMARY & CONCLUSIONS
◆ Our results suggest that besides side of excision, the presence of depression and anxiety should be taken into account when evaluating verbal memory deficits after ATL.
◆ There was no relationship between emotional disturbance and nonverbal memory.
◆ The relationship between emotional disturbance and cognition is complex and requires further exploration.
◆ Questions remain regarding whether or not verbal memory deficits will improve after ATL if psychiatric symptoms are remediated with psychotherapeutic or psychopharmaceutical interventions.

REFERENCES

FIGURE 1: Association between depression and memory in chronic epilepsy

FIGURE 2: Association between depression and memory before and after ATL

Hence, our findings suggest that left-ATL patients who experienced emotional disturbance had the largest verbal memory declines from before to after surgery compared to all other groups. This correlation highlights the significant impact of emotional factors on cognitive performance in patients undergoing ATL.