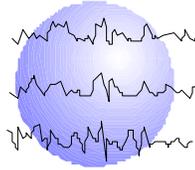


LANGUAGE OUTCOME AFTER SUBDURAL ELECTRODE ARRAY DIRECTED LEFT (DOMINANT) TEMPORAL LOBECTOMY

Sara J. Farnham, Ph.D.
Gail L. Risse, Ph.D.
D. Kent Mercer, Psy.D.
John R. Gates, M.D.



This paper has been prepared specifically for:

American Epilepsy Society Annual Meeting
Los Angeles, CA
December 1 – 6, 2000

Please consider this information to be preliminary findings.

Minnesota Epilepsy Group, P.A.[®]
225 Smith Avenue N., Suite 201
St. Paul, MN 55102
Phone: (651) 241-5290
Fax: (651) 241-5248

REVISED ABSTRACT

RATIONALE: While reports of aphasia following left temporal lobectomy (LTL) are rare, deterioration in confrontation naming performance and other subtle language functions are frequently described. We report language outcome in LTL patients who have undergone cortical language mapping with subdural electrode array (SEA).

METHODS: 39 adult patients underwent LTL guided by functional cortical mapping with SEA. All were confirmed left hemisphere dominant for speech and language by intracarotid amytal procedure (IAP). All underwent comprehensive pre- and postoperative neuropsychological assessment that included measures of language functions such as verbal processing, verbal fluency, confrontation naming and digit memory. Patients were divided into two groups according to proximity of resection to identified language cortex, and language outcome was compared (t-test).

RESULTS: Statistically significant differences in pre- to postoperative change scores on the Boston Naming Test (BNT) and WAIS-R/WAIS-III Vocabulary were observed ($p < .01$). In addition, clinically significant language decline did occur in some patients on measures of confrontation naming (32%), digit memory (19%), verbal fluency (12%), and other WAIS-R/WAIS-III subtests of verbal processing (12%). 74% of patients achieved Engel's Class I outcome. An additional 16% achieved Engel's Class II outcome for a total of 90% who were seizure free or nearly seizure free. Proximity of resection to language cortex did not result in significant differences in language outcome.

CONCLUSION: In 39 patients who underwent mapping of language areas prior to dominant LTL, post-operative language deficits were minimal while seizure outcome was optimal. Proximity of resection to language cortex did not affect language outcome.

Epilepsia 41(S7):156, 2000

INTRODUCTION

Many epilepsy patients whose seizure focus is within the dominant temporal lobe are at risk for language deficits following aggressive temporal lobectomy. In particular, postoperative declines in confrontation naming are reported¹. At our epilepsy center, we map language functions prior to resection, which allows for customized resection that minimizes postoperative language deficits while maximizing seizure outcome. This mapping is accomplished by testing for language function during stimulation studies using a subdural electrode array (SEA). Language functions assessed include automatic speech, confrontation naming, comprehension, repetition, and reading. The present study expands on a previous study which found minimal language deficits and optimal seizure outcome postoperatively in a group of 19 dominant LTL patients².

METHODS

Subjects: 39 patients with medically intractable seizure disorder who underwent LTL guided by functional cortical mapping with SEA.

Demographics:

- ◆ N = 39 (19 female and 20 male)
- ◆ Mean age = 31.73 (Range = 16 to 53)
- ◆ Mean age of seizure onset = 7 years
- ◆ Mean Wechsler VIQ = 91
- ◆ All LEFT hemisphere dominant by IAP (intracarotid amytal procedure)

Procedures: All subjects underwent pre- and postoperative neuropsychological testing that included comprehensive assessment of verbal processing. Postoperative follow-up occurred an average of eight months following surgery.

Measures:

- ◆ Wechsler Verbal subtests (WAIS-R/WAIS-III)
 Vocabulary, Similarities, Comprehension, Digit Span
- ◆ Controlled Oral Word Association
- ◆ Category Fluency (Animal Naming)
- ◆ Boston Naming Test
- ◆ Serial Digit Learning (supraspan)

Analysis of SEA Directed Resection: Thirty-five of the patients (90%) were divided into two groups based on proximity of resection to language cortex mapped with SEA. Data necessary for selection into one of the two groups was not available for four patients. The NEAR group (N=23) was characterized by resection ≤ 1 cm from primary language cortex. The FAR group (N=12) was characterized by resection > 1 cm from primary language cortex. Change in pre- to postoperative scores on language measures was analyzed using t-tests for independent samples.

RESULTS

Statistically significant differences in mean pre- to postoperative change scores were found for the Boston Naming Test (BNT) and the Vocabulary subtest of the WAIS-R/WAIS-III ($p < .01$; Figures 1a and 1b). However, significant variability was associated with these group differences. In addition, a limited number of individual patients evidenced clinically significant declines in confrontation naming (BNT), phonemic word fluency (COWA), category fluency (Animal Naming), digit memory (Serial Digit Learning) and verbal processing measures from the WAIS-R/WAIS-III (see Figure 2). Seizure outcome as measured by Engel's classification was excellent in the vast majority of cases (see Table 1). Between the NEAR and FAR resection groups, there were no significantly different pre- to postoperative change scores on any verbal processing measure (see Figures 3a and 3b). Therefore, proximity of resection to focal language cortex is not necessarily related to these relatively nonspecific language changes, when they occur.

CONCLUSIONS

- ❖ Post-operative language deficits following dominant TL directed by cortical mapping with SEA are minimal.
- ❖ Excellent seizure outcome in the vast majority of cases argues for the utility of dominant TL guided by cortical mapping with SEA.
- ❖ Proximity of resection to functional language cortex did not significantly affect outcome on language measures, suggesting that cortical mapping with SEA prior to dominant TL is effective in sparing critical functional cortex.

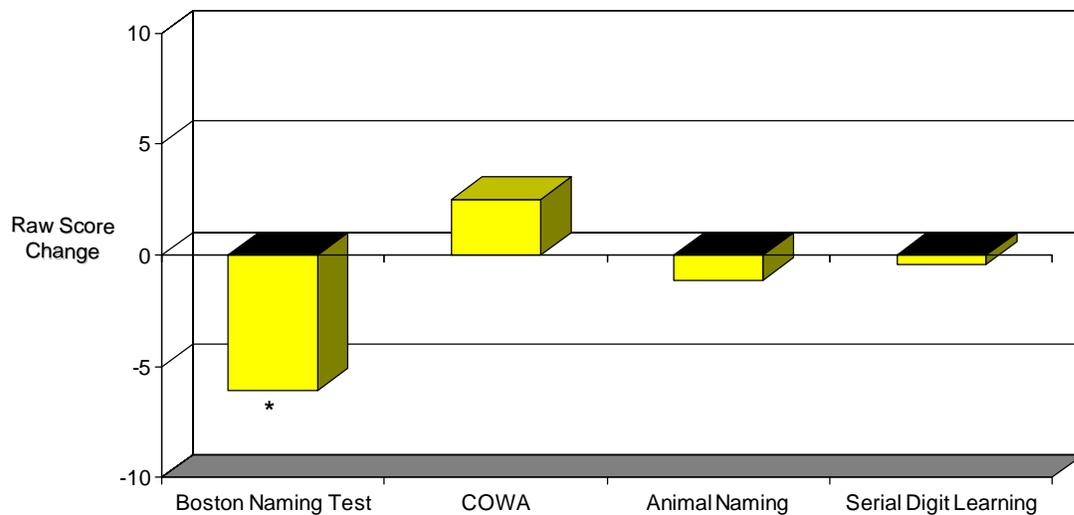
REFERENCES

1. Hermann BP, Wyler AR, Somes G, Clement L. Dysnomia after left anterior temporal lobectomy without functional mapping: frequency and correlation. *Neurosurgery*, 35:52-57, 1994.
2. Mercer DK, Risse GL, Gates JR, Fangman MA. Language outcome after surgical electrode array directed dominant temporal lobectomy. *Epilepsia*, 36(S4):146, 1995.

Table 1 SEIZURE OUTCOME*		
Engel's Classification	N	%ile
I	28	74%
II	6	16%
III	2	5%
IV	2	5%

*N=38: Data unavailable for one patient.

Figure 1a PRE- TO POSTOPERATIVE DIFFERENCE SCORES ON LANGUAGE MEASURES



* p < .01

Figure 1b PRE- TO POSTOPERATIVE DIFFERENCE SCORES ON LANGUAGE MEASURES

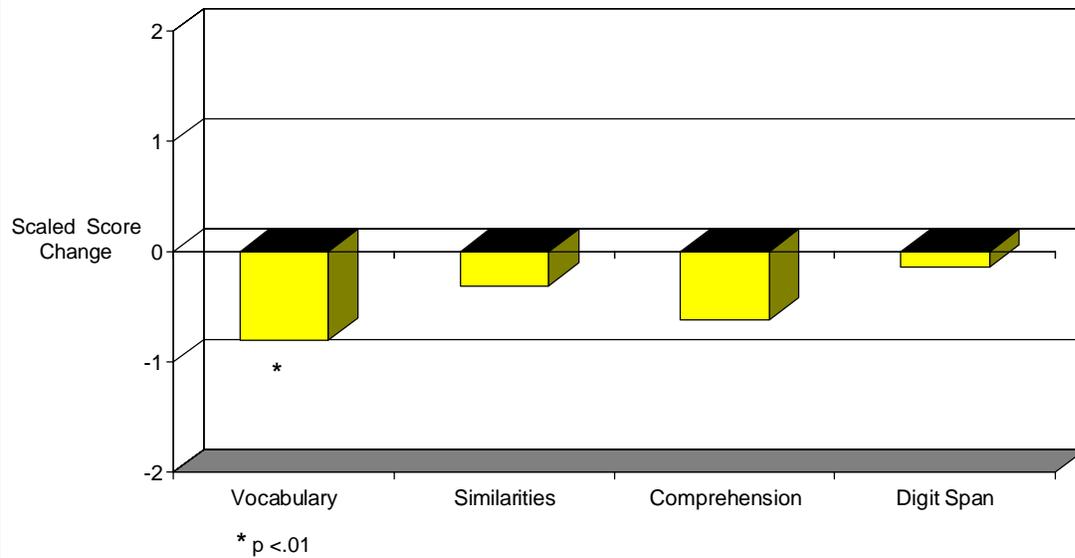


Figure 2 CLINICALLY SIGNIFICANT POSTOPERATIVE DECLINE

