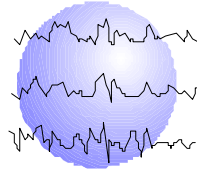


NEUROPSYCHOLOGICAL OUTCOME IN MULTIPLE SUBPIAL TRANSECTION

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Please consider this information to be preliminary findings.

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REVISED ABSTRACT

RATIONALE:

This study sought to determine cognitive outcome in a sample of medically intractable epilepsy patients who underwent either left frontal topectomy (LFT) or left temporal lobectomy (LTL) in combination with multiple subpial transection (LMST). Postsurgical neuropsychological (NP) performance was compared to a sample of patients who underwent focal resective surgery alone (LF/LT). The objective of this study was to assess the cognitive risk of MST to cortical speech areas.

METHODS:

The sample consisted of 12 patients who underwent either LFT (n = 9) or LTL (n = 3) and MST of speech and in some case, motor areas as determined by intraoperative mapping. The control sample consisted of eight patients who had only LFT (n = 5) or LTL (n = 3). All patients in this study were left speech dominant as determined by Wada procedure. Demographic, seizure, medical, and surgical data were retrospectively collected for both the presurgical and postsurgical periods. The two groups were compared on both verbal and nonverbal measures of NP function. Descriptive, parametric, and nonparametric statistical analyses were utilized to assess group differences and NP outcome following surgery.

RESULTS:

There were no significant differences between the two groups in terms of gender, age of seizure onset, age at surgery, education, number of presurgical and postsurgical antiepileptic drugs, postsurgical interval, and presurgical and postsurgical seizure frequency. Ninety percent or greater improvement in postsurgical seizure control was achieved by 67% and 78% of the LMST and LF/LT groups, respectively. Presurgical neuropsychological performance was comparable between the two groups save for the MST group performing significantly worse on measures of general intellectual function and visuoconstruction ability. Postsurgical NP outcome for the MST group revealed moderate to substantial (7-27%) declines on measures of verbal fluency ($p < .05$), verbal reasoning, and vocabulary. All other measures of verbal and nonverbal cognitive function showed either no change or modest improvements. In contrast, the LF/LT group demonstrated no change or improved performance on all verbal and nonverbal cognitive measures. On postsurgical neurologic exam, 67% of the MST group showed clinical language deficits.

CONCLUSION:

These preliminary data support previous findings of adverse cognitive risk, especially to language, associated with MST plus additional resective surgery to the frontal or temporal lobe of the speech-dominant hemisphere. These findings should be considered when counseling patients regarding postoperative risk. There is a need to extend and replicate this study with a larger series of patients.

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BACKGROUND

- The utilization of multiple subpial transection (MST) to treat seizures has become more widespread
- MST extends the effective focal resection when eloquent functional cortex is thought to be involved
- MST provides presumably less risk to speech or motor function although Devinsky et al. (1997) showed that MST of language cortex is variably associated with language disorders

OBJECTIVE

- Compare neuropsychological outcome in patients who underwent focal cortical resection (either frontal or temporal) plus multiple subpial transection (LMST) to patients with focal resection only (LF/LT)

DESIGNS/METHODS

- All patients were evaluated and treated by the Minnesota Epilepsy Group, P.A., at United Hospital, St. Paul, MN
- All patients were left speech dominant by Wada procedure
- All MST cases included transection of speech areas as determined by functional cortical mapping with indwelling electrodes
- data collected retrospectively
- Descriptive, parametric, and nonparametric statistical analyses were utilized

CONCLUSIONS

- 67% of patients who undergo focal resective surgery plus MST obtain 90% or greater improvement in seizure control
- The LMST group demonstrated post-surgical losses as compared to the LF/LT group for only language-based tasks
- 67% of the LMST showed functional language impairments on post-surgical neurologic exam
- These findings are preliminary but supportive of previous research
- Presurgical discussion of cognitive risk is indicated for patients undergoing MST of presumed language areas

REFERENCES

- Devinsky, O., Perrine, K., Pacia, S., Vazquez, B., Buchwald, J. & Luciano, D.J. (1997). Multiple subpial transection in language cortex: Effects on language functions. Journal of Epilepsy, 10, 247-253.

Table 1.

Demographic and Seizure Variables

	LMST	LF/LT
n	12	9
Education	10.4	13.1
Age of Seizure Onset	9.4	8.7
Presurgical Seizure Freq. (/Month)	28.6 (43.4)	20.3 (29.5)
Age at Surgery	31.8	29.2
Gender (% Male)	67%	67%
Left Speech Dom. by Wada	100%	100%
No. of Postsurgical AEDs	2.5	2.1
Follow-up Interval (Months)	10.3	9.9
Postsurgical Seizure Freq. (/Month)	2.7 (5.1)	.54(1.0)
Postsurgical Seizure Free Rate (%)	42%	22%

* All comparisons are n.s.

Figure 1. > 90% Improvement in Postoperative Seizure Frequency

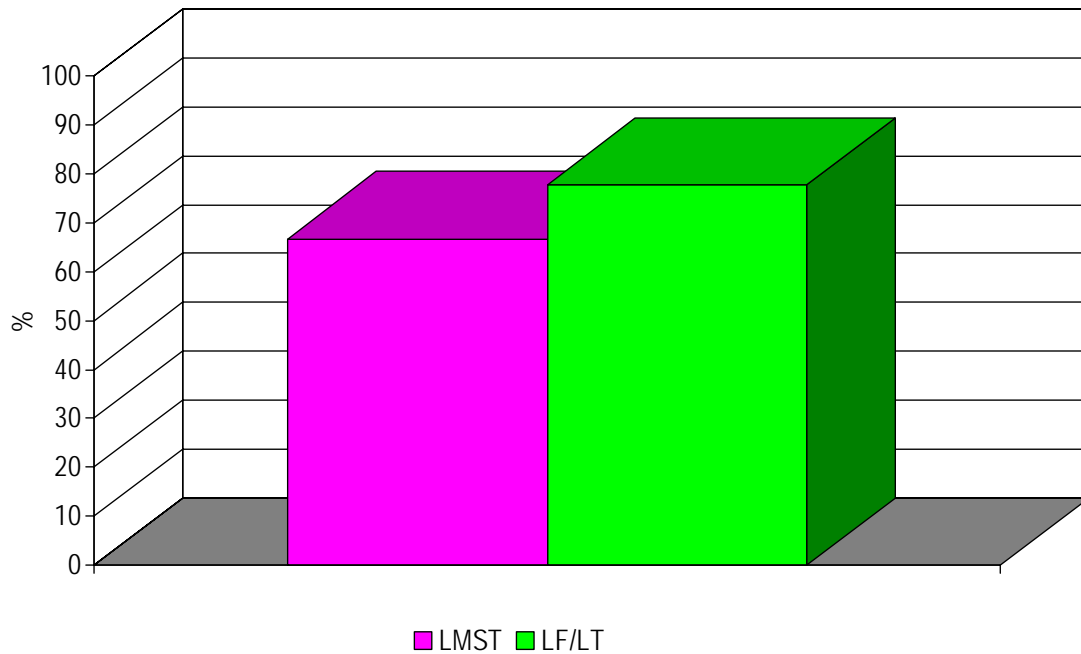


Figure 2.

Presurgical Cognitive Performance

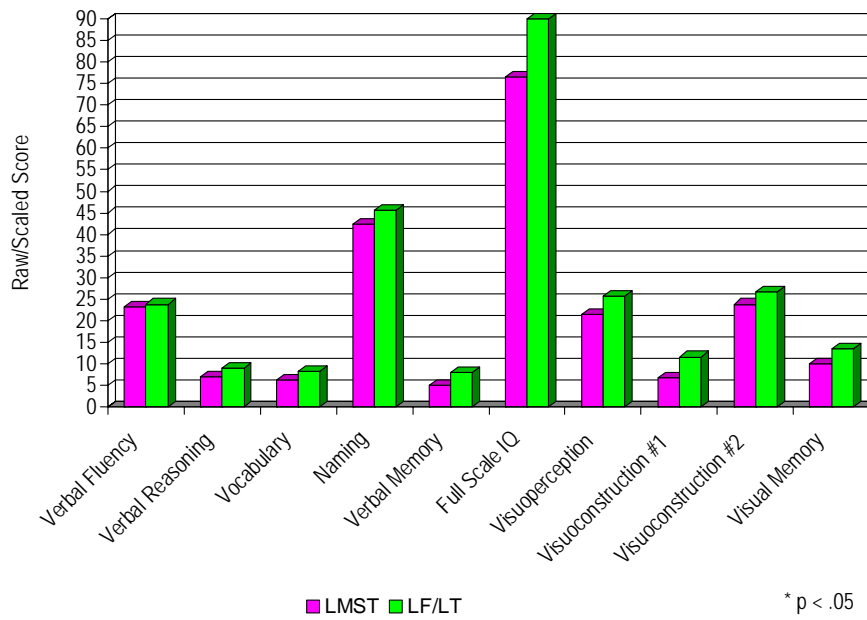
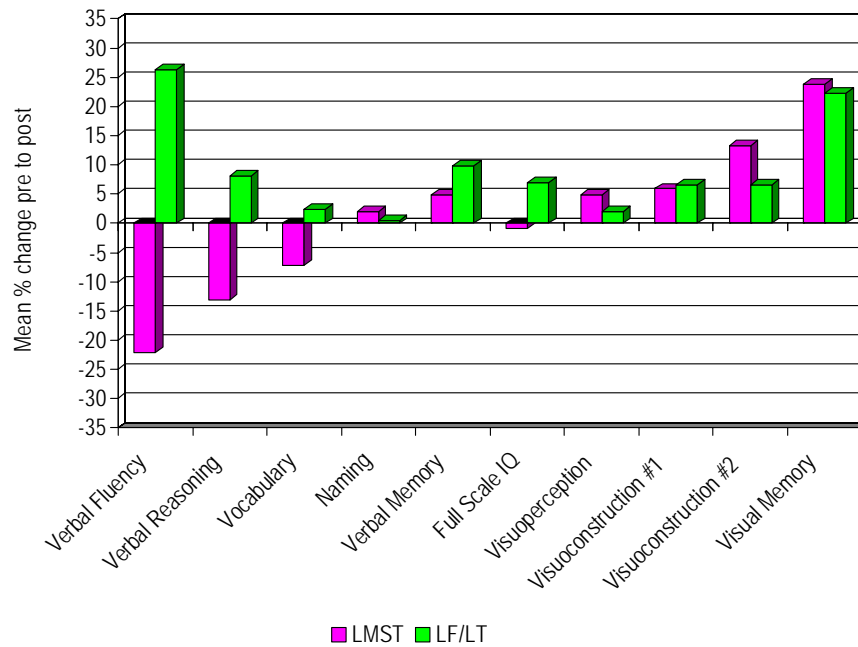
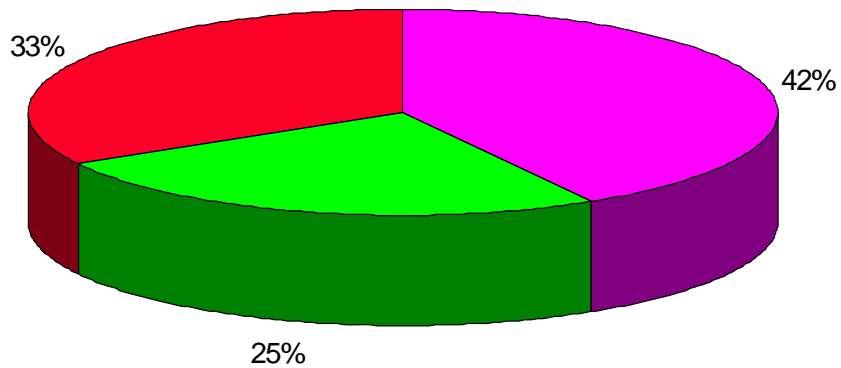


Figure 3.

Postsurgical Cognitive Performance



**Postsurgical Speech/Language Status on Neurologic Exam
for the LMST Group (N = 12)**



■ Persistent Language Deficit

■ Transient Language Deficit

■ No Language Deficit