INTRODUCTION

The minimally conscious state (MCS) is characterized by reliable but inconsistent behavioral evidence of self or environmental awareness. Recent studies show that time in MCS is not well-correlated with functional recovery (cf. Lammi et al. 2005). Very late recoveries from MCS, though rare, are documented.

Goals of the study

The study is limited by artifact in many leads not allowing analysis. Power spectra were computed using the method of averaging over individual tapered spectral estimates, where

\[ \hat{S}(\omega) = \frac{1}{N} \sum_{i=1}^{N} \hat{S}(\omega)_i \]

The coherence spectrum, \( \xi \), is obtained from the power spectra and coherence estimates. The power percent variance (VPV) is defined as

\[ \text{VPV} = \frac{\sum_{i=1}^{N} S(\omega)_i}{\sum_{i=1}^{N} \hat{S}(\omega)} \]

Power and coherence spectra were computed using the same method, but with different parameters. Power spectra and coherence estimates shown on the poster (see Thomson and Chave 1991).

METHODS

EEG Power and Coherence Spectra and fMRI during silence and while listening to narrative played forward and time-reversed

ACKNOWLEDGEMENTS

REFERENCES

SUMMARY AND CONCLUSIONS

We used EEG power spectra and coherence analysis of neighboring and remote electrophysiologic rhythms to study the brain of a patient who emerged from a 19 year minimally conscious state after traumatic brain injury, and compared the results to the patients fMRI and anatomical MRI data as well as a normal control. EEG was recorded while subjects listened to a spoken narrative played forward and in time reverse as well as during silence.

1. The patient has similar amplitudes of coherence as a normal subject (average 0.7). This is despite the fact that the injury the patient underwent resulting in loss of much of his motor and sensory function.

2. During the listening tasks, the patient's power spectrum of his temporal lobe EEG has suppression of activity in the low frequencies but increase in the higher frequencies. These findings seem to correlate with increased activity in these regions in the patients on the patient's MRI.

3. In the normal subject's frontal lobe there is increased coherence during silence compared to low frequency activity may reflect decreased activity in that region. This could not be confirmed in the normal due to artifact though a similar finding is seen in the interparietal lobe coherence.

These findings may be representing processing of language stimuli and reflect return of full consciousness.

The study is limited by artifact in many leads not allowing analysis of the patients' frontal and normal's occipital and many temporal leads. If these findings can be replicated in other subjects it may be useful to some degree in determining disorders of consciousness to determine patients level of consciousness and help predict recovery. EEG analysis has the benefit of being able to be recorded at the patient's bedside, and for use in the field of time in different states, and allows for study of cortical connectivity.

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