

Characterization of Baseline EEG Abnormalities in the Brain Injury and Mechanisms of Action of Hyperbaric Oxygen (HBO₂) for Persistent Post-Concussive Symptoms after Mild Traumatic Brain Injury (mTBI) Study (BIMA)

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EEG Methods in BIMA

- Clinical EEG assessed by 3 neurologists inspecting for both ictal and interictal epileptiform abnormalities, background periodic discharges, localized and generalized slow wave activity.
- Concomitant medication use recorded at baseline and before EEG was performed
- Any antidepressants were continued while narcotics and benzodiazepines were recommended to be withheld the day of the EEG

Current Objectives

- There exists scant literature about EEG findings in this particular population
- Focus placed on determining abnormalities based on clinical read of EEG data
- Of interest are the baseline distributions of:
 - Ictal and interictal epileptiform abnormalities
 - Background periodic discharges
 - Localized and generalized slowing
- Compare those with EEG abnormalities to those without to determine if covariates influenced abnormalities

EEG Summaries

At baseline, of the 60 participants with completed EEG reads:

- No interictal epileptiform abnormalities
- No ictal abnormalities
- No periodic discharges
- 38% (N = 22) participants displayed slowing of mild severity
 - 1 localized slowing only
 - 19 generalized slowing
 - 2 both localized and generalized slowing

EEG Abnormalities by Medication Use

Medication Usage		Presence of Any Abnormalities			
		No		Yes	
Narcotics	No	28	(65)	15	(35)
	Yes	10	(59)	7	(41)
Antidepressants	No	19	(70)	8	(30)
	Yes	19	(58)	14	(42)
Antiepileptics	No	34	(64)	19	(36)
	Yes	4	(57)	3	(43)
Sedatives	No	25	(64)	14	(36)
	Yes	13	(62)	8	(38)
Stimulants	No	38	(66)	20	(34)
	Yes	0	(0)	2	(100)

Displayed in each cell: N (row %).

Generalized Slowing by Medication Use

Medication Usage		Presence of Slowing			
		No		Yes	
Narcotics	No	28	(65)	15	(35)
	Yes	11	(65)	6	(35)
Antidepressants	No	19	(70)	8	(30)
	Yes	20	(61)	13	(39)
Antiepileptics	No	35	(66)	18	(34)
	Yes	4	(57)	3	(43)
Sedatives	No	26	(67)	13	(33)
	Yes	13	(62)	8	(38)
Stimulants	No	38	(66)	20	(34)
	Yes	1	(50)	1	(50)

Displayed in each cell: *N* (row %).

Medication Usage on the day of EEG Scan

On the day of the EEG :

- No sedative or barbiturate use was reported
- Three participants reported use of narcotics, two of which displayed generalized slowing
- Five participants reported use of antidepressants, none of which displayed abnormalities
- Three participants reported use of antiepileptics, one of which displayed generalized slowing
- One participants reported use of stimulants, and displayed generalized slowing

Discussion

- In this study of participants with sequelae following mTBI, the clinical EEG interpretation was abnormal in 38%
- Most common abnormality was generalized slowing (35%)
- The use of concomitant antidepressants and chronic narcotics or sedatives did not seem to influence these results
- Hence, generalized slowing may be due to mTBI-related brain injury