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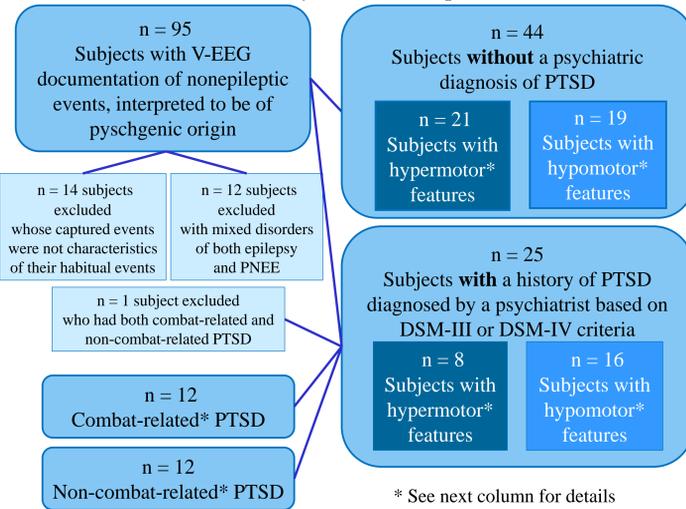
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Background

- Psychogenic nonepileptic events (PNEE) are episodes of altered motor, sensory, and mental function that are not associated with abnormal electrical discharges in the brain.
- The clinical features of PNEE can vary among different patients and a firm diagnosis can only be made by Video-EEG (VEEG) monitoring.
- Various psychiatric disorders can contribute to PNEE, such as conversion disorders, dissociative disorders, depression, and anxiety disorders including posttraumatic stress disorder (PTSD).
- There are limited data regarding the association of PTSD, or the nature of trauma leading up to PTSD, with any particular PNEE phenomenology.
- We hypothesize that among PTSD patients with PNEE, the nature of the traumatic experience has an effect on the clinical manifestations of PNEE. Our study aims to examine whether PTSD and its subtypes, combat-related versus non-combat-related, may be preferentially associated with distinctive PNEE semiology.

Methods

- We reviewed the medical records of patients admitted to the epilepsy monitoring unit (EMU) of the Michael E. DeBakey VA Medical Center from January 1, 2000 to April 14, 2009.



- *Combat-related PTSD: Subjects with traumatic experiences related to US military combat operations or from training exercises for such operations.
- *Non-combat-related PTSD: Subjects whose PTSD were related to traumatic experiences outside of military operations, e.g physical or sexual abuses (including those occurring in both civilian and military service settings).
- *Hyper-motor features: characterized by violent and disorganized movements of the extremities, pelvic thrusting, head movements, or posturing mannerisms.
- *Hypo-motor features: characterized by altered responsiveness associated with mild motor or trembling-like activities, unifocal negative symptoms, or diffuse absence of any motor phenomena

Results

Demographics

	PNEE with PTSD (n=24)			p-value between CR and NCR groups	PNEE without PTSD (n=40)
	Total (n=24)	CR (n=12)	NCR (n=12)		
Mean age (SD)	46.8 (11.6)	53.7 (8.2)	39.8 (10.6)	0.004	43.3 (10.5)
Gender					
Male	17 (70.8)	12 (100%)	5 (41.7%)		27 (67.5%)
Female	7 (29.2)	0	7 (58.3%)	0.002	13 (32.5%)
Mean number of years of symptoms before diagnosis (SD)	11.3 (11.8)	17.2 (13.8)	5.4 (5.0)	0.043	11.0 (10.6)
Mean number of years of trauma to onset of symptoms (SD)	18.1 (13.7)	14.3 (12.6)	21.9 (14.2)	0.26	Not applicable
Marital status					
Married	18 (75%)	11 (91.7%)	7 (58.3%)		23 (57.5%)
Single (including divorced or widowed)	6 (25%)	1 (8.3%)	5 (41.7%)	0.155	17 (42.5%)
History of substance abuse	6 (25%)	2 (16.7%)	4 (33.3%)	0.64	9 (22.5%)
History of psychiatric disorder other than PTSD	11 (45.8%)	4 (33.3%)	7 (58.3%)	0.414	26 (68.4%)
Mean percentage of service connected disability related to seizures (SD)	1.67 (8.3)	3.3 (11.5)	0 (0)	0.75	10.7 (24.1)
History of AED use	18 (75%)	9 (75%)	9 (75%)	0.68	19 (47.5%)

SD = Standard Deviation; CR = Combat-related; NCR = Non-combat-related; AED = Anti-epileptic drug

Comparison of PNEE semiology between subjects with and without PTSD

	With PTSD	Without PTSD
Hyper-motor PNEE	8 (33.3%)	21 (52.5%)
Hypo-motor PNEE	16 (66.7%)	19 (47.5%)
Total	24	40

p=0.195

Comparison of PNEE semiology between combat-related and non-combat-related PTSD

	Combat-related PTSD	Non-combat-related PTSD
Hyper-motor PNEE	1(8.3%)	7(58.3%)
Hypo-motor PNEE	11(91.7%)	5(41.7%)
Total	12	12

p=0.0127

- Comparison of semiologic features between subjects with PTSD versus subjects without PTSD revealed no statistically significant difference between these two groups (p = 0.195). Further examination of PTSD subgroup with combat-related PTSD revealed that 91.7% (n=11) manifested hypo-motor features, while 8.3% (n=1) showed hyper-motor features.
- In the non-combat-related subgroup, hypo-motor features were observed in 41.7% (n=5) and hyper-motor features in 58.3% (n=7). Statistical comparison showed a significant association (p=0.027) of hypo-motor PNEE features with the combat-related PTSD subgroup.
- Upon examination of other potential confounders between combat-related and non-combat-related PTSD subgroups (including the mean percentage of service connected disability related to “seizures”, history of psychiatric disorder other than PTSD, marital status, history of substance abuse, and history of anti-epileptic drug use), we found no significant differences.
- There was statistically significant difference (p=0.015) when we compared the mean interval from onset of symptoms to time of PNEE diagnosis between the combat-related PTSD subgroup (17.2 years) versus the non-combat related PTSD subgroup (5.4 years). The mean time of PNEE onset was the year 1988 (+/- 13.5 SD) for the combat-related PTSD subgroup, and the year 2000 (+/- 5.6 SD) for the non-combat related.

Discussion

- PNEE subjects with combat-related PTSD showed significant predilection for hypo-motor PNEE as their most predominant event type.
- All 12 subjects with combat-related PTSD were male. However, when we examined the effect of gender on PNEE characteristics among the noncombat-related PTSD (5 males, 7 females) and the non-PTSD group (27 males, 13 females), we did not uncover any significant association of gender with any particular PNEE semiology (p=0.072 and p=0.511, respectively).
- Our combat-related PTSD subgroup consisted primarily of combat-exposed Vietnam veterans, and the mean age for this subgroup was expectantly older than the non-combat-related PTSD subgroup. When we examined the non-PTSD group by comparing the mean age with PNEE semiology, we found no statistical association (p=0.607).

- Another observation is that the duration of symptoms before definitive PNEE diagnosis was on average 3 times longer in the combat-related PTSD subjects compared to non-combat-related PTSD. This may in part be contributed by the significantly lengthier period from PNEE onset to the availability of V-EEG technology for the combat-related PTSD subgroup. Our VA medical center established V-EEG capability in 1999.
- Another contributing explanation maybe that the frequently subtle, hypo-motor PNEE symptoms of the combat-related PTSD subjects can be easily overlooked or erringly attributed to other psychological ailments. On the other hand, the higher prevalence of hyper-motor PNEE features in the non-combat related PTSD subjects readily alarm the subjects’ families and doctors to pursue aggressive work-ups.
- The underlying mechanisms to explain the association of combat-related PTSD with predominantly hypo-motor PNEE semiology is less clear.
- We hypothesize that traumatic experiences from combat operations are unique in the following ways:
 - The traumas are the result of direct lethal intent, whereupon the primary goal is almost always to inflict fatal injury.
 - In in some cases, the victim of combat trauma may also be the perpetrator of trauma himself.

- Because combat-related traumatic experiences are so uniquely onerous, we postulate that these subjects’ PNEE “hypo-motor” expressions may represent dissociative states driven by a mutual underlying defense mechanism – to allow for “numbing” or “escape” from a distressful reality marred by traumatic combat experiences.
- On the other hand, the non-combat-related PTSD group represents a wider spectrum of underlying psychodynamics. It is perhaps not surprising for this group to also manifest with wider range of PNEE semiologies, including fulminate “hyper-motor” somatic expressions as the means to release psychosocial distress or fulfill ulterior subconscious gains.
- Timely diagnosis of PNEE can be especially relevant to veterans with combat-related PTSD, whose PNEE manifestations may be subtle, easily overlooked, or misdiagnosed. Early recognition of PNEE is also highly important as longer duration of undiagnosed PNEE has been known to be associated with poorer outcome.