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Understanding the Impact of Complicated Grief on Combat Related Posttraumatic Stress Disorder, Guilt, Suicide and Functional Impairment in a Clinical Trial of Post-9/11 Service Members and Veterans

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Abstract

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Background: Complicated Grief (CG) is a bereavement-specific syndrome distinct from but commonly comorbid with posttraumatic stress disorder (PTSD). While bereavement is common among military personnel (Simon et al., 2018), there is little research on the impact of CG comorbidity on PTSD treatment outcomes.

Methods: To evaluate the impact of comorbid CG on PTSD treatment outcomes we analyzed data from a randomized trial comparing prolonged exposure (PE), sertraline, and their combination in veterans with a primary diagnosis of combat-related PTSD (n=194). Assessment of PTSD, trauma-related guilt, functional impairment, and suicidal ideation and behavior occurred at baseline and weeks 6, 12 and 24 during the 24-week trial.

Results: CG was associated with lower PTSD treatment response (OR=0.29, 95% CI [0.12, 0.69], p=0.005) and remission (OR=0.28, 95% CI [0.11, 0.71], *p*=0.007). Those with CG had greater severity of PTSD (p=.005) and trauma-related guilt (<.001) at baseline and endpoint. In addition, those with CG were more likely to experience suicidal ideation during the study (CG: 35%, 14/40 vs. no CG 15%, 20/130; OR: 3.01, 95% CI [1.29, 7.02], *p*=0.011).

Conclusions: Comorbid CG is associated with elevated PTSD severity and independently associated with poorer endpoint treatment outcomes in veterans with combat-related PTSD, suggesting that screening and additional intervention for CG may be needed.

Loss of a close attachment is among life's greatest stressors (Holmes & Rahe, 1967). Although the distress and disruption of grief subsides over time for most bereaved adults, approximately 10% experience a prolonged, impairing grief reaction (Lundorff et al., 2017). This grief-related condition was included in the ICD-11 (World Health Organization, 2018) and provisionally in the DSM-5 (American Psychiatric Association, 2013) with different names. Consistent with our prior work and that of many others (e.g., Horowitz et al., 1997; Shear et al., 2011; Simon et al., 2018), we will refer to this syndrome as Complicated Grief (CG). Although precise diagnostic criteria are still being refined (Mauro et al., 2017; Reynolds, Cozza, & Shear, 2017; Prigerson & Maciejewski, 2017), there is broad agreement that core CG symptoms include intense yearning for the deceased, emotional pain, and preoccupation with thoughts about the death or the deceased (Simon et al., 2011; Prigerson et al., 2009; World Health Organization, 2018; American Psychiatric Association, 2013). Individuals with CG may also experience difficulty accepting the death or planning for the future, role and identity confusion, feeling life is unbearable without the deceased, avoidance of reminders of the loss, and in some cases a wish to die to join the deceased (Mauro et al., 2016; Simon et al., 2011).

CG is conceptualized as persistent symptoms of both traumatic distress and separation distress due to the loss of an important attachment (Shear et al., 2011; Simon et al., 2011). Notably, attachment related CG symptoms, such as yearning, are not observed in other disorders that may follow bereavement, such as posttraumatic stress disorder (PTSD) or major depressive disorder (MDD), supporting its designation as a distinct post-loss condition (e.g., Boelen & van den Bout, 2005; Maercker & Lalor, 2012; Simon, 2012). Nonetheless,

CG often co-occurs with mood, anxiety, and trauma related disorders such as PTSD, and the presence of comorbidity is associated with greater CG severity and greater functional impairment (Marques et al., 2013; Simon et al., 2007; Sung et al, 2011; Kristensen et al., 2015). CG also shares features with other stressor-related conditions (e.g., PTSD and depression), including emotional distress, avoidance, and guilt (Li et al, 2018; American Psychiatric Association, 2013).

CG comorbidity with PTSD may be especially relevant for military personnel, given the high risk for exposure to traumatic events as well as significant, sudden, and violent losses (e.g., Wisco et al., 2014; Toblin et al., 2012). A recent study in a military mental health clinic found 43.5% of outpatients were impacted by a significant loss, nearly half (46.1%) of whom exhibited clinically significant CG symptoms (Delaney et al., 2017). Losses during deployment, especially the loss of a fellow service member (FSM), were associated with greater CG symptom severity than other types of losses. Similarly, in a large sample of post-9/11 treatment-seeking veterans, over 80% reported a significant loss and 30% exhibited clinically significant CG symptoms (Charney et al., 2018). In this sample, CG was associated with more severe PTSD and reduced quality of life. Previous studies of veterans suggest that guilt may play a particularly important role when there is a loss of a FSM, in part due to the nature of the special bonds formed within military units as well as the potential responsibility for decisions that can result in death in combat settings (Lee, Scragg, & Turner, 2001; Litz et al., 2009; Nazarov et al., 2015). Guilt has also been clearly associated with CG, including feelings of responsibility for the death, guilt about one's behavior towards the deceased in life, or the very fact of living when the deceased person is not (survivor guilt; e.g., see Li et al., 2018).

Our research group recently reported primary results of a randomized controlled trial comparing prolonged exposure (PE), sertraline, and their combination for combat-related PTSD in a large sample of post 9/11 veterans (Rauch, Simon, et al., 2018; Rauch, Kim, et al., 2018). Although participants in all three treatment arms improved significantly, no significant difference in PTSD symptom change by treatment assignment was found (Rauch, Kim, et al., 2018). The correlates of CG comorbidity were examined in this study sample at baseline (Simon et al., 2018). Most participants (79%) reported a significant death, and 31% exhibited clinically significant CG symptoms. Notably, those who had lost a FSM (47%) exhibited a significantly higher rate of CG (41%) than those reporting other losses (17%), suggesting this type of loss may be particularly challenging for service members and veterans. CG was associated with greater functional impairment, trauma-related guilt, and lifetime suicide attempts. These data are consistent with prior research supporting an association of CG with functional impairment independent of other disorders including PTSD (e.g., Kristensen et al., 2015; Marques et al., 2013). Similarly, suicidal thoughts have been commonly reported in treatment seeking CG samples (Shear et al., 2014; Shear et al., 2016) and in prospective CG research. This includes a study demonstrating an 8-fold risk of high suicidal ideation and behaviors even after controlling for depression and PTSD (Latham & Prigerson, 2004). Given the high prevalence and burden of comorbid CG and PTSD, screening for loss and CG is recommended in military mental health settings, but is not yet routinely implemented (Delaney et al., 2017). This could be, in part, due to our limited understanding of the impact of CG on PTSD outcomes. To our knowledge, no study

has examined the impact of comorbid CG symptoms on PTSD treatment outcomes in individuals receiving PE or an antidepressant such as sertraline, both recommended evidence-based treatments for PTSD (e.g., Management of Posttraumatic Stress Disorder Work Group, 2017; American Psychological Association, 2017). Such examination is particularly relevant to military populations, as comorbid PTSD and CG are common and impairing.

The present study thus aimed to examine the impact of co-occurring CG on PTSD treatment outcomes in a sample of post 9/11 veterans with a primary diagnosis of combat-related PTSD. The study data were collected as part of a larger comparative effectiveness trial comparing the efficacy of PE, sertraline, versus their combination in the treatment of PTSD for this population (Rauch, Simon, et al., 2018), and builds upon the baseline findings reported recently by Simon and colleagues (2018). We hypothesized that comorbid CG would be associated with poorer outcomes as indicated by (a) higher PTSD symptoms, trauma-related guilt, suicidal ideation, and functional impairment at post-treatment, (b) lower PTSD response rate, and (c) lower PTSD remission rates than those without CG, even after adjusting for baseline differences in PTSD symptom severity. We further hypothesized that this impact on treatment outcomes would be especially present among those reporting the death of a fellow service member.

Methods:

Participants:

This study was a planned secondary analysis of a multicenter clinical trial funded by the Department of Defense (W81XWH-11-1-0073). Procedures were approved by site IRBs and DOD Human Research Protection Office (HRPO), and registered at ClinicalTrials.gov (NCT01524133). All participants were randomized to one of three active evidence-based PTSD treatment arms: PE + pill placebo, sertraline (an FDA approved serotonin selective reuptake inhibitor) + an enhanced medication management (EMM) protocol administered by the pharmacotherapist, or PE + sertraline. Detailed methods and primary results have been published (Rauch, Simon, et al., 2018; Rauch, Kim, et al., 2018). Briefly, participants were 223 veterans or service members with a primary diagnosis of combat- related PTSD who served in Iraq/Afghanistan wars in the United States military, and 149 completed the 24-week study. The primary modified intent-to-treat analyses examined the 207 randomized participants who received the study pills at least once. Our final sample consisted of the subset of the modified intent-to-treat sample who completed a loss cover sheet (indicating the presence or absence of a loss at baseline) and the *Inventory of Complicated Grief* (ICG; Prigerson et al., 1995: n=194); thirteen subjects (6%) were excluded for non-completion.

Measures:

The primary outcome measure was the *Clinician-Administered PTSD Scale (CAPS) for DSM-IV* (Blake et al., 1995), with diagnosis based on a score of 50 or higher and PTSD present for at least 3 months. The CAPS is commonly used to assess PTSD intensity, frequency, and severity (Blake et al., 1995; Weathers, F.W., Keane, T.M., & Davidson, 2001). It has a total score range from 0 to 272, where higher scores indicate more severe

PTSD symptoms. CAPS were administered by raters certified by the standard process of the National Center for PTSD. PTSD treatment response was defined as 50% CAPS reduction, and remission was defined as CAPS of 35 or less; all definitions were based on week 24 or last observed CAPS up to week 24. Comorbid depression was assessed with the *MINI International Neuropsychiatric Interview (MINI)* for DSM-IV version 5.0 (Sheehan et al., 1998).

Grief symptoms were measured using the *Inventory of Complicated Grief (ICG)* (Prigerson et al., 1995), a 19-item self-report form with each item rated from 0 (not at all) to 4 (always) that has a total score range of 0 to 76, where higher scores indicate greater symptom severity. The ICG was completed only if the participant selected yes to the cover sheet question "*Have you had an important person in your life pass away?*" The cover sheet included questions about the relation of important lifetime losses (including spouse, parent, child, sibling, grandparent, grandchild, other relative, significant other, partner, fiancé, friend, fellow service member, or other), as well as which death was the most distressing. The ICG was completed in relation to this loss. Threshold CG was defined as an ICG score of 30 or higher (Prigerson et al., 1995) at baseline. The term "CG" is used to represent threshold CG symptoms throughout this paper.

Three additional measures were examined at baseline and endpoint in relation to threshold CG. The *Trauma-Related Guilt Inventory (TRGI)*, a 32-item (each ranging from 0 to 4, where higher scores indicate greater symptom severity) questionnaire measuring cognitive and emotional aspects of guilt associated with the traumatic event (Kubany et al., 1996), is comprised of three factors: Global Guilt, Distress, and Guilt Cognitions. The *Inventory of Functional Impairment (IFI)* is an 80-item assessment of functional impairment related to PTSD in seven domains (romantic relationships, family relationships, work, friendships and socializing, parenting, education, and self-care) rated from 0–100%, with higher scores representing greater impairment (Rodriguez, Holowka, & Marx, 2012). Finally, the clinician-rated *Columbia Suicide Severity Rating Scale (C-SSRS)*, a standardized 8-point rating assessing a wide spectrum of suicidal ideation (SI) and behaviors (Posner et al., 2008; Posner et al., 2011), was used to assess SI and behaviors. We examined two C-SSRS outcomes during treatment: any SI following baseline (n=170 with post-baseline assessments) and worse SI compared to past-month history at baseline (i.e., new SI or SI worse than baseline; n=163 with baseline and at least one post-baseline assessment).

Statistical Analyses:

All models were run in SAS version 9.4 for Windows. For categorical outcomes (i.e., treatment response, remission, any and worse SI during treatment), we used logistic regressions with CG at baseline as the main predictor of interest. For continuous outcomes measured over time (i.e., CAPS, TRGI sub-scales, IFI), we used repeated measures mixed models with treatment, time (categorical; baseline, weeks 6, 12, and 24), CG at baseline (yes vs. no), and the interactions of time by treatment and time by CG as predictors. Time was modeled as a repeated measure within participant, using an unstructured covariance matrix to account for the different variances at each visit and different time-steps between visits. Consistent with the primary trial outcome paper (Rauch, Kim, et al., 2018), all models were

adjusted for site and sex, and all models, except for the longitudinal CAPS model, were also adjusted for baseline CAPS. The longitudinal CAPS model retained baseline values as outcomes and allowed groups to differ at baseline. We used specific contrasts to test whether the between CG-group differences observed at baseline changed at week 24 (end-of-treatment). Means for longitudinal outcomes are presented as model-adjusted least-squares means (LSM) with 95% confidence intervals, and significance was evaluated with 2-sided tests using α=0.05. Effect sizes (*d*) between groups were based on LSM differences divided by the pooled standard deviation of available scores at each time point. In a follow-up model, we split the CG group into those who had indicated their most distressing loss was a fellow service member (n=25) versus those who indicated some other loss (n=21) as most distressing, to examine the effect of type of loss on CAPS treatment outcome. Because there were no significant differences between treatment groups for overall PTSD outcomes (Rauch, Kim, et al., 2018) and power was limited, we did not plan significance testing of differential CG effects on PTSD outcomes by treatment type.

Results:

CG was present for 24% (46/194) of participants. The CG sample had a mean ICG (M±SD) of 40.9±9.0. The non-CG sample (148/194) included subjects reporting a loss but no CG (n=108: mean ICG=16.6±8.1) plus those without a reported loss (n=40). Table 1 describes demographics and baseline clinical symptom severity. There was some missing data for select baseline characteristics reported in Table 1: race and ethnicity (no-CG=2, CG=0), marital status (no-CG=2, CG=0), service capacity (no-CG=1, CG=0), number of deployments (no-CG=3, CG=0), service-connected disability (no-CG=1, CG=0), lifetime suicidality (no-CG=6, CG=1), and past month suicidality (no-CG=7, CG=1). Demographics and military service factors did not differ by presence of CG, with the exception of ethnicity; Hispanic participants had a lower proportion of CG (Table 1). The time since the primary loss was 12 or more months prior to baseline in 83% of both the CG and non-CG groups. Loss of a FSM was reported as the primary most distressing loss by 56% (25/46) of those with CG, compared to only 27% (29/108) of those with a loss but no CG. Consistent with our prior baseline report from this study (Simon et al., 2018), baseline CG was associated with greater PTSD severity (CAPS), as well as greater trauma-related guilt (three TRGI sub-scales) and functional impairment (Table 2). Suicidal ideation and behavior did not vary by CG at baseline (Table 1).

PTSD Response and Remission

CG was associated with lower odds of achieving PTSD treatment response (adjusted odds ratio (AOR)=0.29, 95% CI [0.12, 0.69], p=0.005) or remission (AOR=0.28, 95% CI [0.11, 0.71], *p*=0.007) by week 24 (end-of-treatment; see Figure 1), after adjusting for site, sex, and baseline CAPS. Response rates for those with comorbid CG compared to no-CG were respectively: 7% (1/15) vs. 33% (16/49) for PE + placebo, 27% (4/15) vs. 47% (25/53) for sertraline + EMM, and 19% (3/16) vs. 46% (21/46) for PE + sertraline.

Symptom Change and Endpoint Severity with PTSD Treatment

The greater symptom severity associated with CG at baseline persisted at treatment endpoint for CAPS severity (p=0.003, d=0.57), TRGI global guilt (p<0.001, d=0.75), TRGI distress (p=0.025, d=0.43), and TRGI guilt cognitions (p=0.004, d=0.53). Functional impairment with CG was greater at baseline (p=0.033, d=0.35), but not at end-of-treatment (p=0.324, d=0.18). CG was not associated with a significant difference in the amount of change in CAPS (see Figure 2a), TRGI subscales, or IFI over the 24 weeks (Table 2).

Suicidal Ideation and CG

There were no baseline differences in lifetime or past month suicidal ideation (SI) between groups (Table 1). Participants with CG were more likely to experience some level of SI during the 24 weeks of the study (OR: 3.01, 95%CI [1.29, 7.02], p=0.011). There were no differences in the odds of experiencing worse SI during the treatment period relative to the month prior to treatment (26% (10/39) vs. 12% (15/124); OR: 2.54, 95%CI [0.99, 6.51], p=0.053). Suicidal behavior during treatment was rare (3%) in both groups.

Impact of Loss of a Fellow Service Member

In order to examine the association of CG with PTSD symptom severity in greater detail, we split the sample of participants with CG into those who had CG due to the loss of a FSM (CG-FSM) and those who had CG due to non-FSM losses (CG non-FSM). In contrast to our hypotheses, the CG-FSM sub-sample was more similar to the no-CG sample in terms of baseline PTSD symptom severity and symptom change throughout treatment than the CG non-FSM sub-sample (Figure 2b). This appeared to be explained by a greater baseline PTSD symptom severity in the CG non-FSM sub-sample than the no-CG sample (p=0.004, d=0.69), which persisted throughout treatment. Baseline PTSD symptom severity in the CG-FSM sub-sample (CAPS: LSM=62.6, 95%CI [54.8, 70.5]) was intermediate between the no-CG sample (LSM=56.0, 95% CI [52.1, 60.0]) and the CG non-FSM sub-sample (LSM=74.4, 95%CI [65.5, 83.4]), but did not differ significantly from either (CG-FSM vs. no-CG: p=0.157, d=0.30; CG-FSM vs. CG non-FSM: p=0.214, d=−0.36). We similarly found no difference in the change in PTSD symptoms between the CG-FSM sub-sample and the no-CG sample (interaction contrast: p=0.553; end-of-treatment difference: p=0.203, d=0.29); by contrast, the CG non-FSM sub-sample exhibited a significantly smaller reduction in PTSD symptoms than the no-CG sample (interaction contrast: p=0.023; end-of-treatment difference: p=0.001, d=1.01).

Discussion:

This is the first study to examine the impact of co-occurring complicated grief on PTSD outcomes in those receiving evidence-based PTSD treatment with sertraline, PE, or their combination. As hypothesized, CG was associated with significantly lower odds of PTSD treatment response and remission, after adjustment for baseline PTSD severity (CAPS score) and other covariates. This appeared to be due to those with CG having more severe PTSD at baseline. Thus, while participants with PTSD and comorbid CG had a comparable magnitude of reduction in PTSD symptoms across treatment during the trial, a higher percentage of those with CG nonetheless remained above the threshold for PTSD response

or remission at study endpoint. Consistent with this, the CG group had greater post-treatment PTSD symptom severity and greater trauma-related guilt relative to those without CG at endpoint. Further suggesting comorbid CG is a marker of greater severity, those with CG were also more likely to experience suicidal ideation during PTSD treatment compared to those without CG; however, this represented persistence, not worsening, of SI in the CG group. Given these findings, it is unclear why CG was not associated with greater endpoint residual functional impairment.

The current sample comprises a post-9/11 combat trauma sample and as such, these findings should be considered in the context of prior military grief research. For example, a study of Vietnam veterans with chronic PTSD suggested that grief is often unaddressed and can persist for over 30 years after a combat loss at levels similar to spousal loss (Pivar & Field, 2004). Papa, Neria and Litz (2008) have noted that grief symptoms do not fit in the prevailing fear conditioning models of PTSD, and that combat losses in particular may activate survivor guilt and contribute to suicide risk.

In contrast to our hypotheses and prior reports of the impact of military losses, we found some evidence that CG due to losses that were not a FSM may be associated with even greater PTSD severity and be more likely to impair PTSD treatment response as measured both by the severity of PTSD symptoms at endpoint and the amount of change in CAPS (see Figure 2b). In other words, while our data cannot address this directly, CG due to non-FSM losses could be acting more similarly to a comorbid condition in worsening PTSD severity. Additional research is needed to understand how this may occur, including the effect of non-FSM losses on social support and coping with combat related traumas. The higher rate of PTSD symptom change during treatment seen in veterans with CG due to FSM losses relative to those with CG due to non-FSM losses may be due to a greater overlap between FSM losses and the primary combat trauma (which patients were directly addressing in PTSD treatment). . In other words, the effects of therapy based on the index combat trauma may not generalize as well to non-FSM bereavement. Although our sample sizes are too low to perform additional analyses by treatment type, future studies should carefully assess if these potential explanations may be at play for those in PE specifically. Those with additional non-military losses and associated CG symptoms distinct from their index trauma may need additional intervention to achieve optimal PTSD responses. Importantly, our findings do not suggest that the loss of a FSM is not impactful; in contrast, our prior work demonstrated that those with PTSD and the loss of a FSM have higher CG symptom severity and are more likely to cross the symptom threshold for CG than those bereaved due to other causes (Charney et al., 2018; Simon et al., 2018).

It is worth noting that there was a high rate of comorbid major depressive disorder (MDD) in this population overall, and even higher (75%) in the CG comorbidity group (Table 1). This is consistent with prior research suggesting that after traumatic loss there may be a subgroup of individuals who have high levels of psychiatric comorbidity and associated distress (e.g., Heeke et al., 2017; Simon et al., 2007). Future studies should examine the effects of comorbid CG with or without MDD on PTSD as well as on CG treatment outcomes. Additional research on how to optimally treat comorbid CG, PTSD and MDD after loss and combat trauma is needed. For example, the psychotherapy complicated grief treatment

(CGT) has good efficacy for CG despite the high co-occurrence of CG with PTSD and MDD (Shear et al., 2016), but its impact on combat PTSD with comorbid CG is unknown. Overall, more research is needed to understand the optimal treatment approaches for enhancing PTSD outcomes in the presence of CG comorbidity, including whether additional evidence-based treatments for grief (e.g., Shear et al., 2005; Shear at al., 2016; Boelen et al., 2007; Bryant et al., 2014) or other combined approaches for comorbidity (e.g., Smid and colleagues, 2015) may be needed in addition to trauma focused work (Papa, Neria & Litz, 2008).

Limitations

Our study has some limitations. The presence of CG was based solely on self-report, using an ICG score of 30 or higher; this is the most conservative threshold commonly associated with clinical significance though lower thresholds have also been used (Kersting et al., 2011; Kersting et al., 2009; Ott, 2003; Prigerson et al., 2009; Simon et al., 2007; Arizmendi, Kaszniak, & O'Connor, 2016; American Psychological Association, 2018). In addition, because CG was not the primary focus of the parent trial, we do not have detailed information regarding the nature of the death (e.g., suicide, combat) or its possible relation to the key traumatic event reported by participants. We also lack sufficient data to report the effect of PTSD treatments on CG symptom change or its correlation with PTSD treatment response. Further, 17% of primary losses reported occurred less than 12 months prior to baseline, suggesting there could be some participants with grief persisting less than 6 months. Future studies should more closely examine the time course of effects and whether time since loss and nature of the death differentially predict PTSD outcomes.

Of interest, while there was some suggestion that there may be differences in the impact of comorbid CG on PTSD outcomes by type of treatment, we were underpowered to test this possibility. Finally, all participants were presenting with a chief complaint of PTSD, not grief related distress; these data do not address how to best treat veterans and service members with primary CG.

Conclusions

Complicated grief commonly occurs in service members and veterans with combat related PTSD. Our data showed lower response and remission rates in those with comorbid CG relative to those without comorbid CG. In the parent trial, participants in all three treatment arms improved significantly and no significant difference in PTSD symptom change was found by treatment (Rauch, Kim, et al., 2018). Although our study was not designed to test for differential treatment outcomes by CG, our data suggest lower response and remission rates for all three treatments in those with comorbid CG vs. without comorbid CG. Currently, CG is not routinely screened in military treatment settings. Our findings add to the growing evidence that such screening may be warranted (e.g., Currier & Holland, 2012; Toblin et al., 2012; Papa, Neria & Litz, 2008) along with additional research on how to optimally treat PTSD with CG comorbidity.

Acknowledgements:

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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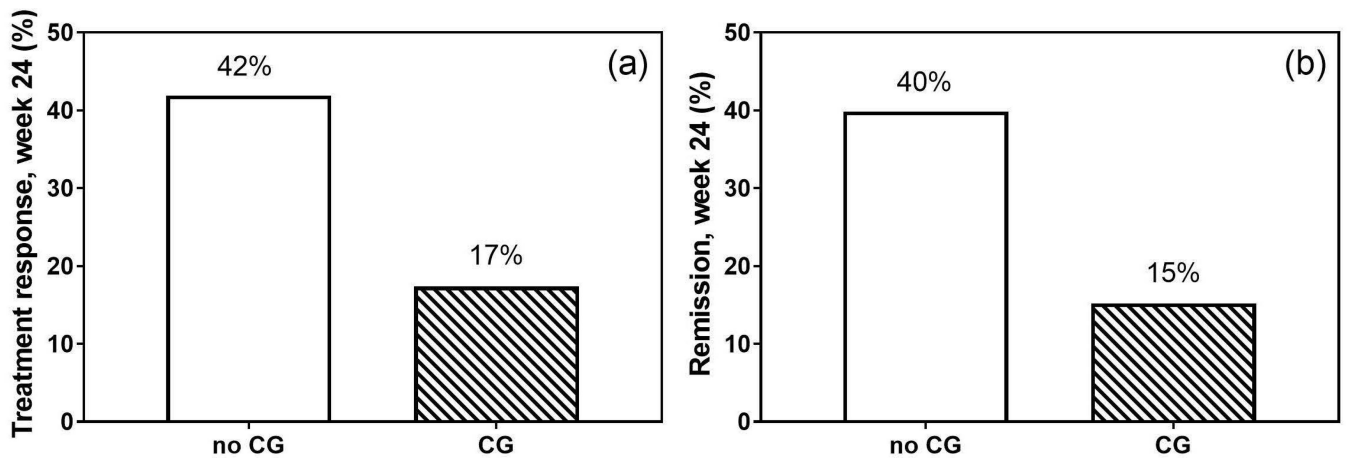
Figure 1.
Association between baseline comorbid complicated grief and treatment response (panel a) and PTSD remission (panel b) in post-9/11 combat veterans at the end of 24 weeks of treatment for PTSD.
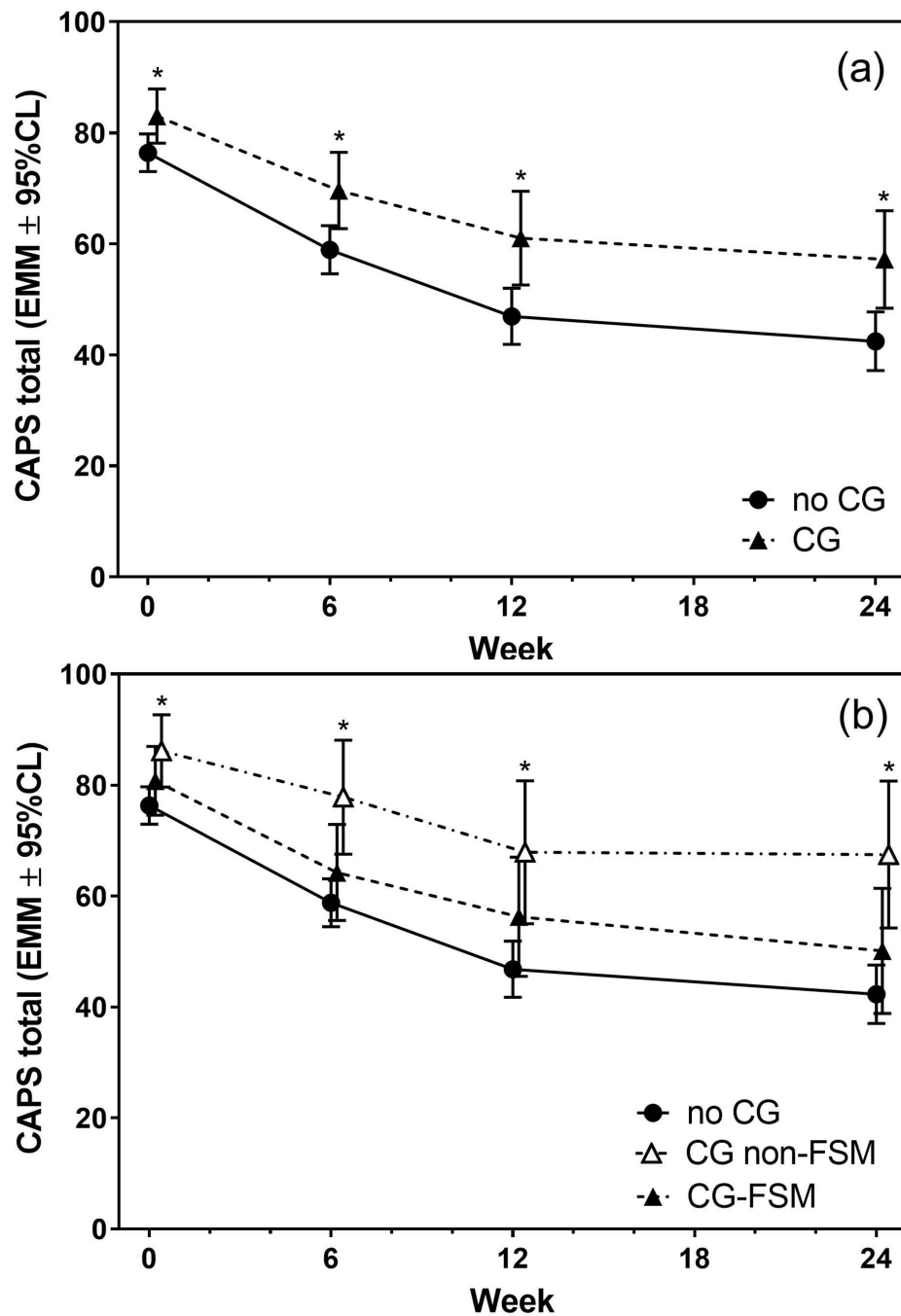
Figure 2.
Association of baseline comorbid CG with PTSD symptom severity over time in post-9/11 combat veterans in treatment for PTSD. In panel (a), all veterans with CG are combined. In panel (b), veterans with CG are split into those who indicated that their most distressing loss involved a fellow service member (CG-FSM) and those whose most distressing loss was not a fellow service member (CG non-FSM). Data points for CG groups are nudged to show the

confidence intervals more clearly, and stars above the upper confidence limits indicate group differences from that group to the non-CG group (p<.05).

Table 1.

Baseline characteristics of treatment seeking post-9/11 combat veterans with and without comorbid complicated grief.

Outcomes	No CG (n=148)		CG (n=46)		$p<.05$ [†]
	M/%	(SD/N)	M/%	(SD/N)	
Demographics					
Age, years, M (SD)	34.6	(8.7)	34	(7.4)	
Male Gender, % (n)	87	(128)	89	(41)	
Race, % (n)					
White	61	(89)	52	(24)	
Black	27	(39)	37	(17)	
Other	12	(18)	11	(5)	
Hispanic, % (n)	19	(28)	4	(2)	*
High school or less, % (n)	36	(53)	37	(17)	
Marital status, % (n)					
Single, Never Married	22	(33)	24	(11)	
Married, remarried	52	(76)	54	(25)	
Separated, divorced	26	(38)	22	(10)	
Widowed	0	(0)	0	(0)	
Employment, % (n)					
Full-time	46	(68)	61	(28)	
Part-time	12	(18)	11	(5)	
None	42	(62)	28	(13)	
Service and disability					
Service capacity, most recent, % (n)					
Regular Armed Forces	86	(127)	89	(41)	
Reserve Unit	3	(4)	4	(2)	
National Guard	11	(16)	7	(3)	
Number of Deployments, M (SD)	2.6	(2.8)	2.5	(1.7)	
Any Disability, % (n)	58	(86)	48	(22)	
Service connected disability for PTSD, % (n)	18	(27)	24	(11)	
Clinical symptoms					
Comorbid MDD, % (n)	66	(98)	78	(36)	
Most distressing loss was a FSM, % (n) [‡]	27	(29)	56	(25)	***
ICG total score, M(SD) [‡]	16.6	(8.1)	40.9	(9.0)	***
Suicidality					
Any suicidal ideation, lifetime, % (n)	39	(56)	53	(24)	
Any suicidal ideation, past month, % (n)	13	(18)	22	(10)	
Any suicidal behavior, lifetime, % (n)	10	(14)	13	(6)	
Any suicidal behavior, past 3 months, % (n)	1	(2)	0	(0)	

Note:

†
where

*
p<.05,

**
p<.01,

***
p<.001;

‡loss type and ICG totals in the no-CG group are based only on those who were bereaved and completed the ICG (n=108). MDD = major depressive disorder; FSM = fellow service-member; ICG = Inventory of Complicated grief; CAPS = Clinician-Administered PTSD Scale for DSM-IV; TRGI = Trauma-Related Guilt Inventory (all sub-scales are reported as mean scores); IFI = Inventory of Functional Impairment.

Table 2.

Estimated (Least Square) Means (LSM) of PTSD symptom severity, trauma-related guilt severity, and functional impairment at baseline and end-of-treatment (week 24) in post-9/11 combat veterans with and without comorbid complicated grief (CG).

Outcome	week	no CG		CG		Pair-wise $p<.05$	SD_{pooled}	d	interaction contrast p
		LSM	95% CL	LSM	95% CL				
CAPS total scores	0	76.4	[73.0, 79.8]	83.0	[37.2, 47.7]	0.005	14.0	0.47	0.079
	24	42.4	[78.1, 87.9]	57.2	[48.4, 66.0]	0.003	25.8	0.57	
TRGI global guilt	0	1.44	[1.17, 1.71]	2.34	[1.94, 2.74]	<.001	1.16	0.78	0.632
	24	0.84	[0.58, 1.10]	1.64	[1.24, 2.04]	<.001	1.07	0.75	
TRGI distress	0	2.39	[2.21, 2.57]	2.92	[1.63, 2.05]	<.001	0.80	0.67	0.495
	24	1.84	[2.65, 3.19]	2.24	[1.90, 2.58]	0.025	0.94	0.43	
TRGI guilt cog.	0	0.78	[0.61, 0.94]	1.22	[0.98, 1.46]	<.001	0.68	0.65	0.566
	24	0.59	[0.42, 0.76]	0.96	[0.70, 1.22]	0.004	0.70	0.53	
IFI total scores	0	40.3	[37.3, 43.4]	45.3	[40.7, 49.9]	0.033	14.3	0.35	0.417
	24	34.9	[31.5, 38.2]	37.5	[32.2, 42.8]	0.324	15.0	0.18	

Note: Estimated marginal means were adjusted for treatment type, site, gender, and (for all models except CAPS total scores) CAPS baseline scores in maximum-likelihood mixed models. The effect size d is based on LSM differences divided by the raw pooled standard deviation (SD_{pooled}).

The interaction contrast tests whether the no CG vs. CG group difference observed at baseline significantly differs from that at end of treatment (week 24).